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Effects of Agricultural Conservation Practices on Fish and Wildlife

A Conservation Effects Assessment Project (CEAP) Bibliography

Effects of Agricultural Conservation Practices on Fish and Wildlife

A Conservation Effects Assessment Project (CEAP) Bibliography

Special Reference Briefs Series no. SRB 2008-01

Volume 7a

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Water Quality Information Center
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Abstract

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This bibliography, in two volumes, is part of a multi-volume set developed by the Water Quality Information Center at the National Agricultural Library in support of the U.S. Department of Agriculture's Conservation Effects Assessment Project (CEAP). The bibliography is a guide to recent scientific literature covering effects of agricultural conservation practices on fish and wildlife. The citations listed here provide information on how conservation programs and practices designed to improve fish and wildlife habitat, as well as those intended for other purposes, e.g., water quality improvement, affect various aquatic and terrestrial fauna.

Keywords: aquatic habitat, aquatic organisms, biodiversity, conservation buffers, conservation practices, conservation programs, ecology, ecosystem management, fish, habitat conservation, habitat fragmentation, natural resource management, wild animals, wildlife, wildlife habitats, wildlife management.

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Preface

This bibliography, in two volumes, is part of a series of bibliographies developed by the Water Quality Information Center at the National Agricultural Library (NAL) in support of the U.S. Department of Agriculture's Conservation Effects Assessment Project (CEAP).

The purpose of CEAP is to study the environmental effects of conservation practices implemented through various U.S. Department of Agriculture conservation programs. A national assessment covers cropland, wetlands, wildlife and grazing lands. Conservation practices being assessed include conservation buffers; erosion control; wetlands conservation and restoration; establishment of wildlife habitat; and management of grazing land, tillage, irrigation water, nutrients, and pests. More information about this and other components of CEAP is available at www.nrcs.usda.gov/technical/nri/ceap/.

The current titles in this series are

- *Environmental Effects of U.S. Department of Agriculture Conservation Programs*
  Special Reference Brief 2004-01
- *Implementing Agricultural Conservation Practices: Barriers and Incentives*
  Special Reference Brief 2004-02
- *Data and Modeling for Environmental Credit Trading*
  Special Reference Brief 2004-03
- *Agricultural Conservation Practices and Related Issues: Reviews of the State of the Art and Research Needs*
  Special Reference Brief 2004-04
- *Wetlands in Agricultural Landscapes*
  Special Reference Brief 2006-01
- *Environmental Effects of Conservation Practices on Grazing Lands*
  Special Reference Brief 2006-02
- *Effects of Agricultural Conservation Practices on Fish and Wildlife*
  Special Reference Brief 2008-01 (in two volumes)

Each of the documents, as well as bibliographies on similar topics, is accessible online from the NAL Water Quality Information Center at www.nal.usda.gov/wqic/.

Acknowledgments

The center gratefully acknowledges these organizations who granted permission to use their citations and abstracts.

- American Geological Institute
  www.agiweb.org
- CABI
  www.cabi.org
- Cambridge Information Group/ProQuest
  www.csa.com
- Elsevier/Scopus
  www.scopus.com
- National Information Services Corporation (NISC)
  www.nisc.com
- Thomson Reuters Scientific
  scientific.thomson.com

The following databases were used to develop this bibliography:

- **AGRICOLA** (National Agricultural Library)
- **Aquatic Science and Fisheries Abstracts** (ProQuest)
- **BioOne** (ProQuest)
- **Biological Sciences** (ProQuest)
- **BIOSIS Previews** (Thomson Reuters Scientific)
- **CAB Abstracts** (CABI)
- **Current Contents** (Thomson Reuters Scientific)
- **Conference Papers Index** (ProQuest)
- **Entomology Abstracts** (ProQuest)
- **Fish and Fisheries Worldwide** (NISC)
- **GeoRef** (American Geological Institute)
- **NTIS** (National Technical Information Service)
- **Scopus** (Elsevier)
- **Treesearch** (USDA Forest Service)
- **Water Resources Abstracts** (ProQuest)
- **Web of Science** (Thomson Reuters Scientific)
- **Wildlife and Ecology Studies Worldwide** (NISC)
- **Zoological Record** (Thomson Reuters Scientific)

In addition, support from the Natural Resources Conservation Service (NRCS) for the development of this bibliography is greatly appreciated. Special thanks to Charles Rewa, NRCS, for his valuable assistance.

About This Bibliography

This bibliography is a guide to recent scientific literature covering effects of agricultural conservation practices on fish and wildlife. The citations listed here provide information on how conservation programs and practices designed to improve fish and wildlife habitat, as well as those intended for other purposes, e.g., water quality improvement, affect various aquatic and terrestrial fauna.

Citations are broadly grouped into two volumes of the bibliography, 7a and 7b. Volume 7a covers the terrestrial habitats of cropland (including set-aside lands, buffers, strip habitats), grazing lands (including some riparian areas) and forests. Volume 7b covers aquatic habitats in sections focused on lotic habitats (streams, rivers) and lentic habitats (estuaries, lakes, ponds, wetlands). This volume also contains a third grouping of citations covering mixed habitats, which may be mixed terrestrial and/or aquatic habitats.

There are 2,285 citations with abstracts (when available) in this bibliography. Citations were found through literature searches of the AGRICOLA database, produced by the National Agricultural Library, and several commercial bibliographic databases listed on page two. The literature searches focused on documents published during the years 2000 through 2007. Relevant citations from the previous six CEAP bibliographies are also included. Many of these citations are from documents published before 2000. The geographical coverage is North America.

In addition, Water Quality Information Center staff created citations for documents that were located by other means. If they were readily available to the compilers, URLs are provided for online documents. The inclusion or omission of a particular citation does not imply endorsement or disapproval.

Within sections, citations are arranged alphabetically by title. To locate information on a specific topic, for example, “ring-necked pheasant,” use the subject index beginning on page 273 of volume 7b. To ensure that you see all the relevant citations for a particular topic, be sure to also look up related terms in the subject index, such as “*Phasianus colchicus*” or “gamebird” from this example. An author index is also available beginning on page 341.

To obtain a specific document, please contact your local library. Information on how to obtain documents from the National Agricultural Library can be found at www.nal.usda.gov/services/request.shtml.

Terrestrial Habitats
Cropland

1. **Agricultural buffers and wildlife conservation: A summary about linear practices.**
Clark, William R. and Reeder, Kathleen F.
In: Fish and Wildlife Response to Farm Bill Conservation Practices; Bethesda, MD: The Wildlife Society, 2007.
ftp://ftp-fc.sc.egov.usda.gov/NHQ/nri/ceap/fwfb4.pdf
Descriptors: agricultural buffers/ conservation practices/ terrestrial habitat/ wildlife species/ wildlife management
Abstract: Conservation practices such as filter strips, grassed waterways, buffers, contour strips, riparian buffers, windbreaks and shelterbelts are eligible under a variety of USDA programs. Most were originally designed to provide benefits regarding reduced soil erosion and improved water quality. Most often grasses, or mixtures of grasses and forbs, are used in these practices, although establishment of trees and shrubs is encouraged in some practices. The small area and high edge-area ratios limit the usefulness of these practices for wildlife. Scientific evidence suggests that enrolling land in linear practices has accumulated in recent years, although most studies still focus heavily on benefits to birds and do not address the larger questions of the animal communities. With careful planning and management, applying linear practices widely within an agricultural landscape could be expected to have positive wildlife benefits compared with continued intensive row cropping.

2. **Agricultural producers' perceptions of sandhill cranes in the San Luis Valley of Colorado.**
Laubhan, Murray K. and Gammonley, James H.
Wildlife Society Bulletin 29(2): 639-645. (2001)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Grus canadensis tabida [greater sandhill crane] (Gruiformes)/ human (Hominidae)/ animals/ birds/ chordates/ humans/ mammals/ nonhuman vertebrates/ Primates/ vertebrates/ agricultural production/ croplands/ economic attitudes/ human wildlife conflicts/ natural resources/ perceptions/ private land use/ social attitudes
Abstract: Management for migratory birds at an ecosystem scale requires forming cooperative partnerships with the private sector. To be effective, however, wildlife managers must understand the economic and social attitudes of private landowners to ensure that strategies involving stakeholders are viable and can be implemented. We documented attitudes of farmers in the San Luis Valley (SLV) of Colorado toward Rocky Mountain Population greater sandhill cranes (Grus canadensis tabida) using a self-administered, mail-back survey. Overall response rate was 46.7%. Viewing sandhill cranes in the SLV was considered somewhat important or important by 78.6% of respondents. In contrast, only 62.1% of respondents indicated that viewing sandhill cranes was somewhat important or important on their own land. Farmers' attitudes toward viewing sandhill cranes on their own property were related (P=0.02) to perceived conflicts with crop production. The extent of crane use (P=0.04) was the only variable we tested that predicted whether conflicts were reported. Our results suggest that partnerships between farmers and natural resource agencies concerned with management of sandhill cranes may be viable. However, the role of farmers in any proposed management strategy must be examined carefully because there may be an upper limit of crane use on private land that farmers will tolerate.
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3. **An annotated bibliography for wildlife responses to the Conservation Reserve Program.**
Allen, A. W.
In: A comprehensive review of Farm Bill contributions to wildlife conservation, 1985-2000/ Heard, L. P.; Hohman, W. L.; Halloum, D. J.; and Wildlife Habitat Management Institute (U.S.); Series: Technical Report USDA/NRCS/WHMI.
Madison, MS: USDA, NRCS, Wildlife Habitat Management Institute, 2000; pp. 151-206.
NAL Call #: aS604.6 C66 2000
Descriptors: Conservation Reserve Program/ wildlife habitats/ wildlife management

4. **Annual set-aside programs: A long-term perspective of habitat quality in Illinois and the Midwest.**
Warner, Richard E.; Etter, Stanley L.; David, Larry M.; and Mankin, Philip C.
Wildlife Society Bulletin 28(2): 347-354. (2000)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: policies and programs/ farms/ food crops/ production/ grassland/ cultivated farmland/ habitat management for wildlife/ conservation programs/ land use/ cover/ vegetation/ agriculture/ habitat change/ grains/ prairie/ extensive agriculture/ Illinois/ Iowa
Abstract: Farm programs that divert cropland from production have been important for establishing grassy habitat in the Midwest since the 1930s. This study documents 1) the expansion of row crop production and general decline of grasses on farm landscapes of the Midwest in recent decades, and 2) the trend toward short-term set-aside programs that establish grassy habitat of marginal value, depicted in Illinois. During the 1980s and early 1990s, row crop production in the Midwest moderated and millions of hectares of grassland were established on cropland diverted from production. Nonetheless, from 1964 to 1992, row crop plantings increased by 39%, with an 84% increase in soybeans being the most striking land-use change. Row crops supplanted numerous cover types that have grassy structure, including oats (-83%), wheat (-10%), other minor crops (-51%), permanent pasture (-54%), diverted cropland (-51%), and other farmland (-41%). On a study area in east-central Illinois, we evaluated and compared selected habitat characteristics of grassy cover for 1962-63 and 1991-94 on 100 randomly selected 4.05-ha plots, including tract width, heterogeneity of vegetation, disturbance during the growing season, persistence of vegetation from one growing season to the next, and extent to which grassy fields were connected by permanent (grass) edges to surrounding landscape elements. There was a diminution (P<0.05) in these habitat attributes in the 1990s compared to the 1960s. The conservation community has emphasized the potential benefits of the Conservation Reserve Program (CRP) for wildlife, while

most of the grassland in the Corn Belt has been established by annual set-aside programs. Although the most recent set-aside era ended in the late 1990s, programs of this nature may reemerge. Our study underscores the need and opportunity for improving habitat conditions as part of future farm programs that would divert land from production under short-term contract.
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5. **Architectural features of agricultural habitats and their impact on the spider inhabitants.**
Rypstra, A. L.; Carter, P. E.; Balfour, R. A.; and Marshall, S. D.
Journal of Arachnology 27(1): 371-377. (1999)
NAL Call #: QL451.J6; ISSN: 0161-8202.
Notes: Literature review.
Descriptors: habitats/ conservation tillage/ herbivores/ humidity/ intercropping/ mulching/ predator-prey relationships/ productivity/ tillage/ agricultural entomology/ Araneae/ arthropods/ Arachnida/ invertebrates/ animals
Abstract: The density and diversity of the spider community has been closely tied to the structural complexity of the local environment. For instance, soil dwelling spiders increase dramatically when the litter layer is enhanced because there are more retreats and hiding places and because temperature and humidity extremes are moderated. Web-building spiders are directly linked to the configuration of the vegetation because of specific web attachment requirements. Both correlative and experimental data support a tight relationship between spider density and habitat structure. Most of the available data show that agricultural practices which enhance the structural complexity of the environment (such as intercropping, mulching, and conservation tillage practices) enhance the density and diversity of the spider community. The key question regarding spiders in agroecosystems is, of course, whether they are in any way suppressing the activity of herbivores. Some studies uncovered a strong link between habitat complexity, spider abundance and plant productivity; but others have not, and the mechanisms by which spiders could exert a top-down effect are not clear. More investigation into the specifics of how habitat structure influences the predator-prey interactions in agroecosystems is needed in order to truly understand and manage agricultural production in a responsible manner.
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6. **The Arkansas response to federal farm program opportunities.**
Long, J. D.; Akers, D.; and Wilson, S. N.
Journal of Soil and Water Conservation 46(4): 272-275. (July 1991-Aug. 1991)
NAL Call #: 56.8 J822; ISSN: 0022-4561 [JSWCA3]
Descriptors: farmland/ wildlife conservation/ habitats/ environmental protection/ federal programs/ Conservation Reserve Program
This citation is from AGRICOLA.

7. **Arsenic and mercury concentrations in major landscape components of an intensively cultivated watershed.**
Cooper, C. M. and Gillespie, W. B.
Environmental Pollution 111(1): 67-74. (2000)
NAL Call #: QH545.A1E52; ISSN: 0269-7491
Descriptors: wetlands/ arsenic/ mercury/ watersheds/ bioaccumulation/ stormwater runoff/ water pollution/ sediment pollution/ agricultural runoff/ flood plains/ aquatic organisms/ soil contamination/ sediment contamination/ fish/ runoff/ mercury-197/ pollution (soil)/ pollution (water)/ contaminated sediments/ fish/ catchment areas/ Pisces/ freshwater fish/ Mississippi R.
Abstract: To provide an understanding of arsenic (As) and mercury (Hg) concentrations in soil, sediment, water, and fish tissues, samples were collected from a Mississippi River alluvial floodplain located in northwest Mississippi. As concentrations increased approximately an order of magnitude from water (5.12 µg/l) to fish tissues (36.99 µg/kg) and an additional two orders of magnitude in soils, lake sediments, and wetland sediments (5728, 5614, and 6746 µg/kg), respectively. Average Hg concentrations in water, soils, lake sediments, and fish were 2.16 µg/l, 55.1, 14.5 and 125 µg/kg, respectively. As and Hg concentrations were within published ranges for uncontaminated soil, water, and sediments. As concentrations represented a low risk. Hg concentrations were also low but showed a greater tendency to concentrate in fish tissue. The dominant mode of entry of these materials into aquatic systems is through storm-generated runoff. Since both metals accompany sediments, agricultural conservation practices such as reduced tillage, buffer riparian strips, and bordering sediment ponds or drainage wetlands will minimize watershed input to aquatic systems.
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8. **Artificial nest predation in hedgerows and scrub forest in a human-dominated landscape of central Mexico.**
Zuria, I.; Gates, J. E.; and Castellanos, I.
Acta Oecologica 31(2): 158-167. (2007); ISSN: 1146609X.
Notes: doi: 10.1016/j.actao.2006.07.005.
Descriptors: agriculture/ artificial nest/ birds/ ecological trap/ El Bajio/ hedgerow/ Mexico/ plasticine egg/ predation
Abstract: Hedgerows as well as other narrow corridors could be valuable habitats for birds in regions of intensive agriculture, however, it is still not clear how successful breeding birds are in different types of hedgerows as compared to birds nesting in their natural habitats. We used artificial nests to examine whether hedgerows were sinks (ecological traps) for birds by comparing rates of predation in two types of hedgerows with different vegetation structure (simple and complex), and in a tract of scrub forest in an agricultural landscape of central Mexico. We determined also the types of predators responsible for egg predation. Ground and elevated nests were baited with one Japanese quail Coturnix japonica egg and one plasticine egg and placed alternately along transects. Significantly, greater predation rates were found in scrub forest and complex hedgerows than in simple hedgerows. Higher predation rates in complex habitats seemed to reflect the higher number of predator types found there. The most important predator types were carnivores followed by rodents, birds, and humans. Carnivores and rodents mainly predated ground nests, whereas birds and humans predated elevated nests. Simple hedgerows in this landscape appeared to offer relatively safe nest sites in terms of predation pressure when compared to more complex habitats (complex hedgerows and scrub forest).
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9. **Assessment of farmer attitudes and behavioral intentions toward bird conservation on organic and conventional Florida farms.**
Jacobson, Susan K.; Sieving, Kathryn E.; Jones, Gregory A.; and Van Doorn, Annamamria
Conservation Biology 17(2): 595-606. (2003)
NAL Call #: QH75.A1C5 ; ISSN: 0888-8892
Descriptors: bird (Aves)/ animals/ birds/ chordates/ nonhuman vertebrates/ vertebrates/ bird conservation: behavioral intentions, farmer attitudes
Abstract: To enhance efforts to conserve birds, especially insectivorous species, we examined the social dimensions of conventional and organic farming in northern Florida (U.S.A.). Using a framework for the adoption of agricultural innovations, we developed a 44-item survey instrument to measure farmers' socio-demographic background, farm characteristics, participation in social organizations, communication and information networks, and perceived barriers and incentives to adopting bird-friendly practices. Seventy-six surveys were completed, with a response rate of 84% for organic farmers and 60% for conventional farmers. The population of conventional farmer was composed of more males who were older, less educated, and earned a greater income than organic farmers. Conventional farms were on average 20 times larger than organic farms and grew less than half the varieties of crops. These two factors correlated with higher agreement with statements that a considerable amount of money is spent on pest management and that leaf-eating insects cause considerable damage. Fewer conventional than organic farmers scouted for pests daily, an important component of integrated pest management. Almost all farmers (95%) reported recognizing most of the bird species on their farms. More organic farmers (31%) than conventional farmers (12%) reported more than 30 bird species on their farms. Farmers' overall willingness to attract birds to their farms was not correlated with economic or noneconomic incentives and barriers to adopting bird-friendly practices, such as current costs of pest management, experience with bird damage to crops, and farmers' knowledge of insectivorous birds and birds on their farms. Innovations in current farming practices that could enhance bird populations should be disseminated through existing social networks and media channels identified in this paper.
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10. **Association of ring-necked pheasant, gray partridge, and meadowlark abundance to Conservation Reserve Program grasslands.**
Haroldson, K. J.; Kimmel, R. O.; Riggs, M. R.; and Berner, A. H.
Journal of Wildlife Management 70(5): 1276-1284. (2006)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2006)70[1276:AORPGP]2.0.CO;2.
Descriptors: abundance/ Conservation Reserve Program/ grasslands/ gray partridge/ habitat/ meadowlark/ Minnesota/ Perdix perdix/ Phasianus colchicus/ ring-necked pheasant/ Sturnella/ weather
Abstract: Wildlife managers and farm program administrators need information on how much habitat grassland birds need to support or expand their populations. We quantified the relationships between the amount of Conservation Reserve Program (CRP) habitat in 15 agricultural landscapes and relative abundance of ring-necked pheasants (Phasianus colchicus), gray partridge (Perdix perdix), and meadowlarks (Sturnella spp.) in south-central Minnesota, USA, over a 10-year CRP enrollment cycle. For each 10% increase of grass in the landscape, pheasant survey counts increased by an average of 12.4 birds per route in spring and by 32.9 birds per route in summer. Pheasant indices also varied by year, and the magnitude of year effects were equivalent to a change in grass abundance of 26-36%. Regardless of the amount of grass habitat available, partridge indices in our study declined dramatically from a peak in 1990 to a low in 1994-1995. Meadowlark indices increased by an average of 11.7 birds per route in summer for each 10% increase of grass in the landscape, while indices simultaneously declined from 1990 to 1998. Our results indicate that conversion of cropland to CRP grassland in intensively cultivated landscapes is associated with higher population indices of pheasants and meadowlarks, but not partridge. Managers should assess the success of habitat programs over periods of ≥ 5 years because population indices may fluctuate dramatically over time with little apparent change in habitat abundance.
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11. **Association of the Conservation Reserve Program with ring-necked pheasant survey counts in Iowa.**
Riley, Terry Z.
Wildlife Society Bulletin 23(3): 386-390. (1995)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Phasianus colchicus (Galliformes)/ animals/ birds/ chordates/ nonhuman vertebrates/ vertebrates/ agriculture/ snowfall/ weather/ wildlife management
Abstract: More than 880,000 ha of Iowa farmland were enrolled in the Conservation Reserve Program (CRP) from 1986-1991. I evaluated the relationship between CRP enrollment and ring-necked pheasants (Phasianus colchicus) in Iowa and how cropland and weather affected that relationship. Six percent of the land area in Iowa was enrolled in the CRP between 1986 and 1991. Pheasant numbers in Iowa increased 30% during the first 5 years of the CRP compared to a similar period before the program began (P = 0.026). Numbers increased 34% (P < 0.018) in counties with > 70% cropland and 26% (P= 0.12) in counties with 50-70% cropland. I did not detect increases in pheasant numbers in counties with < 50% cropland (P > 0.71). Pheasant numbers were positively related to the CRP, but this function was also influenced by percent cropland and cumulative snowfall.
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12. **Avian abundance, composition, and reproductive success on Conservation Reserve Program fields in northern Missouri.**
McCoy, T. D.
Columbia, MO: University of Missouri, 1996.
Notes: M.S. Thesis
Descriptors: Conservation Reserve Program/ State conservation programs/ Missouri
Abstract: Studied various avian species abundance, composition, and reproductive success in different grassland types (CP1 vs. CP2) in northern Missouri.

13. **Avian abundance in CRP and crop fields during winter in the Midwest.**
Best, Louis B.; Campa, Henry; Kemp, Kenneth E.; Robel, Robert J.; Ryan, Mark R.; Savidge, Julie A.; Weeks, Harmon P.; and Winterstein, Scott R.
American Midland Naturalist 139(2): 311-324. (1998)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: dark eyed junco (Passeriformes)/ horned lark (Passeriformes)/ lapland longspur (Passeriformes)/ meadowlark (Passeriformes)/ mourning dove (Columbiformes)/ northern bobwhite (Galliformes)/ ring necked pheasant (Galliformes)/ American goldfinch (Passeriformes)/ American tree sparrow (Passeriformes)/ Canada goose (Anseriformes)/ European starling (Passeriformes)/ animals/ birds/ chordates/ nonhuman vertebrates/ vertebrates/ crop fields/ species abundance/ species composition/ winter/
Conservation Reserve Program
Abstract: We compared the abundance and species composition of birds in Conservation Reserve Program (CRP) fields with the same aspects in row-crop fields during the winter (January and February) over several years (1992-1995) for six Midwestern states (Indiana, Iowa, Kansas, Michigan, Missouri and Nebraska). Field techniques were standardized in all states. CRP fields consisted of either permanent introduced grasses and legumes (CP1) or permanent native grasses (CP2), and the plant species seeded in CRP fields differed within and among states. Vegetation characteristics of CRP fields varied considerably from state to state, but vertical density and total canopy cover (primarily grasses) were particularly high in Nebraska. Mean annual total bird abundance ranged from 0.1 to 5.1 birds per km of transect in CRP fields and from 0.1 to 24.2 in row-crop fields. The total number of bird species recorded in CRP fields in the six states ranged from 6 to 32; the range for row-crop fields was 8 to 18. The most abundant species in CRP fields differed among states but included the ring-necked pheasant, American tree sparrow, northern bobwhite, dark-eyed junco and American goldfinch. The most abundant species in row-crop fields included the horned lark, American tree sparrow, European starling, mourning dove, lapland longspur, meadowlarks and Canada goose. Some of the most abundant bird species wintering on CRP fields have been undergoing long-term population declines, thus this program has the potential to mitigate population losses.
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14. **Avian community structure, reproductive success, vegetative structure, and food availability in burned CRP Fields and grazed pastures in northeastern Kansas.**
Klute, D. S.
Manhattan, KS: Kansas State University, 1994.
Notes: M.S. Thesis
Descriptors: Conservation Reserve Program/ State conservation programs/ Kansas
Abstract: Compared avian community structure and reproductive success, food availability, and vegetative structure in CRP grasslands in northern Kansas that were grazed and burned.

15. **Avian diversity and functional insectivory on north-central Florida farmlands.**
Jones, G. A.; Sieving, K. E.; and Jacobson, S. K.
Conservation Biology 19(4): 1234-1245. (2005)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1111/j.1523-1739.2005.00211.x.
Descriptors: agroecosystems/ avian biodiversity/ avian conservation/ birds and farmlands/ functional insectivores/ avifauna/ biological control/ habitat related behavior/ insectivory/ pest control/ species diversity/ Florida/ Aves/ Hexapoda/ Insecta
Abstract: We studied the potential for native birds to control insect pests on farms. We assessed habitat factors correlated with diversity, distribution, and insect-foraging activity of native birds on farms in north-central Florida and then characterized common bird species that consumed insect biomass in crops as "functional insectivores" (birds most likely to contribute to pest control). Analyses of point-count survey data and foraging observations collected over 2 years on paired organic and conventional farm sites indicated that (1) farms supported most (82-96%) land birds known to breed in the region; (2) bird species richness and abundance varied significantly with matrix habitat and field border type (but not with year or farm management type); (3) the highest bird abundances were associated with mixed crop plantings, field borders, and adjacent matrix composed of forest and hedge; and (4) abundances of 10 species identified as functional insectivores were primarily influenced by crop type (mixed crops attracted significantly more insect foragers into fields than monocrops). We documented birds eating pest insects in crops and did not observe substantive crop damage by birds during growing-season observations. We advocate use of the term functional insectivore to emphasize the potential positive role of avian insectivory on farms during the growing season. ©2005 Society for Conservation Biology.
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16. **Avian nesting density and success in alfalfa, cool season CRP, and warm season CRP plantings in eastern South Dakota.**
Rock, Marcus E. South Dakota State University, 2006.
Notes: Thesis (M.S.); Includes bibliographical references (leaves 46-52).
http://wfs.sdstate.edu/wfsdept/Publications/Theses/Rock,%20Marcus%20E.%20MS-2006.pdf
Descriptors: Conservation Reserve Program (U.S.)/ Birds---nests---South Dakota/ Birds---Habitat---Conservation---South Dakota/ Alfalfa
This citation is from AGRICOLA.

17. **Avian use and vegetation characteristics of Conservation Reserve Program fields.**
Delisle, Jennifer M. and Savidge, Julie A.
Journal of Wildlife Management 61(2): 318-325. (1997)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: bobolinks (Passeriformes)/ common yellowthroat (Passeriformes)/ dickcissels (Passeriformes)/ grasshopper sparrow (Passeriformes)/ ring necked pheasant (Galliformes)/ American tree sparrow (Passeriformes)/ Ammodramus savannarum (Passeriformes)/ Dolichonyx oryzivorus (Passeriformes)/ Geothlypis trichas (Passeriformes)/ Phasianus colchicus (Galliformes)/ Spiza americana (Passeriformes)/ Spizella arborea (Passeriformes)/ Sturnella spp. (Passeriformes)/

animals/ birds/ chordates/ nonhuman vertebrates/ vertebrates/ Conservation Reserve Program/ fields/ meadowlarks/ seasonality/ species abundance/ vegetation structure/ wildlife management
Abstract: We compared avian use of Conservation Reserve Program (CRP) fields enrolled in the CP1 (cool-season grasses and legumes) and CP2 (warm-season native grasses) options in southeastern Nebraska from 1991 to 1995. In winter and in the breeding season CP2 fields had taller, denser vegetation than CP1 fields. However, total bird abundance did not differ between CP1 and CP2 fields (P = 0.47). Dickcissels (Spiza americana) and grasshopper sparrows (Ammodramus savannarum) were the most abundant species during the breeding season although population numbers varied among years (P < 0.001). Dickcissels and grasshopper sparrows showed no differences in abundance between CPs, but dickcissels were associated with tall, dense vegetation and grasshopper sparrows with sparser vegetation and a shallow litter layer. Bobolinks (Dolichonyx oryzivorus) were more abundant on CP1 fields (P = 0.001), and common yellowthroats (Geothlypis trichas) and sedge wrens (Cistothorus platensis) were more abundant on CP2 fields (P = 0.001 and P = 0.05). Average winter abundances did not change over years (P = 0.90). American tree sparrows (Spizella arborea) and ring-necked pheasants (Phasianus colchicus) were the most abundant species during winter and were more abundant on CP2 fields (P < 0.05). Meadowlarks (Sturnella spp.) were more abundant on CP1 fields in winter (P < 0.05).
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18. **Avian use of fields enrolled in the Conservation Reserve Program in southeast Nebraska.**
Delisle, Jennifer M.
Lincoln, Nebraska: University of Nebraska, 1995.
Notes: Thesis (M.S.); Includes bibliographical references.
NAL Call #: NBU LD3656 1995 D455
Descriptors: Conservation Reserve Program---United States/ Birds---Habitat---Nebraska
This citation is from AGRICOLA.

19. **Aviation population trends within the evolving agricultural landscape of eastern and central United States.**
Murphy, Michael T.
Auk 120(1): 20-34. (2003)
NAL Call #: 413.8 AU4; ISSN: 0004-8038
Descriptors: agriculture/ conservation/ population studies/ terrestrial ecology/ Breeding Bird Survey/ Conservation Reserve Program/ U.S. Department of Agriculture/ agricultural land use/ agricultural landscape/ avian population trends/ farmland/ ecosystems/ eastern United States/ central United States/ farming and agriculture/ grasslands/ population ecology/ wildlife-human relationships/ commercial enterprises/ disturbances/ habitat use/ land zones/ artificial structures
Abstract: State-level Breeding Bird Survey (1980-1998) and U.S. Department of Agriculture statistics were used to test the hypothesis that changes in agricultural land use within the eastern and central U.S. have driven population trends of grassland and shrub habitat birds over the past two decades. The degree to which population trends differed between grassland and shrub habitats was evaluated with respect to migratory and nesting behavior. Grassland birds declined significantly between 1980 and 1999, but, on average, shrub habitat species did not. Grassland-breeding, long-distance migrants exhibited the strongest negative trends. Most species (78%; n=63) exhibited at least one significant association between population trends and changes in agricultural land use, and in most, land use "explained" 25-30% of the variation in population trends among states. Changes in the farmland landscape accounted for more of the interstate variability of population trends of short-distance migrants than of both long-distance migrants and residents, and that variability was greater in grassland than shrub species. Declines in the area of rangeland and cover crops were followed by population declines and increases, respectively, by many species. Increases of land in the Conservation Reserve Program had negative associations with population trends of some shrub species. The results indicate that grassland birds have declined strongly over the past two decades, and that regardless of migratory behavior or nesting habits, avian population trends are linked strongly to changes in agricultural land use within North America.
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20. **Biotechnology: Environmental impacts of introducing crops and biocontrol agents in North American agriculture.**
Pimentel, D.
In: Biological control: Benefits and risks/ Hokkanen, H. M. and Lynch, J. M.; Series: Plant and microbial biotechnology research series No. 4, 1995; pp. 13-29.
Notes: Literature review; ISBN: 052154405X.
NAL Call #: TP248.27.P55P54
Descriptors: plant introduction/ introduced species/ crops/ livestock/ game birds/ game animals/ environmental impact/ weeds/ pests/ biological control agents/ weed control/ insect pests/ genetic engineering/ recombinant DNA/ transgenic plants/ risk/ North America/ animal pests/ pest potential/ weed eating insects
This citation is from AGRICOLA.

21. **Bird abundance and nesting in CRP fields and cropland in the Midwest: A regional approach.**
Best, Louis B.; Campa, Henry; Kemp, Kenneth E.; Robel, Robert J.; Ryan, Mark R.; Savidge, Julie A.; Weeks, Harmon P.; and Winterstein, Scott R.
Wildlife Society Bulletin 25(4): 864-877. (1997)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: nest predation/ nesting success/ rowcrop field/ species abundance/ vegetational structure/ Conservation Reserve Program/ Agelaius phoeniceus [red winged blackbird] (Passeriformes)/ Ammodramus savannarum [grasshopper sparrow] (Passeriformes)/ Spiza americana [dickcissel] (Passeriformes)
Abstract: We compared the abundance and nesting success of avian species in Conservation Reserve Program (CRP) fields during the summer with that in rowcrop fields over 5 years (1991-1995) for 6 Midwestern states (Ind., La., Kans., Mich., Mo., and Nebr.). Field techniques were standardized in all states. CRP fields consisted of either perennial introduced grasses and legumes (CP1) or perennial native grasses (CP2), and the plant species seeded in CRP fields differed within and among the states. Disturbances to CRP fields included mowing (partial or complete), application of herbicides, and burning. The height, vertical density, and canopy coverage of vegetation

in CRP fields were measured in each state; values for these measurements were particularly low in Kansas. Mean annual total bird abundance in CRP fields ranged from 4.9 to 29.3 birds/km of transect. The most abundant species on CRP fields differed among states but included red-winged blackbirds (Agelaius phoeniceus), grasshopper sparrows (Ammodramus savannarum), and dickcissels (Spiza americana). Although the total number of bird species was similar in CRP and rowcrop fields across the region, bird abundance was 1.4-10.5 times greater in the former. Nests of 33 bird species were found in CRP fields compared with only 10 species in rowcrop fields, and the number of nests found was 13.5 times greater in CRP fields. Nest success in CRP fields was 40% overall; predation was the greatest cause of nest failure. Long-term farm set-aside programs that establish perennial grass cover, such as the CRP, seem to provide many benefits for grassland birds, including several species for which conservation is a great concern.
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22. **Bird abundance and nesting success in Iowa CRP fields: The importance of vegetation structure and composition.**
Patterson, Matthew P. and Best, L. B.
American Midland Naturalist 135(1): 153-167. (1996)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: passerine/ Passeriformes/ Aves/ Plantae/ animals/ birds/ chordates/ nonhuman vertebrates/ plants/ vertebrates/ Conservation Reserve Program/ land management practice
Abstract: Bird use of Conservation Reserve Program (CRP) and row-crop fields was studied in central Iowa from May through July 1991-1993. Thirty-three bird species were recorded in CRP fields and 34 in row-crop fields. The most abundant species in both habitats was the red-winged blackbird (Agelaius phoeniceus), accounting for 35% of all birds in CRP and 24% in row-crop fields. The dickcissel (Spiza americana), grasshopper sparrow (Ammodramus savannarum), bobolink (Dolichonyx oryzivorus), common yellowthroat (Geothypis trichas), brown-headed cowbird (Molothrus ater), savannah sparrow (Passerculus sandwichensis) and ring-necked pheasant (Phasianus colchicus) were the next most abundant species in CRP plots. The horned lark (Eremophila alpestris), vesper sparrow (Pooecetes gramineus) and brownheaded cowbird were the next most abundant species in row-crop fields. Nests of 16 bird species were found in CRP fields, with red-winged blackbirds accounting for 48% of all nests found. The vesper sparrow and horned lark were the only species nesting in row-crop fields. The major cause of nest loss for all species was predation, accounting for 52% of all nest loss in CRP fields and 65% in row-crop fields. Mammals accounted for 89, 88 and 85% of the predation on grasshopper sparrow, red-winged blackbird and dickcissel nests, respectively. The Conservation Reserve Program has likely contributed to an increase in the abundance of many bird species in central Iowa, inasmuch as the row-crop habitat that it replaced has lower bird abundance and supports fewer nesting species. The vegetation structure and composition of CRP fields in central Iowa are diverse, resulting in differences in the bird species communities using these fields. The effects of several land-management practices are discussed relative to bird species composition and nesting success.
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23. **Bird abundance and success in CRP.**
Mccoy, T.
In: 62nd Midwest Fish and Wildlife Conference. Minneapolis. MN (USA). 2001.
Notes: Paper No. 307; Conference Sponsor: NCD-AFS; World Meeting Number 000 5249.
Descriptors: aquatic science/ biology/ environmental science
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24. **Bird species richness in vegetation fences and in strips of residual rain forest vegetation at Los Tuxtlas, Mexico.**
Estrada, A.; Cammarano, P.; and Coates-Estrada, R.
Biodiversity and Conservation 9(10): 1399-1416. (2000)
NAL Call #: QH75.A1B562; ISSN: 09603115.
Notes: doi: 10.1023/A:1008935016046.
Descriptors: bird diversity/ conservation/ corridors/ forest fragmentation/ Los Tuxtlas/ Mexico/ tropical rain forests/ avifauna/ habitat corridor/ habitat fragmentation/ rainforest/ species richness/ Mexico
Abstract: Fragmentation of the lowland tropical rain forest has resulted in loss of animal and plant species and isolation of remaining populations that puts them at risk. At Los Tuxtlas, Mexico, lowland rain forests are particularly diverse in the avian fauna they contain and while most of the forests have been fragmented by human activity, many of the fragments still harbor diverse assemblages of bird species. In these landscapes, linear strips of residual rain forest vegetation along streams as well as linear strips of vegetation fences (live fences) crossing the pastures might provide some connectivity to bird populations existed in forest fragments. We investigated bird species richness and relative abundance in one 6-km long section of live fences (LF) bordering a dirt road and in two 6-km long sections of residual forest vegetation along a river (MR) and one permanent stream (BS). We used point count procedures which resulted in the count of 2984 birds representing 133 species. At the LF site we detected 74% of the species, 72% at the BS site and 57% at the MR site. Only 38% of the species were common among sites. Neotropical migratory birds accounted for 34-41% of the species counted at all sites. While edge and open habitat birds accounted for 6-10% of the species and for 50% of the records at the three vegetation strips, about 90% of the species were forest birds. Distance to forest fragments and degree of disturbance of the vegetation seemed to negatively influence bird species presence at the BS and MR strips. Rarefaction analysis indicated that the LF strip was richer in species than the other two sites, but the occurrence of the three vegetation strips in the landscape seem to favor the presence of many more species. We discuss the value of these vegetation strips to birds as stepping stones in the fragmented landscape.
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25. **Bird use and nesting in conventional, minimum-tillage, and organic cropland.**
Lokemoen, John T. and Beiser, Julia A.
Journal of Wildlife Management 61(3): 644-655. (1997)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: commercial activities/ reproduction/ reproductive productivity/ ecology/ population dynamics/ animal constructions/ man-made habitat/ land and freshwater zones/ Aves: farming and agriculture/ fledgeing success/ farming system effect/ hatching success/ community structure/ seasonal changes/ mortality/ nest losses/ predators/ nest loss significance/ minimum tillage and organic farms/ nests/ density/ conventional/ minimum tillage and organic farmland/ cultivated land habitat/ farming system/ effect on community structure and reproduction/ North Dakota/ Prairie Pothole Region/ community structure and reproduction/ effect of farming system/ Aves/ birds/ chordates/ vertebrates
© Thomson Reuters Scientific

26. **Bird use of terraces in Iowa rowcrop fields.**
Hultquist, J. M. and Best, L. B.
American Midland Naturalist 145(2): 275-287. (2001)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: abundance estimation/ agricultural land/ avifauna/ habitat use/ terrace/ United States/ Agelaius phoeniceus/ Spiza americana
Abstract: Bird use of terraces in rowcrop fields was evaluated during 1996-1997 in southwestern Iowa by line transect counts of birds, nest searches and nest monitoring. Twenty-six bird species were observed in terraces. Red-winged blackbirds (Agelaius phoeniceus) and dickcissels (Spiza americana) were most abundant, accounting for 58% of the total bird abundance. Bird abundance in terraces ($\bar{x}$ = 463.0 birds/100 ha, SE = 33.0) was less than that in other strip-cover habitats such as grassed waterways and roadsides, but greater than that in rowcrops. Five species nested in terraces. We found 64.8 nests/10 ha of which 76% were red-winged blackbird nests. Predation resulted in failure of 73% of all nests. The relative contribution of terraces to grassland bird conservation is minor, and changes in current terrace management practices would not likely improve conditions for birds nor be economical.
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27. **Bird use of three types of field margins in relation to intensive agriculture in Quebec, Canada.**
Jobin, B.; Choiniere, L.; and Belanger, L.
Agriculture, Ecosystems and Environment 84(2): 131-143. (2001)
NAL Call #: S601.A34; ISSN: 01678809.
Notes: doi: 10.1016/S0167-8809(00)00206-1.
Descriptors: Canada/ Crop pests/ Farmland birds/ field margin/ hedgerow/ Quebec/ windbreak/ habitat use/ birds/ field margin/ habitat use/ intensive agriculture/ Canada/ Aves/ Coniferales/ Galliformes
Abstract: Habitat structure and bird use of field margins were studied in intensive farmlands of southern Quebec, Canada. The main objectives were: (1) to assess the value of field margins for conserving avian diversity in agricultural landscapes, (2) to document their potential as breeding habitats for bird species particularly those considered as nuisance for crops, and (3) to describe habitat variables that best explained bird use of field margins. Three types of field margins were distinguished: (a) natural hedgerows (n = 27) with well developed tree and shrub strata, (b) planted windbreaks (n = 17) mostly composed of coniferous trees and generally devoid of a well structured shrub stratum, and (c) herbaceous field margins (n = 17) with isolated shrubs. A total of 42 bird species were recorded. Bird use of hedgerows and windbreaks was similar, herbaceous field margins having fewer bird species and individuals than the other two types of field margin. Field margins did not contribute significantly as breeding habitats of bird species that may damage crops, but offered shelter to a broad range of species potentially useful for biological pest control. Bird use of field margins was mostly related to hedges' structural complexity and dimension. Conserving natural hedgerows, minimising mechanical and chemical control of the vegetation in field margins, and planting a mix of deciduous and coniferous species in windbreaks represent efficient conservation strategies both from a wildlife and an agronomic point of view.
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28. **Birds and the Conservation Reserve Program: A retrospective study.**
Lauber, T. B.
Orono, Me.: University of Maine, 1991.
Notes: Thesis (M.S.) in Wildlife Management. Bibliography: leaves 243-248. Includes vita.
NAL Call #: MeU Univ. 1991 L38
Descriptors: Conservation Reserve Program---U.S/ Bird populations, Effect of agricultural conservation on
This citation is from AGRICOLA.

29. **Black-tailed prairie dogs and the structure of avian communities on the shortgrass plains.**
Smith, G. A. and Lomolino, M. V.
Oecologia 138(4): 592-602. (2004); ISSN: 00298549
Descriptors: biological diversity/ fragmentation/ grassland birds/ keystone species/ avifauna/ community structure/ conservation management/ prairie/ rodent/ ecosystem/ Sciuridae/ ecosystem/ Sciuridae/ Oklahoma/ Artemisia filifolia/ Athene cunicularia/ Buteo regalis/ Charadrius vociferous/ Cynomys ludovicianus/ Eremophila alpestris/ Sturnella
Abstract: We tested the hypothesis that black-tailed prairie dogs (Cynomys ludovicianus) influence avian community structure on the shortgrass prairie. We surveyed 36 prairie dog towns and 36 paired sites without prairie dogs during summer and fall of 1997, 1998, and 1999 in the Oklahoma Panhandle. Our surveys totaled 9,040 individual observations for 73 avian species. Significantly distinct avian communities were present on prairie dog towns when compared to sites within four different macrohabitats of the surrounding landscape: open rangeland, scrub/sandsage (Artemisia filifolia) habitats, Conservation Reserve Program (CRP) plots, and fallow crop fields. Relative densities of all bird species combined was higher on prairie dog towns versus paired sites in summer and fall. Mean species richness of birds was significantly higher on prairie dog towns than paired sites during summer, but there were no significant differences in fall. Open rangeland had the highest mean species richness in fall. Assemblages of avian communities differed significantly between prairie dog towns and the four macrohabitat types during summer. Burrowing owls (Athene cunicularia), killdeer (Charadrius vociferous), horned larks (Eremophila alpestris), and

meadowlarks (Sturnella spp.) were positively and significantly associated with prairie dog towns during summer, while horned larks and ferruginous hawks (Buteo regalis) were significantly associated with prairie dog towns during fall. Even in their current remnant state, black-tailed prairie dogs continue to play a significant rolein the assembly of ecological communities across the Great Plains. Conservation of prairie dogs goes well beyond a single species, and is an important strategy for the preservation of the prairie ecosystem as a whole.
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30. **Breeding bird abundance and diversity in agricultural field borders in the black belt prairie of Mississippi.**
Smith, Mark D.; Barbour, Philip J.; Burger, L. Wes.; and Dinsmore, Stephen J.
Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies 59: 43-56. (2005)
NAL Call #: SK1.S6; ISSN: 0276-7929
Descriptors: conservation measures/ ecology/ community structure/ population dynamics/ terrestrial habitat/ man-made habitat/ land zones/ Aves: habitat management/ breeding species abundance/ species diversity/ agricultural field border strips/ relative abundance/ population density/ distribution within habitat/ grasslands/ cultivated land habitat/ Mississippi/ Clay and Lowndes Counties/ birds/ chordates/ vertebrates
Abstract: Conservation buffer practices implemented under U.S. Department of Agriculture (USDA) Farm Bill programs offer opportunities for enhancing breeding season habitat for farmland birds. Recently, CP33 (Habitat Buffers for Upland Birds) was added as a new continuous Conservation Reserve Program (CRP) practice designed to address habitat goals for northern bobwhite (Colinus virginianus) under the Northern Bobwhite Conservation Initiative. However, it is presumed that this practice will also benefit other birds. To evaluate potential benefits of CP33 field borders for farmland birds, we established a total of 89.0 km of experimental field borders (6.1-m wide) along agriculture field edges on three 405-ha farms in Clay and Lowndes counties, Mississippi. We used 200-m x 20-m strip transects to measure abundance and diversity of birds inhabiting bordered and non-bordered field edges. Indigo bunting (Passerina cyanea) and dickcissel (Spiza americana) abundances were nearly twofold greater along bordered field edges. However, mourning dove (Zenaida macroura), northern cardinal (Cardinalis cardinalis), and common grackle (Quiscalus quiscula) abundances did not differ between bordered and non-bordered field edges. Field borders adjacent to strip habitats (i.e., fencerows, drainage ditches) had greater total bird and red-winged blackbird (Agelaius phoeniceus) abundance than non-bordered edges adjacent to strip habitats. Species richness was greater along bordered than non-bordered edges. Within intensive agricultural landscapes where large-scale grassland restoration is impractical, USDA conservation buffer practices such as field borders (CP33) may be useful for enhancing local breedingbird richness and abundance.
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31. **Breeding bird composition and species relative abundance patterns on Conservation Reserve Program (CRP) land in western Minnesota.**
Hanowski, JoAnn M.
Loon 67(1): 12-16. (1995)
Descriptors: communities/ Conservation Reserve Program/ conservation programs/ birds/ Minnesota/ Minnesota, western
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32. **Butterflies and continuous Conservation Reserve Program filter strips: Landscape considerations.**
Davros, N. M.; Debinski, D. M.; Reeder, K. F.; and Hohman, W. L.
Wildlife Society Bulletin 34(4): 936-943. (2006)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2006)34 [936:BACCRP]2.0.CO;2.
Descriptors: buffers/ butterfly abundance/ diversity/ farm conservation/ filter strip/ landscape context/ Minnesota/ species richness
Abstract: Filter strips or buffers are areas of grass or other perennial herbaceous vegetation established along waterways to remove contaminants and sediments from agricultural field runoff. In the heavily cultivated regions of the Midwestern United States, these buffer zones established under the Farm Bill provide important habitat for wildlife such as butterflies. The question of how the landscape context of these plantings influences their use has not been adequately researched. We used multiple regression and Akaike's Information Criteria to determine how habitat width and several landscape-level factors (i.e., landscape composition [total herbaceous cover, amount of developed area, and amount of wooded cover] and configuration [herbaceous edge density]) influenced the abundance and diversity of the butterfly community using filter strips in southwestern Minnesota, USA. Habitat-sensitive butterfly abundance and all richness and diversity measures were positively correlated with filter-strip width. Butterfly abundance was negatively associated with the amount of developed areas (cities, towns, and roads) within the area of a 1-km radius (3.14 km^2) surrounding the sites. Percentage of wooded cover in the landscape was an important variable explaining individual species abundance, although the direction of the relationship varied. Our finding that landscape context influences butterfly use of filter strips highlights the importance of landscape-level approaches to wildlife conservation in agroecosystems.
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33. **Changes in breeding bird populations with habitat restoration in northern Iowa.**
Fletcher, R. J. and Koford, R. R.
American Midland Naturalist 150(1): 83-94. (July 2003)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: Conservation Reserve Program/ grassland birds/ avian communities/ area sensitivity/ prairie wetlands/ natural wetlands/ abundance/ Dakota/ fields
Abstract: Native tallgrass prairie and wetland habitat in the Prairie Pothole Region of the United States have declined over the past two centuries. Bird communities using these habitats have also experienced widespread declines that are often attributed to severe habitat loss and fragmentation. We estimated the change, or turnover, in bird populations in the Eagle Lake Wetland Complex, Iowa,

with ongoing grassland and wetland restoration by linking geographic information system data and bird surveys in different land cover types (hayland, pasture, restored grassland, restored wetland and rowcrop agriculture) during the 1999-2001 breeding seasons. Habitat restoration efforts primarily converted rowcrop agriculture and pastures into grassland and wetland habitat. Based on land conversion, abundances of most species have likely increased in the area, including many species of management concern. Yet a few species, such as killdeer (Charadrius vociferus), have probably decreased in abundance. This estimation approach and these estimates provided a critical first step for evaluating restoration efforts; however, information on demographic parameters, such as nesting success, in restored areas is needed for understanding how restoration ultimately affects bird populations.
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34. **Comanagement of wildlife corridors: The case for citizen participation in the Algonquin to Adirondack proposal.**
Brown, R. and Harris, G.
Journal of Environmental Management 74(2): 97-106. (Jan. 2005)
NAL Call #: HC75.E5J6
Descriptors: citizen participation/ conservation programs/ wildlife habitats/ case studies/ animal communities/ landowners/ household surveys/ environmental management/ land use/ Eastern United States/ forest management/ natural resources, environment, general ecology, and wildlife conservation/ forestry related
Abstract: The debate between top-down and bottom-up planning has recently re-emerged in environmental management. Many commentators agree on the merits of comanagement, in which affected citizens and professional managers share responsibility for planning. Nevertheless, the manifold advantages of comanagement have not always been fully appreciated in environmental planning. For example, a group representing NGOs and academic institutions recently proposed an ecological corridor linking Algonquin Provincial Park in southern Ontario to the Adirondack Park in northern New York. This corridor, known as A2A, was designed to encourage the migration of wolves and other wildlife between the parks. Much of the land in A2A is private property. A survey of households, randomly scattered throughout the United States portion of the corridor, revealed that affected landowners had little knowledge of the proposal and no contact with its advocates. Many respondents were farmers who utilized land for livelihood. Other landowners enjoyed property for a variety of recreational purposes. Regardless of use, survey participants placed high value on the importance of conserving biological diversity. They also expressed great distrust toward restrictions that might be placed on their activities. In general, respondents felt very unsure about A2A, and they were uncertain about personal involvement in the planning process. Certain landowners indicated a willingness to have their land be included in an ecological corridor, despite not knowing about it before the survey was administered. These results suggest that A2A proponents have little to lose and much to gain by disseminating information locally and by embracing comanagement for further formulation of this plan. © 2004 Elsevier Ltd. All rights reserved. [publisher]
This citation is from AGRICOLA.

35. **Combining data from state and national monitoring surveys to assess large-scale impacts of agricultural policy.**
Nusser, S. M.; Clark, W. R.; Wang, J.; and Bogenschutz, T. R.
Journal of Agricultural, Biological, and Environmental Statistics 9(3): 381-397. (2004)
NAL Call #: S566.55.J68; ISSN: 10857117.
Notes: doi: 10.1198/108571104X4441.
Descriptors: Conservation Reserve Program/ National Resources Inventory/ Phasianus colchicus/ population modeling/ ring-necked pheasant
Abstract: An increasing number of state and national databases are available to assess agricultural and environmental trends in natural resource populations. We use a case study approach to consider methodologies for combining state and national data to assess the impact of agricultural policy on state wildlife populations. The scientific question is to assess the impact of the Conservation Reserve Program on pheasant populations in Iowa, using land cover/use data from the National Resources Inventory and count data from an annual state pheasant population survey. Our approach involves identifying a common spatial polygon for linking summaries from each of two datasets, and then estimating parameters that describe temporal trends in land cover and in pheasant populations over a common time period within each polygon. Estimated pheasant population parameters are regressed on land cover summaries to investigate the impact of the Conservation Reserve Program on pheasant populations in regions of the state. Results reveal that the population response to the Conservation Reserve Program varies by region in relation to the physiography and agricultural use of the region, in ways that were not anticipated by policy developers. Statistical considerations for developing appropriate models for combining data are discussed. © 2004 American Statistical Association and the International Biometric Society.
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36. **A comparison of Conservation Reserve Program habitat plantings with respect to arthropod prey for grassland birds.**
McIntyre, N. E. and Thompson, T. R.
American Midland Naturalist 150(2): 291-301. (2003)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: environment-ecology/ Texas High Plains/ North American grassland/ population trends/ CRP fields/ community structure/ avian abundance/ nestling diet/ vegetation/ Coleoptera/ landscape
Abstract: The Conservation Reserve Program (CRP) was designed to reduce soil erosion and curb agricultural overproduction by converting highly erodible agricultural land to various forms of perennial habitat. It has had an incidental benefit of providing habitat for wildlife and has been beneficial in reversing population declines of several grassland bird species. However, the mechanisms behind these reversals remain unknown. One such mechanism may be differences in food availability on CRP vs. non-CRP land or between different types of CRP. The influence of CRP habitat type on the abundance of arthropod prey used by grassland birds has not been previously explored. We compared the abundance and diversity of arthropods among four CRP habitat types in Texas [replicated plots of exotic lovegrass (Eragrostis curvula), Old World bluestem

(Bothriochloa ischaemum), mixed native grasses with buffalograss (Buchlo dactyloides) and mixed native grasses without buffalograss] and native shortgrass prairie. Attention was focused on adult and juvenile spiders (Order Araneae), beetles (Coleoptera), orthopterans (Orthroptera: grasshoppers and crickets) and lepidopterans (Lepidoptera: butterflies and moths), as these taxa are the primary prey items of grassland birds during the breeding season. Arthropod diversity and abundance were higher on indigenous prairie compared to CRP, reflecting differences in vegetative diversity and structure, but there were no differences in arthropod richness or abundance among CRP types. These results indicate that, although CRP is not equivalent to native prairie in terms of vegetation or arthropod diversity, CRP lands do support arthropod prey for grassland birds. More direct assays of the survivorship and fitness of birds on CRP compared to native shortgrass prairie are clearly warranted.
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37. **A comparison of landscapes occupied by increasing and decreasing populations of grassland birds.**
Veech, J. A.
Conservation Biology 20(5): 1422-1432. (2006)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1111/j.1523-1739.2006.00487.x.
Descriptors: bird population trends/ Conservation Reserve Program/ randomization test/ urbanization
Abstract: For several decades, many grassland bird species have been declining in abundance throughout the Midwest and Great Plains regions of the United States, possibly due to loss of natural grassland habitat and increasing urbanization. I used 20 years of data from the North American Breeding Bird Survey to identify increasing, decreasing, and stable populations of 36 grassland-nesting bird species. I characterized the immediate landscape (circle with radius = 30 km) surrounding each population based on data from the National Resources Inventory. For each landscape, I calculated the proportion of eight different land-cover types: restored grassland, rangeland, cultivated cropland, pasture, noncultivated cropland, forest, urban land, and water. Using a null model, I compared landscape composition of increasing, decreasing, and stable populations. As predicted on the basis of the habitat preferences of grassland birds, increasing populations inhabited landscapes that contained significantly more restored grassland and rangeland but significantly less forest land and urban land than landscapes inhabited by decreasing populations. There was no significant difference in the proportion of cropland within the landscapes of increasing and decreasing populations, although cropland composed a large proportion (>30%) of many landscapes. In contrast, restored grassland typically composed a very small proportion (<3.5%) of total land cover, yet it was significantly more common in the landscapes of increasing than decreasing populations. These results suggest that grassland birds may benefit from government initiatives, such as the Conservation Reserve Program, that promote the restoration of grassland at a landscape scale. ©2006 Society for Conservation Biology.
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38. **A comparison of public lands and farmlands for grassland bird conservation.**
Cunningham, M. A.
Professional Geographer 57(1): 51-65. (2005);
ISSN: 00330124
Descriptors: biodiversity/ Conservation Reserve Program/ grassland birds/ habitat fragmentation/ biodiversity/ environmental management/ grasslands/ habitat fragmentation/ passerines/ species conservation/ Minnesota/ Aves/ Passeri
Abstract: Midwestern states have invested extensively in grasslands for wildlife conservation, yet these public lands make up a minority of grassland habitat. How effective are public grasslands, relative to private lands, for conserving native songbird populations? I compare private and public lands in southern Minnesota using bird survey data from Conservation Reserve Program (CRP) fields and public lands and assessing fragmentation in a GIS. Bird abundance and diversity were greater on CRP lands. Vegetation composition, field isolation, and field size appear to explain differences in bird counts. Land cover data show that grassland habitat on public lands is scarce and widely scattered. The CRP provides more, and here better, habitat for grassland birds. Funding partly explains this disparity. Trends in farm set-aside program rules and distribution, which can be vary greatly over time, will strongly influence the success or failure of biodiversity conservation in this region. © 2005 by Association of American Geographers.
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39. **A conceptual model and indicators for assessing the ecological condition of agricultural lands.**
Hess, G. R.; Campbell, C. L.; Fiscus, D. A.; Hellkamp, A. S.; McQuaid, B. F.; Munster, M. J.; Peck, S. L.; and Shafer, S. R.
Journal of Environmental Quality 29(3): 728-737. (2000)
NAL Call #: QH540.J6; ISSN: 00472425
Descriptors: agricultural products/ ecosystems/ environmental protection/ farms/ mathematical models/ productivity/ societies and institutions/ agricultural land/ agroecosystems/ sustainability/ agriculture/ agriculture/ conference paper/ ecosystem/ environmental management/ environmental monitoring/ environmental planning
Abstract: As part of an environmental monitoring and assessment effort, we developed a conceptual model for measuring and assessing the condition and sustainability of agroecosystems. An agroecosystem is a field, pasture, or orchard and the associated border areas. We focused on ecological sustainability and defined the goals for agroecosystems in terms of the values people place on them. The purpose of an agroecosystem is to produce food and fiber. Other desired outcomes can be considered as goals for the larger landscape and the rest of the world, and they sometimes function as constraints on production. Condition is defined by agroecosystem productivity and the degree to which farmers use management and stewardship practices that conserve and protect valued natural resources in the landscape and the rest of the world. An agroecosystem in good condition is productive and is managed to conserve valued resources. Sustainability is the maintenance of good condition over time. We developed indicators that link system condition and sustainability to societal values and goals. These indicators measure productivity, management practices that promote

sustainability at the agroecosystem scale, and management practices that promote sustainability at landscape and global scales. Our initial efforts focused on annually harvested herbaceous crops; however, the concepts we used can be adapted to other plant and livestock systems. Our conceptual approach may be used to evaluate the effectiveness of several major programs now being implemented, including the USDA's Environmental Quality Incentive and Conservation Reserve Programs.
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40. **Conducting a financial analysis of quail hunting within the Conservation Reserve Program.**
Williams, C. F. and Mjelde, J. W.
Wildlife Society Bulletin 22(2): 233-241. (Summer 1994)
NAL Call #: SK357.A1W5; ISSN: 0091-7648 [WLSBA6]
Descriptors: colinus virginianus/ hunting/ economic analysis/ federal programs/ Texas
This citation is from AGRICOLA.

41. **Conservation assessment: Henslow's sparrow Ammodramus henslowii.**
Burhans, Dirk E.
St. Paul, MN: North Central Forest Experiment Station, Forest Service, U.S. Department of Agriculture; General Technical Report-NC 226, 2002. 46 p.
Notes: 0363-616X (ISSN); Literature review.
Descriptors: conservation/ reproduction/ ecology/ land zones/ Ammodramus henslowii: conservation measures/ conservation assessment/ United States/ distribution/ biology and conservation assessment/ Aves, Passeriformes, Emberizidae/ birds/ chordates/ vertebrates
Abstract: Apparent population declines of migrant songbirds have resulted in special interest in grassland songbirds, which show some of the most consistent declines among songbirds generally. Among these species, Henslow's Sparrows have the most restrictive habitat requirements and show some of the most serious declines. The Henslow's Sparrow is often overlooked due to its shy, secretive nature and nondescript song. In the Midwest, Henslow's Sparrows historically bred in native tallgrass prairie habitat; in the East, grasslands maintained by natural disturbances or fires set by Native Americans provided habitat for birds like Henslow's Sparrow. Henslow's Sparrows were probably numerous in the Midwest before European settlement and the transition to large-scale grassland development. Declines in the Midwest are largely due to loss of tallgrass habitat; estimates of the tallgrass prairie lost range as high as 99.9 percent. Declines in the East may be due to reforestation and loss of pastures. In addition to loss of prairies and native grasslands throughout the Henslow's Sparrow's range, intensive human use of "secondary grasslands"--hayfields and pastures that contribute to the grassland landscape--has also contributed to habitat decline. Henslow's Sparrows use grassland habitats. Grasslands that provide breeding habitat for Henslow's Sparrow need to be large (generally >30 ha), have a well-developed layer of litter, and contain standing dead vegetation. Some woody shrubs will be used as song perches, but too many shrubs, such as in an old field, will result in unsuitable habitat. Wintering habitats used by Henslow's Sparrow may be much smaller (sometimes <1.0 ha) and may not require litter and standing dead vegetation. With the possible exception of reclaimed strip mines, both wintering and breeding habitats require frequent disturbance, such as fire, grazing, or mowing, to maintain suitability for Henslow's Sparrows. Henslow's Sparrows will not occupy these habitats immediately following severe disturbance, so that in some cases maintaining a desirable tract requires a "mosaic" of recently and not so recently (2-4 years) disturbed habitat parcels. Other recent studies suggest that light to moderate levels of grazing will maintain proper habitat structure throughout an entire tract. Where patches of grassland habitat adjoin one another, removal of fencerows and treelines between patches may facilitate occupancy of smaller breeding habitats. Publicly owned grasslands on both the breeding and wintering grounds, particularly at some U.S.Army installations and National and State Wildlife Refuges, comprise significant habitats having large Henslow's Sparrow populations; yet many significant breeding populations are also found on privately owned lands, including reclaimed strip mines, pastures, hayfields, and ConservationReserve Program (CRP) lands. The future of sparrow populations on private lands is not assured, particularly with declines in dairy farming, increases in intensive grazing, and row cropping of former hayfields. Studies on use of CRP land indicate that this land may provide appropriateHenslow's Sparrow habitat, but continuance of the program and management of grassland succession under CRP are not assured. Present population surveys using Breeding Bird Survey (BBS) routes do not appear well suited for monitoring the species because of the ephemeralnature of Henslow's Sparrow habitat and because the surveys miss some significant populations. Future research needs to more adequately surveyand monitor populations so that potential declines or increases can be accurately assessed. Although much new information on breeding and wintering populations of Henslow's Sparrow has been acquired since Pruitt's 1996 report, more information is needed to determine the extent and viability of populations. Additional data are required on locations of breeding populations and nesting success across a range of fragment sizes; wintering site fidelity, habitat use, and site locations; and management approaches for both wintering and breeding habitat. The above data, when combined with reliable population survey data, will provide a more accurate assessment of how stable the Henslow's Sparrow population is and where or when management should intervene.
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42. **Conservation practices in western Oregon perennial grass seed systems: III. Impacts on gray-tailed vole activity.**
Steiner, J. J.; Gavin, W. E.; Mueller-Warrant, G. W.; Griffith, S. M.; Whittaker, G. W.; and Banowetz, G. M.
Agronomy Journal 99(2): 537-542. (2007);
ISSN: 00021962.
Notes: doi: 10.2134/agronj2006.0165.
Descriptors: conservation tillage/ seeds/ gray-tailed voles/ Microtus canicaudus/ wildlife habitat/ prescribed burns
Abstract: Decreased use of field burning to dispose of straw after harvest of temperate grass seed crops and the implementation of alternative conservation practices including direct seeding (DS) and maximal residue (HR) management have raised questions whether certain pests such as the gray-tailed vole (Microtus canicaudus) are worse than before these changes. The number of vole

burrow holes was determined 15 Jan. 1999 at two research locations in western Oregon. Comparisons were made for the effects of DS and conventional tillage (CT) establishment, maximal and minimal residue (LR) management, present perennial seed crops, and immediate-prior crop in the rotation sequence and two-crops-prior in the rotation sequence. The treatments that most greatly influenced vole activity were crop establishment method and the previous crop in the rotation sequence. Vole activity was greatest in DS tillage establishment and when perennial grass seed was the prior crop in the rotation sequence. A possible production strategy to reduce vole activity could be to include meadowfoam (Limnanthes alba Benth.) or cereals in the rotation sequences when DS perennial grass seed crops are grown. This research demonstrates how vole activity can be reduced in perennial grass seed crops, without the need for tillage before establishment of new stands.
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43. **The Conservation Reserve Program: A wildlife conservation legacy.**
Rude, Kathleen and Wildlife Management Institute.
Washington, D.C.: Wildlife Management Institute, 1994.
15 p.: ll., map.
Notes: Original title: "The Conservation Reserve Program: A wildlife conservation legacy --- America needs the Conservation Reserve Program"; "October, 1994."
NAL Call #: S624.A1C67 1994
Descriptors: Conservation Reserve Program---United States/ Soil conservation---Government policy---United States/ Wildlife conservation---United States
This citation is from AGRICOLA.

44. **Conservation Reserve Program: Alternatives are available for managing environmentally sensitive cropland.**
General Accounting Office
Washington, DC: GAO, 1995.
Notes: GAO/RCED-95-42.
http://www.gao.gov/archive/1995/rc95042.pdf
Descriptors: cultivated lands/ land management/ agriculture/ land use/ water quality/ watershed protection
Abstract: If not properly managed, agricultural production on the nation's 382 million cropland acres can adversely affect the quality of water and air, the productivity of soil, and the availability of wildlife habitat. In an effort to reduce these effects by temporarily removing highly erodible cropland from production, the Congress enacted the Conservation Reserve Program (CRP) in 1985. The CRP was also designed to reduce surplus crop production and support farm income. Under the CRP, the U.S. Department of Agriculture (USDA) contracted with farmers to take 36.4 million acres out of production for 10 years in return for rental and cost-share payments of almost $20 billion through the year 2002. These contracts will begin to expire in 1995, with the contracts for the majority of acres-22 million-expiring in 1996 and 1997.
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45. **The Conservation Reserve Program and duck and pheasant production in St. Croix County, Wisconsin.**
Evrard, J. O.
Madison, Wisconsin: Wisconsin Dept. of Natural Resources; Report 183, 2000. 8 p.
http://digital.library.wisc.edu/
Descriptors: Phasianus colchicus/ Anas discors/ Anas platyrhynchos/ common pheasant/ blue-winged teal/ mallard/ habitat management/ prairie/ cover/ nest
© NISC

46. **The Conservation Reserve Program and grassland birds.**
Johnson, D. H. and Schwartz, M. D.
Conservation Biology 7(4): 934-937. (1993)
NAL Call #: QH75.A1C5; ISSN: 0888-8892
Descriptors: Aves/ grasslands/ environmental restoration/ habitat utilization/ government policy/ United States/ birds
Abstract: Several bird species that breed in the temperate grasslands of North America, many of which winter in the Neotropics, declined in abundance during the past quarter century. The Lark Bunting (see Table 1 for scientific names) and Grasshopper Sparrow, as examples, declined by about half during that period, as indexed by the U.S. Fish and Wildlife Service's Breeding Bird Survey. Populations of other grassland species have also diminished steadily, if not as spectacularly. Why so many species declined is not known, but continued conversion of perennial grassland to annually tilled cropland is a suspected cause. A test of this possibility is offered by the Conservation Reserve Program, a program of the United States Department of Agriculture that caused the reversion of millions of hectares of marginal cropland to perennial grassland. We evaluated the use by breeding birds of selected Program fields in eastern Montana, North Dakota, South Dakota, and western Minnesota. These four states have about four million hectares of land enrolled in the Program.
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47. **The Conservation Reserve Program and northern bobwhite population trends in Illinois.**
Roseberry, J. L. and David, L. M.
Transactions of the Illinois State Academy of Science 87 (1-2): 61-70. (1994)
NAL Call #: 500 IL6; ISSN: 0019-2252
Descriptors: Colinus virginianus/ population status/ land use/ agricultural ecosystems/ Illinois/ management/ birds/ United States
Abstract: We examined 3 indexes of Northern Bobwhite abundance in Illinois at various geographic scales to determine possible relationships with the Conservation Reserve Program. Over 256,000 ha were enrolled in the CRP during the first 9 signup periods (1986-1990). About 87% of this land was in CP-1 vegetation (introduced cool-season grasses and legumes). Male bobwhite call counts in some parts of the state may have been positively related to amounts of CRP land. However, there was no strong evidence that autumn population densities increased as a result of the program. Positive CRP effects on local bobwhite habitat in some areas were probably offset by neutral or negative effects in others. We discuss possible reasons why potential benefits of the CRP for Northern Bobwhite have not been fully realized.
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48. **The Conservation Reserve Program and wildlife habitat in the southeastern United States.**
Carmichael, D. Breck
Wildlife Society Bulletin 25(4): 773-775. (1997)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: conservation programs/ Conservation Reserve Program/ habitat management/ management/ wildlife/ United States, southeastern region
Abstract: The author provides a history of the Conservation Reserve Program in the southeastern United States. A recent cooperative study by the International Association of Fish and Wildlife Agencies and the U.S. Fish and Wildlife Service conducted between 1988 and 1992 showed no significant, long-term enhancement of habitat attributable to the CRP in the Southeast. The author discusses reasons for this lack of success in this region.
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49. **Conservation Reserve Program: Benefit for grassland birds in the northern plains.**
Reynolds, R. E.; Shaffer, T. L.; Sauer, J. R.; and Peterjohn, B. G.
Transactions of the North American Wildlife and Natural Resource Conference 59: 328-336. (1994)
NAL Call #: 412.9 N814; ISSN: 0078-1355
Descriptors: birds/ conservation programs/ ducks/ grassland/ nests and nesting/ waterfowl/ abundance/ cover, nesting/ policies and programs/ statistics/ North Dakota/ South Dakota/ Conservation Reserve Program/ upland nesting/ nest success/ waterfowl production Areas/ Breeding Bird surveys/ population Trends/ grasslands/ North Dakota/ South Dakota/ northern plains
Abstract: The importance of the Conservation Reserve Program (CRP) to upland-nesting ducks and certain other grassland-nesting birds was investigated. For ducks, nest success in CRP cover was compared with nest success in planted cover on waterfowl production areas in the same period (1992-93) and with that of an earlier period (1980-84). For nonwaterfowl, North American Breeding Bird Survey data were used to compare trends in populations of certain species found in CRP, for the Periods 1966-86 (pre-CRP establishment) and 1987-92 (post-CRP cover establishment) in North Dakota.
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50. **Conservation Reserve Program benefits on Henslow's sparrows within the United States.**
Herkert, J. R.
Journal of Wildlife Management 71(8): 2749-2751. (Nov. 2007)
NAL Call #: 410 J827
Descriptors: Conservation Reserve Program/ Henslow's sparrow/ Ammodramus henslowii
Abstract: Henslow's sparrow (Ammodramus henslowii) is one of North America's fastest declining songbirds. Population declines combined with a small global population have led to heightened conservation concern. I used data from the North American Breeding Bird Survey to assess the impact that the Conservation Reserve Program (CRP) has had on Henslow's sparrows throughout their United States breeding range. My analysis suggests local Henslow's sparrow population trends are correlated with CRP enrollment, with populations increasing more in areas with relatively high local CRP enrollment, and that CRP appears to be playing a significant role in reversing long-term population declines.
This citation is from AGRICOLA.

51. **Conservation Reserve Program bibliography.**
Allen, Arthur W.
Fort Collins, CO: Northern Prairie Wildlife Research Center, 1996.
Notes: Version 30SEP2002; Query-searchable bibliography.
http://www.npwrc.usgs.gov/resource/literatr/crpbib/index.htm
Descriptors: Conservation Reserve Program (CRP)/ wildlife habitat/ wildlife management/ cropland/ grassland
Abstract: This bibliography contains citations pertaining to the effects of the Conservation Reserve Program (CRP) on wildlife habitat. Selected additional references relevant to integration of agricultural policy, wildlife management, or other environmental objectives associated with management of agricultural ecosystems also are included.

52. **Conservation Reserve Program (CRP) contributions to avian habitat.**
Allen, A. W.
In: U.S. Fish and Wildlife Service Federal Aid Report, National Biological Survey; Fort Collins, CO: National Ecology Research Center, 1994.
Descriptors: Conservation Reserve Program/ United States/ avian conservation/ landscape management/ habitat management
Abstract: Discusses characteristics of CRP contracts with greatest potential benefits, landscape planning, and management recommendations.

53. **The Conservation Reserve Program: Good for birds of many feathers.**
Kantrud, H. A.; Koford, R. R.; Johnson, D. H.; and Schwartz, M. D.
North Dakota Outdoors 56(2): 14-17. (1993)
Descriptors: state conservation programs/ North Dakota/ Conservation Reserve Program/ population trends/ birds
Abstract: Examined avian species' use and population trends on CRP land in North Dakota.

54. **The Conservation Reserve Program - Planting for the Future: Proceedings of a National Conference.**
Allen, Arthur W. and Vandever, Mark W.
Reston, VA: U.S. Geological Survey; Scientific Investigations Report 2005-5145, 2005. 268 pp.
Notes: Conference held: June 6-9, 2004 at Fort Collins, Colorado.
http://www.fort.usgs.gov/Products/Publications/21490/21490.pdf
Descriptors: Conservation Reserve Program (CRP)/ conservation assessment/ cropland/ prairies/ shrublands/ wildlife
Abstract: In June 2004 the U.S. Department of Agriculture's Farm Service Agency (FSA), with support from the U.S. Geological Survey (USGS), held a three-day symposium on the Conservation Reserve Program (CRP) in Fort Collins, Colorado. These proceedings contain

papers by most of those who made presentations at the symposium, but some were unable to provide written papers. This shortcoming has been addressed in part by addition of papers presenting information on prairie grouse response to the CRP, long-term trends in Southern Plains CRP grassland vegetation, and discussion of FSA support of an investigation to regionally refine management of CRP grasslands to address ecological conditions in the short-grass prairie region.

55. **Conservation Reserve Program: Source or sink habitat for grassland birds in Missouri?**
McCoy, Timothy D.; Ryan, Mark R.; Kurzejeski, Eric W.; and Burger, Loren W.
Journal of Wildlife Management 63(2): 530-538. (1999)
NAL Call #: 410 J827; ISSN: 0022-541X.
Notes: Project Number: MO W-013-R.
Descriptors: Fringillidae/ Passeriformes/ Agelaius phoeniceus/ Ammodramus savannarum/ Carduelis tristis/ Geothlypis trichas/ Spiza americana/ Spizella pusilla/ Sturnella magna/ behavior/ birds/ communities/ Conservation Reserve Program/ ecosystems/ fecundity/ grasslands/ habitat management/ management/ nests-nesting/ species diversity/ wildlife/ wildlife-habitat relationships/ wild birds/ wildlife conservation/ federal programs/ natural resources/ land development, land reform, and utilization (macroeconomics)/ conservation programs/ grassland/ habitat/ reproduction/ statistics/ wildlife-habitat relationships/ population dynamics/ grasshopper sparrow/ field sparrow/ eastern meadowlark/ American goldfinch/ common yellowthroat/ dickcissel/ red winged blackbird/ Missouri/ Knox County/ Macon County/ Linn County
Abstract: The Conservation Reserve Program (CRP) has been credited with contributing substantially to the conservation of grassland birds. Although many species have nested on grasslands established under the CRP, little evidence of positive effect on populations has been reported. We measured reproductive rates and estimated fecundity of 7 grassland bird species in CRP fields in northern Missouri and compared those rates to estimates of fecundity needed to maintain stable populations ($\lambda = 1$). Under conservative assumptions of survival CRP fields seemingly were source habitats (fecundity exceeded levels necessary for $\lambda = 1$ for grasshopper sparrows (Ammodramus savannarum) and field sparrows (Spizella pusilla) in at least 2 of 3 years, 1995 P = 0.02, 1995 P < 0.001) and pooled over 3 years (Ps < 0.001). Although evidence was less compelling CRP fields were likely source habitat for eastern meadowlarks (Sturnella magna) and American goldfinches (Carduelis tristis). For American goldfinches, fecundity was greater than that necessary of $\lambda = 1$ in 1995 (P < 0.001), and pooled over 3 years (< 0.001). Our pooled estimate of fecundity was greater than necessary for $\lambda = 1$ for eastern meadowlarks (Ps < 0.001), but only under a liberal assumption of survival in 2 of 3 years (1993: P = 0.001; 1995: P = 0.088). Fecundity of common yellowthroats (Geothlypis trichas) varied substantially; therefore, source-sink status alternated among years, although the pooled estimate of fecundity was less than required for $\lambda = 1$ (P < 0.001). Dickcissel (Spiza americana) fecundity was consistently less than necessary for $\lambda = 1$ (conservative survival assumption; all Ps < 0.001; liberal survival assumption: 1994 P = 0.009, pooled P = 0.014). For red-winged blackbirds (Agelaius phoeniceus), CRP fields were consistently a sink habitat (all Ps < 0.001). Based on our evidence, the CRP likely has contributed to the conservation of grasshopper sparrows, field sparrows, and eastern meadowlarks. Although large numbers of dickcissels and red-winged blackbirds nested in CRP fields, there is little evidence that the CRP has contributed to populations of those species.
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56. **Conservation Reserve Program: Tree thinning.**
United States, Farm Service Agency
Washington, D.C.: USDA, Farm Service Agency. (1999).
Notes: Fact sheet (United States. Farm Service Agency)
NAL Call #: aS930.C659 1999
Descriptors: Conservation Reserve Program---United States/ Forest thinning---United States/ Conservation of natural resources---United States/ Wildlife habitat improvement---United States
This citation is from AGRICOLA.

57. **Conservation Reserve: Yesterday, Today and Tomorrow, Symposium Proceedings.**
Joyce, L. A.; Mitchell, J. E.; and Skold, M. D.
Fort Collins, CO: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture; General Technical Report-RM 203, 1991. 71 p.
Notes: Meeting held January 14, 1991 at Washington, DC.
Descriptors: agriculture/ future planning projected/ land use/ environmental effects/ decision making/ implementation/ economic impacts/ reserves/ farm management/ contracts/ land ownership/ history/ wildlife/ recreation/ ecology/ crop yields/ land conservation/ resource conservation/ Agricultural Resources Conservation Program/ Food Security Act of 1985/ Farm Bill of 1990/ Conservation Reserve Program/ Great Plains Region United States/ natural resources and earth sciences/ natural resource management/ agriculture and food agricultural equipment/ facilities and operations/ urban and regional technology and development/ regional administration and planning
Abstract: Contents: The Conservation Reserve Program--How Did We Get Where We Are and Where Do We Go From Here; An Overview of the Agricultural Resources Conservation Program; Economics of Livestock and Crop Production on Post-CRP Lands; Landowner Options When CRP Ends; The Conservation Reserve Program: Effects on Soil, Water and Environmental Quality; Conservation Reserve Program Effects on Wildlife and Recreation; Future Costs and Benefits of Conservation Reserve Lands; Impacts of the Conservation Reserve Program in the Central Great Plains; Research Questions Related to the Conservation Reserve Program; Some Sociological and Ecological Effects of the Conservation Reserve Program in the Northern Great Plains; The CRP in Oregon's Columbia Basin: A Local Perspective.

58. **Conserving biological diversity and the Conservation Reserve Program.**
Szentandrasi, S.; Polasky, S.; Berrens, R.; and Leonard, J.
Growth Change 26(3): 383-404. (1995)
NAL Call #: HT390.G74; ISSN: 0017-4815 [GRCHDH].
Notes: Published: Lexington, Ky., College of Business and Economics, University of Kentucky; In the special issue: Wilderness areas. Paper presented at the conference,

"Wilderness areas, regional planning, and the quality of life" held October 8, 1994.
Descriptors: Conservation Reserve Program/ CRP/ habitat conservation/ biological diversity
This citation is from AGRICOLA.

59. **Le Conte's sparrows breeding in Conservation Reserve Program fields: Precipitation and patterns of population change.**
Igl, L. D. and Johnson, D. H.
In: Ecology and conservation of grassland birds of the western hemisphere/ Vickery, P. D. and Herkert, J. R.; Series: Studies in Avian Biology 19, 1999; pp. 178-186.
Descriptors: Conservation Reserve Program/ regional conservation programs/ Great Plains
Abstract: Discussed pattern of population change in Le Conte's Sparrows associated with changes in precipitation and moisture condition.

60. **Contributions of the Conservation Reserve Program to populations of breeding birds in North Dakota.**
Johnson, Douglas H. and Igl, Lawrence D.
Wilson Bulletin 107(4): 709-718. (1995)
NAL Call #: 413.8 W692; ISSN: 0043-5643
Descriptors: Aves/ animals/ birds/ chordates/ nonhuman vertebrates/ vertebrates/ habitat/ North American Breeding Bird Survey
Abstract: Previous studies have shown that habitat provided by the Conservation Reserve Program (CRP), a feature of the 1985 Farm Bill. is used by many birds. The present study quantitatively assesses the importance of the CRP by estimating changes in breeding-bird populations of North Dakota projected if CRP land would revert to cultivation. Of 18 species that were common in CRP or crop fields or both, 12 were more abundant in CRP habitats. Six of these species had suffered significant population declines during 1967-1990. according to the North American Breeding Bird Survey. In contrast, none of the six species that were more common in cropland than in CRP fields had declined significantly. Termination of the Conservation Reserve Program and a return of enrolled land to cultivation is projected to cause populationdeclines in North Dakota exceeding 17% for Sedge Wren (Cistothorus platensis), Grasshopper Sparrow (Ammodramus savannarum), Savannah Sparrow (Passerculus sandwichensis), Dickcissel (Spiza americana), and Lark Bunting (Calamospiza melanocorys).
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61. **Cover quality of Conservation Reserve Program grasslands in Minnesota, USA.**
Haroldson, K.; Kimmel, R.; and Riggs, M.
Gibier Faune Sauvage 15(4): 501-516. (1998); ISSN: 0761-9243.
Notes: Numero Special Tome 1.
Descriptors: Phasianus colchicus (Phasianidae)/ Sturnella (Icteridae)/ farming and agriculture/ conservation measures/ grasslands/ cover quality/ Minnesota/ Conservation Reserve Program/ birds/ chordates/ vertebrates
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62. **Creating quality quail habitat.**
Fiedler, David
Missouri Conservationist 63(5): 22-27. (2002); ISSN: 0026-6515.
Full Text Available at: http://mdc.mo.gov/conmag/2002/05/40.htm
Descriptors: Galliformes/ Odontophoridae/ Colinus virginianus/ birds/ conservation/ conservation programs/ corridors/ ecosystem management/ ecosystems/ farmland/ fires and burns/ habitat management/ land, private/ landowners/ management/ riparian habitat/ wildlife/ quail
Abstract: The author explains the dedicated efforts of Ed Keifner to create a suitable habitat for quails at his Bollinger County, Missouri farm. Keifner was concerned about the low population of quails on his land. A private lands' conservationist attributed this to the thick growth of fescue and broomsedge in his fields, which was hampering the movement of quails. This could be altered by the use of controlled burning of the grassy areas and careful application of herbicides. Moreover, a dense brush cover like thick briar and brush tangles was required in the nearby woody area, which would serve as a nesting and brooding area for the quails. Apart from this, he was advised to establish a strip of vegetation along the stream bank to reduce soil erosion and improve water quality in the Little Whitewater River. This growth would also provide the quails with more cover. Nearly 32 acres of his property was dedicated to making this strip and 10,000 black walnut and burr oak seedlings were planted. He then controlled the growth of weeds around these seedlings. In addition, Kiefner's land was enrolled in the Conservation Reserve Program (CRP), which provided him financial aid from the US Department of Agriculture. His efforts have yielded positive results. In 2000, the Conservation Department set up the Private Land Services Division for providing assistance to over 300,000 private landowners. Their publication "Private Land Services" gives details on all their services and programs.
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63. **Creating wildlife habitat through federal farm programs: An objective-driven approach.**
Burger, L. W.
Wildlife Society Bulletin 34(4): 994-999. (2006)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2006)34[994:CWHTFF]2.0.CO;2.
Descriptors: conservation planning/ Conservation Reserve Program/ Farm Bill/ objective-driven/ private land/ wildlife habitat
Abstract: Conservation programs administrated by the United States Department of Agriculture under the Farm Bill have tremendous potential to impact wildlife habitat and populations on private land. Recent comprehensive reviews demonstrate that private landowners who participate in these programs have established habitats that may contribute to sustaining some regional wildlife populations. However, I argue that if Farm Bill conservation program lands are to consistently provide habitat that supports viable wildlife populations, conservation planners must have a better understanding of species-specific habitat requirements and ecological processes. Concomitantly, wildlife biologists also must have a working knowledge of the conservation programs, practices, and landowner needs and eligibility requirements. This understanding is

then translated to changes on the landscape through comprehensive planning and implementation at the farm scale. I argue that, all too often, landowner's selection of conservation practices is program-driven. Program-driven implementation is less likely to result in quality wildlife habitat. I contend that the consistent application of an objective-driven approach to farm-scale conservation planning is more likely to produce habitats that sustain viable wildlife populations. Under this approach, landowner conservation objectives drive management practices and management practices lead to program selection, instead of program requirements driving management practices.
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64. **The CRP and wildlife habitat.**
Bucklin, R.
Agricultural Outlook (AO)(162): 30-31. (Apr. 1990)
NAL Call #: aHD1751.A422; ISSN: 0099-1066
Descriptors: wildlife/ habitats/ land management/ farm surveys/ farm income/ United States/ Conservation Reserve Program/ farm costs and returns surveys
This citation is from AGRICOLA.

65. **CRP land and game bird production in the Texas High Plains.**
Berthelsen, P. S.; Smith, L. M.; and Coffman, C. L.
Journal of Soil and Water Conservation 44(5): 504-507. (1989)
NAL Call #: 56.8 J822 ; ISSN: 0022-4561
Descriptors: agricultural practices/ game management/ Aves/ Texas/ government policy/ habitat conservation/ birds/ wildlife management
Abstract: Soil Conservation Service personnel were surveyed about the land enrolled in the Conservation Reserve Program (CRP) in the Southern High Plains of Texas (71 counties, 903,215 ha). Information included type of cover established, land enrolled, establishment success, and cost of establishment for five conservation practices (CP1, 2, 4, 10, 12). Land in permanent introduced grasses (CP1) and permanent native grasses (CP2) accounted for 98% of the total CRP land. Establishment costs for the most common cover types averaged $142.90/ha ($57.85/acre). Establishment success was 87%. Ring-necked pheasant and waterfowl production in a four-county area was estimated on selected CRP grass combinations (blue grama/side-oats grama mixtures, blue grama/Kleingrass mixtures, and blue grama/old world bluestem mixtures) using 1988 nesting information and land enrollment figures. Estimated pheasant production was 174,204 chicks/year. Water-fowl production was estimated at 1,426 ducklings/year.
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66. **CRP, succession, and Brewer's sparrows: Advantages of a long-term, federal land retirement program.**
Igl, Lawrence D. and Murphy, Lisa A.
South Dakota Bird Notes 48(3): 69-70. (1996); ISSN: 0038-3252
Descriptors: Fringillidae/ Passeriformes/ Spizella breweri/ behavior/ birds/ breeding/ conservation programs/ Conservation Reserve Program/ distribution/ ecosystems/ grasslands/ habitat use/ home range-territory/ range extension/ succession/ vocalization/ Brewer's sparrow/ Artemisia spp/ South Dakota: Butte County
Abstract: Brewer's sparrows have extended their breeding range to the grasslands created by the Conservation Reserve Program in Butte County, South Dakota. These grasslands provide habitat for sagebrush nesting and other shrubland bird species.
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67. **Decline of the red-winged blackbird population in Ohio correlated to changes in agriculture (1965-1996).**
Blackwell, B. F. and Dolbeer, R. A.
Journal of Wildlife Management 65(4): 661-667. (2001)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: Agelaius phoeniceus/ habitat/ hay/ Ohio/ population decline/ red-winged blackbird/ agricultural land/ habitat selection/ land use change/ passerines/ United States/ Agelaius phoeniceus/ Glycine max/ Medicago sativa/ Zea mays
Abstract: Based on North American Breeding Bird Survey (BBS) data since 1966, Ohio has traditionally hosted 1 of the highest breeding season densities of red-winged blackbirds (Agelaius phoeniceus) of any U.S. state or Canadian province. However, from 1966 through 1996, breeding populations of red-winged blackbirds in Ohio showed a marked decline ($\bar{x}$% change/yr in birds per route = -3.9), with breeding population indices decreasing by over 53%. Because the red-winged blackbird successfully adapted to habitats created by agricultural expansion over the last century and became a recognized pest of crops such as corn (Zea mays), understanding the decline of this species in Ohio is important from both ecological and damage control perspectives. We examined 35 crop and climatic factors relative to their relationship with the observed breeding population trend for the red-winged blackbird in Ohio 1966 to 1996. Each year, we found that the area of non-alfalfa (Medicago sativa) hay harvested, the combined area of corn and soybeans (Glycine max) harvested, the area of non-alfalfa hay cut by 30 May of the index year (1966-1996), and the area of hay (all types) cut by 30 May of the year prior to the index best explained the variance in the breeding population trend of the red-winged blackbird in Ohio. Given our findings, we suggest that a long-term population trend for this abundant bird in Ohio is negatively associated with the efficiency and expansion of modern agriculture.
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68. **Demographic characteristics of a grasshopper sparrow population in a highly fragmented landscape of western New York State.**
Balent, Karla L. and Norment, Christopher J.
Journal of Field Ornithology 74(4): 341-348. (2003)
NAL Call #: 413.8 B534; ISSN: 0273-8570
Descriptors: Ammodramus savannarum/ Passeriformes/ Emberizidae/ population studies/ reproduction/ terrestrial ecology/ adult return rates/ breeding biology/ colonization/ demographic characteristics/ dispersal/ extirpation/ fragmented landscape/ grassland habitat/ habitat loss/ nest success/ population ecology/ site fidelity/ territorial defense/ home range/ territory/ continuous grassland habitat maintenance/ distribution/ grasslands/ ecosystems/ habitat management/ Monroe County, NY/ Mendon Ponds County Park/ New York/ status/ survival/ behavior/ conservation/ wildlife management/ habitat use/ land zones
Abstract: We studied the breeding biology, site fidelity, and dispersal of Grasshopper Sparrows (Ammodramus

savannarum) from 1996 to 2000 in a fragmented landscape in western New York State. Ten fields (1.8-13.2 ha) contained territorial male Grasshopper Sparrows during the study; total territorial males in the study area varied between 31 and 19 birds. In 1996, eight fields were occupied; five extinctions and two colonizations occurred between 1997-2000. Fields that suffered extinctions were smaller than fields in which subpopulations persisted or colonizations occurred. Adult return rates (0.33 vs. 0.16), nest success (0.59 vs. 0.25) and average number of fledglings/female/year (2.3 vs. 1.3) tended to be higher in fields ≥ 8 ha. Estimates of λ, the finite rate of increase, were 0.23 for small fields and 0.46 for large fields. Although sample sizes were small, our data suggest that return rates and productivity were greater in large than in small habitat patches. However, even the larger habitat patches in our study area appeared to function as population sinks, suggesting that the Grasshopper Sparrow population is unlikely to persist without immigration. Survival prospects for our study population are poor, given its demographic characteristics and the fragmented nature and continuing loss of grassland habitat. Our results suggest that conservation efforts in the Northeast should focus on protecting large patches of continuous grassland habitat.
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69. **Demographics of northern bobwhite on agricultural and intensively-managed bobwhite plantation landscapes.**
Hughes, Daymond W.; Terhune, Theron M.; Sisson, D. Clay; and Stribling, H. Lee
Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies 59: 30-42. (2005)
NAL Call #: SK1.S6; ISSN: 0276-7929
Descriptors: conservation measures/ reproduction/ behavior/ ecology/ habitat utilization/ terrestrial habitat/ man-made habitat/ land zones/ Colinus virginianus: habitat management/ reproductive productivity/ home range/ population dynamics/ demographic studies/ agricultural vs intensively managed plantation landscapes/ distribution within habitat/ habitat preference/ forest and woodland/ cultivated land habitat/ Georgia/ Baker County/ Aves, Galliformes, Phasianidae/ birds/ chordates/ vertebrates
Abstract: The declining bobwhite populations evident throughout the Southeast are cause for concern. Whereas habitat loss and/or intensified agriculture have been implicated as two potential causal mechanisms for these declines, few studies have directly compared bobwhite demographics between agricultural and managed bobwhite plantation landscapes. Therefore, we monitored northern bobwhite (Colinus virginianus; hereafter, bobwhite) via radiotransmitters (N = 472) on a center-pivot irrigated agricultural landscape (N = 154) and an adjacent, intensively-managed bobwhite plantation (N = 318) to evaluate differences in home range, habitat use, survival, and nest survival between these two landscapes. Winter covey home ranges were larger during fall-winter 1998-99 on the agriculture site (P < 0.001). Coveys on the agricultural landscape used young planted pines (Pinus spp.) greater than expected (P < 0.05) during both years. Annual survival did not differ between sites during 1997-98 (P = 0.199) but was lower on the agriculture site (0.081, SE = 0.04) than the plantation (0.297, SE = 0.05) during 1998-99 (P < 0.001). Daily nest survival was lower on the agriculture site (0.939, SE = 0.02) than the plantation (0.979, SE = 0.01) during the 1998 nesting season (P = 0.030) but not during 1997 (P = 0.782). We surmised that large home ranges, low over-winter survival, and low nest survival observed on the agriculture site was related to poor habitat conditions and subsequent limited food resources. Thus, when agricultural landowner objectives are to benefit bobwhite, management endeavors should focus on augmenting habitat in agricultural fields, particularly during fall and winter, and, improving existing habitats (e.g., dry corners, young planted pines).
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70. **Density and fledgling success of grassland birds in Conservation Reserve Program fields in North Dakota and west-central Minnesota.**
Koford, R. R.
Studies in Avian Biology 19: 187-195. (1999)
NAL Call #: QL671.S8
Descriptors: Conservation Reserve Program/ State conservation programs/ Minnesota/ North Dakota
Abstract: Studied how CRP field habitat influences grassland bird density and fledgling success.

71. **Diets of swift foxes (Vulpes velox) in continuous and fragmented prairie in northwestern Texas.**
Kamler, J. F.; Ballard, Warren B.; Wallace, Mark C.; and Gipson, Philip S.
Southwestern Naturalist 52(4): 504-510. (Dec. 2007)
NAL Call #: 409.6 So8
Descriptors: swift foxes/ Vulpes velox/ diets/ habitat fragementation/ prairies/ wildlife habitat/ Texas
Abstract: Distribution of the swift fox (Vulpes velox) has declined dramatically since the 1800s, and suggested causes of this decline are habitat fragmentation and transformation due to agricultural expansion. However, impacts of fragmentation and human-altered habitats on swift foxes still are not well understood. To better understand what effects these factors have on diets of swift foxes, scats were collected in northwestern Texas at two study sites, one of continuous native prairie and one representing fragmented native prairie interspersed with agricultural and fields in the Conservation Reserve Program. Leporids, a potential food source, were surveyed seasonally on both sites. Diets of swift foxes differed between sites; insects were consumed more on continuous prairie, whereas mammals, birds, and crops were consumed more on fragmented prairie. Size of populations of leporids were 2–3 times higher on fragmented prairie, and swift foxes responded by consuming more leporids on fragmented (11.1% frequency occurrence) than continuous (3.8%) prairie. Dietary diversity was greater on fragmented prairie during both years of the study. Differences in diets between sites suggested that the swift fox is an adaptable and opportunistic feeder, able to exploit a variety of food resources, probably in relation to availability of food. We suggest that compared to continuous native prairie, fragmented prairie can offer swift foxes a more diverse prey base, at least within the mosaic of native prairie, agricultural, and fields that are in the Conservation Reserve Program.
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72. **Diversity of arthropod prey of grassland birds on different Conservation Reserve Program habitat types.**
Mcintyre, Nancy E.
In: 87th Annual Meeting of the Ecological Society of America and the 14th Annual International Conference of the Society for Ecological Restoration, Tucson, Arizona, USA; August 04-09, 2002.; Vol. 87.; pp. 391; 2002.
Descriptors: biodiversity/ terrestrial ecology: ecology, environmental sciences/ Conservation Reserve Program/ arthropod community/ avian prey abundance/ avian prey diversity/ habitat type/ prey diversity/ vegetation structure/ vegetative diversity/ vegetative physiognomy
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73. **Do artificial nests reveal meaningful patterns of predation in Kansas grasslands?**
Robel, R. J.; Hughes, J. P.; Keane, T. D.; and Kemp, K. E.
Southwestern Naturalist 48(3): 460-464. (2003)
NAL Call #: 409.6 So8 ; ISSN: 0038-4909
Descriptors: environment-ecology/ duck nests/ success/ prairie/ fragmentation/ dickcissels/ habitats/ cropland/ density/ birds/ Iowa
Abstract: We determined the fates of artificial and natural bird nests in Conservation Reserve Program (CRP) fields in northeastern Kansas from mid May through early August 1994. The CRP fields had been planted to native grasses in 1988 or 1989. Artificial nests contained Japanese quail (Coturnix japonica) or house sparrow (Passer domesticus) eggs in nest baskets in bunchgrass clumps to simulate nests of dickcissels (Spiza americana), the most common avian species nesting in the CRP fields. Natural dickcissel nests were found by rope dragging and intensive searches of the CRP fields. Losses among 562 artificial nests did not differ by egg type; however, the 9.8% loss of artificial nests was significantly lower than the 70.1% loss-level among 97 natural dickcissel nests in those CRP fields. The daily survival rate for artificial nests was 0.99, significantly more than the 0.92 for natural dickcissel nests. An assessment of nest depredation based on data from artificial nests might not be representative of depredation on natural nests in grasslands.
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74. **Do riparian buffer strips mitigate the impacts of clearcutting on small mammals?**
Cockle, K. L. and Richardson, J. S.
Biological Conservation 113(1): 133-140. (Sept. 2003)
NAL Call #: S900.B5
Descriptors: forestry/ Insectivores/ populations/ riparian zones/ rodents/ clearcutting/ mammal/ riparian zone
Abstract: We assessed the impact of clearcutting on small mammals in riparian areas and evaluated riparian buffer strips as a tool for conserving small mammals in managed forests. Over two summers, we trapped small mammals of seven species in riparian areas in southwestern British Columbia, Canada. Communities of small mammals were compared across three different habitat types: (1) clearcut to the stream bank, (2) clearcut with a 30 m riparian buffer strip, and (3)control (no logging). Species richness was significantly lower in clearcuts than in controls and buffers. On clearcut sites, creeping voles were more abundant, but red-backed voles and dusky shrews were less abundant than at the control sites. At sites with riparian buffer strips, both voles were present in numbers similar to those found in controls, but dusky shrews were less common. Significantly more deer mice and creeping voles were infested with bot flies at clearcut sites than at buffer sites, and no animals were infested at any of the control sites. Riparian reserves appear to be useful in reducing the short-term impacts of clearcutting on small mammal communities, though they do not eliminate these impacts altogether.
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75. **Does habitat fragmentation influence nest predation in the shortgrass prairie?**
Howard, Melissa N.; Skagen, Susan K.; and Kennedy, Patricia L.
Condor 103(3): 530-536. (2001)
NAL Call #: QL671.C6; ISSN: 0010-5414
Descriptors: birds/ behavior/ nest predation/ nests-nesting/ ecosystems/ prairies/ grasslands/ agricultural practices/ habitat islands/ habitat alterations/ Conservation Reserve Program/ Colorado, Northeastern
Abstract: The authors examined the effects of habitat fragmentation and vegetation structure of shortgrass prairie and Conservation Reserve Program (CRP) lands on predation rates of artificial and natural nests in northeastern Colorado. The CRP provides federal payments to landowners to take highly erodible cropland out of agricultural production. In this study area, CRP lands have been reseeded primarily with non-native grasses, and this vegetation is taller than native shortgrass prairie. The authors measured three indices of habitat fragmentation (patch size, degree of matrix fragmentation, and distance from edge), none of which influenced mortality rates of artificial or natural nests. Vegetation structure did influence predation rates of artificial nests; daily mortality decreased significantly with increasing vegetation height. Vegetation structure did not influence predation rates of natural nests. CRP lands and shortgrass sites did not differ with respect to mortality rates of artificial nests. The study area is only moderately fragmented; 62% of the study area is occupied by native grassland. The authors conclude that the extent of habitat fragmentation in their study area does not result in increased predation in remaining patches of shortgrass prairie habitat.
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76. **Duck nest success on Conservation Reserve Program land in the Prairie Pothole region.**
Kantrud, H. A.
Journal of Soil and Water Conservation 48(3): 238-242. (May 1993-June 1993)
NAL Call #: 56.8 J822 .
http://www.npwrc.usgs.gov/resource/birds/crpdns/index.htm
Descriptors: waterfowl/ ducks/ nesting/ Conservation Reserve Program/ Prairie Pothole region
Abstract: Implementing Agricultural Conservation Practices: Barriers and Incentives is one in a multi-volume set developed by the Water Quality Information Center at the National Agricultural Library in support of the U.S. Department of Agriculture's Conservation Effects Assessment Project (CEAP). The bibliography is a guide to recent literature examining agricultural producers' views of conservation programs and practices. It provides people working in the area of agriculture and the environment with

a guide to information resources that focus on the psychological and socioeconomic factors that influence agricultural producers' behavior with regard to environmental issues.
This citation is from AGRICOLA.

77. **The dynamics of nongame bird breeding ecology in Iowa alfalfa fields.**
Frawley, B. J.
Ames, IA: Iowa State University, 1989.
Notes: M.S. Thesis
Descriptors: Conservation Reserve Program/ State conservation programs/ Iowa
Abstract: Nesting, abundance, and density of nongame birds in Iowa alfalfa fields were addressed and linked to CRP.

78. **Earthworm, infiltration, and tillage relationships in a dryland pea-wheat rotation.**
Wuest, Stewart B.
Applied Soil Ecology 18(2): 187-192. (2001)
NAL Call #: QH541.5.S6 A67; ISSN: 0929-1393
Descriptors: commercial activities/ ecology/ population dynamics/ terrestrial habitat/ man-made habitat/ land and freshwater zones/ Aporrectodea trapezoides (Oligochaeta): farming and agriculture/ farming practices/ population density/ soil habitat/ cultivated land habitat/ Oregon/ Pendleton/ cultivated soil habitat/ farming practices effects/ Oligochaeta/ Annelida/ Annelids/ invertebrates
Abstract: Dryland farming in the Mediterranean climate of the Pacific Northwest, USA supports extremely low earthworm populations under conventional tillage. Increases in earthworm populations are being observed in fields under no-till cropping systems. A 30+ year experiment with four tillage levels in a pea (Pisum sativum L.)-winter wheat (Triticum aestivum L.) rotation was evaluated for earthworm populations and ponded infiltration rates. Where tillage has been limited to 2.5 cm depth, Apporectodea trapezoides (Duges) mean population was 25 m-2. Plots subject to tillage by plow (25 cm depth) or chisel (35 cm depth) averaged less than 4 earthworms m-2. The shallow tillage treatment also had the highest average infiltration rate of 70 mm h-1 compared to 36 for chisel, 27 for spring plow, and 19 mm h-1 for fall plow treatments. The highly variable nature of earthworm counts and infiltration measurements prevented conclusive correlation between the two, but increases in both can be attributed to minimum tillage.
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79. **Earthworm (Lumbricidae) survey of North Dakota fields placed in the U.S. Conservation Reserve Program.**
Deibert, E. J. and Utter, R. A.
Journal of Soil and Water Conservation 58(1): 39-45. (2003)
NAL Call #: 56.8 J822; ISSN: 0022-4561
Descriptors: electrical conductivity/ environmental impact/ habitat selection/ habitats/ nitrate nitrogen/ particle size/ phosphorus/ population distribution/ potassium/ precipitation/ sand fraction/ soil chemical properties/ soil organic matter/ soil pH/ soil physical properties/ spatial distribution/ surveys/ survival/ Aporrectodea caliginosa/ earthworms/ Lumbricus rubellus/ North Dakota/ United States/ Dendrobaena octaedra/ Aporrectodea/ Lumbricidae/ Oligochaeta/ Annelida/ invertebrates/ animals/ Dendrobaena/ Lumbricus
Abstract: Twenty-three field sites in North Dakota, where highly erodible soil is placed under permanent vegetation in the U.S. Conservation Reserve Program (CRP) from five to eight years, were surveyed for the presence or absence of earthworms. Soils were sampled to determine chemical and physical properties, and soil cores were collected to estimate earthworm populations. Earthworm species identified at 12 CRP sites were Aporrectodea tuberculata (Eisen), Aporrectodea trapezoids (Duges), Aporrectodea caliginosa (Savigny), Dendrobaena octaedra (Savigny), and Lumbricus rubellus (Hoffmeister). Sites with earthworms were associated with organic matter levels of greater than 2.5%. Sand content of the 11 sites without earthworms averaged 67% (± 13), and the soil usually contained what appeared to be sharp shiny crystals or grains that might not be ideal for earthworm survival. Dendrobaena octaedra and Lumbricus rubellus were found at sites with the highest soil organic matter and nitrate-N levels plus low sand percent. Soil P, K, pH and EC levels were not related to the presence or absence of earthworms in these CRP sites. Total earthworm population estimates from five CRP sites averaged 6.3 million ha-1 (± 4.7), with adults, juveniles, and cocoons at 0.6 (± 0.4), 4.5 (± 3.1), and 1.2 (± 2.0) million ha-1, respectively. Earthworm populations along a 90-meter transect from the edge of the CRP field were similar when averaged over the five sites. An estimate of population at the other seven earthworm sites was not possible because environmental stress as earthworms tended to migrate only to areas in the field where taproot plant species were located. The presence of wetlands or tree habitat in these CRP fields could not be used as criteria for determining the presence of earthworms.
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80. **Eastern meadowlarks nesting in rangelands and Conservation Reserve Program fields in Kansas.**
Granfors, D. A.; Church, K. E.; and Smith, L. M.
Journal of Field Ornithology 67(2): 222-235. (1996)
NAL Call #: 413.8 B534; ISSN: 0273-8570
Descriptors: Sturnella magna/ nests/ site selection/ rangelands/ old fields/ ecosystem management/ Kansas/ birds/ United States
Abstract: Eastern Meadowlark (Sturnella magna) nesting habitat was studied to make management recommendations for fields enrolled in a federal land retirement program. We compared available microhabitat, nest-site selection, and nest success on rangelands and Conservation Reserve Program (CRP) fields in eastern Kansas. Daily nest survival rates and numbers fledged per female did not differ significantly between land-use types, but the power of these tests was low. Predation was the primary source of nest failure throughout incubation, hatching, and nestling stages; abandonment, trampling, inviability, and unknown causes also were important during incubation. Mowing CRP fields was a source of nest failure and also induced adults to abandon some fields. CRP fields had a significantly higher percent, depth, and density of litter cover; a taller herbaceous canopy; less herbaceous cover; and more standing dead cover than rangelands. Differences in habitat structure indicate that CRP has increased the diversity of available nesting habitats. Eastern Meadowlarks selected nest sites with significantly greater litter cover, higher proportion of grass, more

uncompacted litter, and more structural homogeneity than available on random plots. Delay of mowing and prescribed burning are recommended to enhance and maintain habitat suitability for nesting Eastern Meadowlarks in CRP fields.
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81. **Ecology of Columbian sharp-tailed grouse associated with Conservation Reserve Program and reclaimed surface mine lands in northwestern Colorado.**
Boisvert, J. H.
Moscow, USA: University of Idaho, 2002.
Notes: Thesis
Descriptors: sharp-tailed grouse/ Conservation Reserve Program/ reclaimed surface mine lands/ Colorado

82. **Effect of field borders and nest-predator reduction on abundance of northern bobwhites.**
Palmer, William E.; Wellendorf, Shane D.; Gillis, James R.; and Bromley, Peter T.
Wildlife Society Bulletin 33(4): 1398-1405. (2005)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: conservation measures/ nutrition/ diet/ prey/ ecology/ community structure/ predators/ man-made habitat/ land zones/ Colinus virginianus: habitat management/ fallow field borders/ relative abundance/ fallow field borders and mammalian nest predation reduction effects/ farm habitat/ mammalian predators/ cultivated land habitat/ North Carolina/ Hyde/ Tyrell and Wilson County/ Aves, Galliformes, Phasianidae/ birds/ carnivores/ chordates/ mammals/ marsupials/ vertebrates
Abstract: Fallow-field borders along edges of crop fields have been promoted for increasing northern bobwhites (Colinus virginianus) on farms and are a component of recovery plans for this species. However, research on bobwhite population response to field-border practices is sparse. Previous research on 2 farms documented increased use of farm fields and greater reproduction by bobwhites on farms with field borders, but nesting success was low during May and June. Bobwhite population response to field-border practices may increase when they are combined with nest-predator reduction on farms. Effect of nest-predator reduction on bobwhite populations on farmed landscapes has not been investigated in the Southeast. Therefore, we tested the effects of field borders and mesomammal nest-predator reduction on bobwhite abundance on 12 farms in eastern North Carolina, 1997-1999. We applied treatments to farms as factorial combinations. Reduction of mesomammal nest predators, including raccoons (Procyon lotor), Virginia opossums (Didelphis virginiana), and foxes (Urocyon cinereoargenteus and Vulpes vulpes), Occurred from February-May of each year. To assess bobwhite response to treatments, we measured summer abundance of males using variable-radius point counts and covey abundance on farms in September and October using morning covey-call surveys. Bobwhites were more abundant on farms with field borders during summer (P=0.08). On field-border farms we heard 1.8x the number of coveys heard on farms without field borders (P=0.004). Summer abundance of bobwhites did not differ as a result of predator reductions (P=0.37), and we heard slightly fewer coveys on predator-reduction farms (P =0.084) during autumn. However, we heard more coveys on farms with both field borders and predator reduction compared to all other farms (P=0.022). Field-border systems were a practical management technique to increase autumn abundance of bobwhites on individual farms in eastern North Carolina.
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83. **Effects of agricultural diversification on the abundance, distribution, and pest control potential of spiders: A review.**
Sunderland, K. and Samu, F.
Entomologia Experimentalis et Applicata 1: 1-13. (2000); ISSN: 0013-8703
Descriptors: population density/ population dynamics/ agricultural practices/ pest control/ Araneae/ agriculture/ applied entomology
Abstract: A review of the literature showed that spider abundance was increased by diversification in 63% of studies. A comparison of diversification modes showed that spider abundance in the crop was increased in 33% of studies by `aggregated diversification' (e.g. intercropping and non-crop strips) and in 80% of studies by `interspersed diversification' (e.g., undersowing, partial weediness, mulching and reduced tillage). It is suggested that spiders tend to remain in diversified patches and that extending the diversification throughout the whole crop (as in interspersed diversification) offers the best prospects for improving pest control. There is little evidence that spiders walk in significant numbers into fields from uncultivated field edges, but diversification at the landscape level serves to foster large multi-species regional populations of spiders which are valuable as a source of aerial immigrants into newly planted crops. There are very few manipulative field studies where the impact of spiders on pests has been measured in diversified crops compared with undiversified controls. It is encouraging, however, that in those few studies an increased spider density resulted in improved pest control. Future work needs are identified.
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84. **Effects of alternative cotton agriculture on avian and arthropod populations.**
Cederbaum, S. B.; Carroll, J. P.; and Cooper, R. J.
Conservation Biology 18(5): 1272-1282. (2004)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1111/j.1523-1739.2004.00385.x.
Descriptors: agroecosystems/ alternative agriculture/ clover/ conservation tillage/ cover crop/ integrated pest management/ r elay stripcover/ songbirds/ agricultural ecosystem/ arthropod/ conservation/ cotton/ songbirds/ Georgia/ Arthropoda/ Aves/ Galliformes/ Gossypium/ Gossypium hirsutum/ Passeri/ Trifolium
Abstract: Among the major agricultural crops in the southeastern United States, cotton (Gossypium hirsutum L.) generally provides the least suitable habitat for most early successional songbirds. Newer cropping approaches, such as use of conservation tillage and stripcover cropping, offer hope for improving the ecological value of cotton fields. We examined the effects of clover stripcover cropping with conservation tillage versus conventionally grown cotton with either conventional or conservation tillage on avian and arthropod species composition and field use in east-central Georgia. Stripcover fields had higher bird densities and biomass and higher relative abundance of arthropods than both conservation tillage and conventional

fields. During migration and breeding periods, total bird densities on stripcover fields were 2-6 times and 7-20 times greater than on conservation and conventional fields, respectively. Abundance and biomass for epigeal arthropods were also greatest on stripcover fields during much of the breeding season. Although the clover treatment attracted the highest avian and arthropod densities, conservation fields still provided more wildlife and agronomic benefits than conventional management. Our findings suggest that both conservation tillage and stripcropping systems will improve conditions for birds in cotton, with stripcropped fields providing superior habitat. The reduction of inputs possible with the clover system could allow farmers to lower costs associated with conventional cotton production by $282-317/ha. This reduction of input, coupled with similar or possibly increased yield over conventional systems makes stripcover cropping not only a good choice for reducing negative impacts on wildlife and surrounding ecosystems, but also an economically desirable one.
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85. **Effects of burning and discing Conservation Reserve Program fields to improve habitat quality for northern bobwhite (Colinus virginianus).**
Greenfield, K. C.; Chamberlain, M. J.; Burger, L. W.; and Kurzejeski, E. W.
American Midland Naturalist 149(2): 344-353. (Apr. 2003)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: vegetation/ wildlife/ Conservation Reserve Program/ northern bobwhite/ Colinus virginianus
Abstract: Since 1985 considerable expanses of highly erodible cropland have been enrolled in the Conservation Reserve Program (CRP). Areas enrolled in CRP provide wildlife habitat; however, habitat quality and specific resources on these sites vary in relation to seasonal biological processes of target wildlife species, planted cover and vegetation succession. Throughout the southeastern United States habitat quality for early successional species, such as northern bobwhite (Colinus virginianus), may decline as CRP grasslands age. Although disturbance may-enhance and maintain habitat quality for bobwhite, concerns regarding perceived conflicts between wildlife habitat and soil erosion objectives of the CRP persist. During 1995 and 1996 we evaluated effects of strip- discing or prescribed burning on vegetation structure and composition and soil erosion in fescue (Festuca arundiacea) dominated CRP fields in Mississippi. Fall discing generally increased percentage bare ground and plant diversity and decreased percentage litter cover and litter depth. Fall discing enhanced bobwhite habitat quality, but responses diminished by the second growing season post treatment. Burning increased plant diversity and improved quality of habitat for bobwhite. Soil loss for all treatments was within United States Department of Agriculture tolerable limits. Discing or burning intensity on CRP fields could be increased without compromising soil erosion provisions of CRP.
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86. **Effects of conservation practice, mowing, and temporal changes on vegetation structure on CRP fields in northern Missouri.**
McCoy, Timothy D.; Kurzejeski, Eric W.; Burger, Loren W.; and Ryan, Mark R.
Wildlife Society Bulletin 29(3): 979-987. (2001)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: conservation measures/ terrestrial habitat/ man-made habitat/ land and freshwater zones/ Aves: habitat management/ grassland/ cultivated land habitat/ Conservation Reserve Program fields/ vegetation structure/ habitat conservation value/ Missouri/ North/ fields management/ birds/ chordates/ vertebrates
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87. **Effects of Conservation Reserve Program field age on avian relative abundance, diversity, and productivity.**
Millenbah, K. F.; Winterstein, S. R.; Campa, H.; Furrow, L. T.; and Minnis, R. B.
Wilson Bulletin 108(4): 760-770. (1996)
NAL Call #: 413.8 W692; ISSN: 0043-5643
Descriptors: Aves/ species richness/ abundance/ productivity/ fields/ age/ Michigan/ birds/ United States
Abstract: Introduced grass dominated Conservation Reserve Program (CRP) fields were monitored in summer 1992 in Gratiot County, Michigan, to determine the relationship between field age and avian relative abundance, diversity, and productivity. Younger CRP fields (1-2 years old), best described as a combination of forbs and bare ground, had the greatest diversity and relative abundance of avian species. Older CRP fields (3-5/6 years old) were a combination of grasses and deep litter cover and had the greatest avian productivity. We recommend that after 3-5 growing seasons CRP fields be manipulated to provide a variety of successional stages to maintain simultaneously high avian relative abundance, diversity, and productivity.
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88. **Effects of Conservation Reserve Program seeding regime on harvester ants (Pogonomyrmex), with implications for the threatened Texas horned lizard (Phrynosoma cornutum).**
McIntyre, N. E.
Southwestern Naturalist 48(2): 274-277. (2003)
NAL Call #: 409.6 So8 ; ISSN: 0038-4909
Descriptors: environment-ecology/ fire ants/ hymenoptera/ formicidae/ grassland/ birds
Abstract: I compared the presence and abundance of nest-sites made by harvester ants (Pogonomyrmex), the primary prey for the endangered Texas horned lizard (Phrynosoma cornutum), among restored grassland plots planted in different grass species and indigenous prairie. The restored plots had been seeded as part of the Conservation Reserve Program (CRP) as exotic monocultures of either Old World bluestem (Bothriochloa ischaemum) or weeping lovegrass (Eragrostis curvula), or as mixtures of native grasses (both with and without buffalograss, Buchloe dactyloides). On average, the fewest ant mounds were found on Old World bluestem plots, whereas the indigenous grassland had the highest density of harvester ant mounds. However, there were no significant differences between native and exotic CRP plantings. Results obtained from a simultaneous

visual survey for Texas horned lizards corroborate these findings. Thus, there is no evidence that CRP plots planted in exotic grasses are significantly poorer habitat for Texas horned lizards in terms of ant abundance than native grass plantings.
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89. **Effects of CRP field age and cover type on ring-necked pheasants in eastern South Dakota.**
Eggebo, S. L.; Higgins, K. F.; Naugle, D. E.; and Quamen, F. R.
Wildlife Society Bulletin 31(3): 779-785. (2003)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: environment-ecology/ Conservation Reserve Program/ cool season/ cover/ CRP/ habitat/ Phasianus colchicus/ ring necked pheasant/ South Dakota/ warm season/ Conservation Reserve Program/ grassland bird conservation/ vegetation/ populations/ abundance/ models
Abstract: Loss of native grasslands to tillage has increased the importance of Conservation Reserve Program (CRP) grasslands to maintain ring-necked pheasant (Phasianus colchicus) populations. Despite the importance of CRP to pheasants, little is known about the effects of CRP field age and cover type on pheasant abundance and productivity in the northern Great Plains. Therefore, we assessed effects of these characteristics on pheasant use of CRP fields. We stratified CRP grasslands (n=42) by CRP stand age (old [10-13 yrs] vs. new [1-3 yrs] grasslands) and cover type (CP1 [cool-season grasslands] vs. CP2 [warm-season grasslands]) in eastern South Dakota and used crowing counts and roadside brood counts to index ring-necked pheasant abundance and productivity. Field-age and cover-type effects on pheasant abundance and productivity were largely the result of differences in vegetation structure among fields. More crowing pheasants were recorded in old cool-season CRP fields than any other age or cover type, and more broods were recorded in cool- than warm-season CRP fields. Extending existing CRP contracts another 5-10 years would provide the time necessary for new fields to acquire the vegetative structure used most by pheasants without a gap in habitat availability. Cool-season grass-legume mixtures (CP1) that support higher pheasant productivity should be given equal or higher ratings than warm-season (CP2) grass stands. We also recommend that United States Department of Agriculture administrators and field staff provide broader and more flexible guidelines on what seed mixtures can be used in CRP grassland plantings in the northern Great Plains. This would allow landowners and natural resource professionals who manage pheasant habitat to plant a mosaic of cool- and warm-season CRP grassland habitats.
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90. **Effects of different age classes of fields enrolled in the Conservation Reserve Program in Michigan on avian diversity, density, and productivity.**
Millenbah, Kelly Francine
East Lansing, MI: Michigan State University, 1994.
Notes: Degree: MS; Advisor: Winterstein, Scott R.
Descriptors: wildlife/ ecology/ bird communities/ wildlife density/ agricultural conservation/ landowners/ Conservation Reserve Program
Abstract: Agricultural landowners have enrolled lands in the Conservation Reserve Program (CRP) for wildlife and economic benefits. Avian communities and vegetative characteristics were examined on 6 age classes (1-6 growing seasons) of CRP fields in Gratiot County, Michigan in 1991 and 1992 to determine the relationships between field age and characteristics of avian communities. Younger CRP fields (1-3 growing seasons), characterized by forbs and bare ground, supported greater avian densities and diversities than older fields (4-6 growing seasons). Older CRP fields, characterized by grasses and high litter cover, supported greater avian productivity. Results indicate that grassland birds in Michigan may require a diversity of age classes of CRP fields in agricultural landscapes to meet their habitat requirements. Continued enrollment of lands into the program and periodic manipulation of these lands, will create a mosaic of grassland successional stages important to a diversity of avian species.
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91. **Effects of emergency haying on duck nesting in Conservation Reserve Program fields, South Dakota.**
Luttschwager, K. A.; Higgins, K. F.; and Jenks, J. A.
Wildlife Society Bulletin 22(3): 403-408. (Fall 1994)
NAL Call #: SK357.A1W5; ISSN: 0091-7648 [WLSBA6]
Descriptors: anas/ nesting/ reproduction/ population density/ habitats/ grasslands/ federal programs/ private ownership/ South Dakota/ nesting success/ private land
This citation is from AGRICOLA.

92. **Effects of emergency haying on vegetative characteristics within selected Conservation Reserve Program fields in the northern Great Plains.**
Allen, A. W.; Cade, B. S.; and Vandever, M. W.
Journal of Soil and Water Conservation 56(2): 120-125. (2001)
NAL Call #: 56.8 J822; ISSN: 00224561
Descriptors: alfalfa/ Conservation Reserve Program/ emergency use/ grasslands/ haying/ intermediate wheatgrass/ management/ wildlife habitat/ grassland/ hay/ soil conservation/ North America/ Cirsium arvense/ Medicago sativa
Abstract: Successional changes in vegetation composition within seeded grasslands may affect attainment of long term conservation objectives. Comparisons between vegetation composition within Conservation Reserve Program (CRP) fields planted to cool season, introduced grasses hayed for emergency use, and non hayed fields of the same age and species composition were completed to determine potential effects of periodic haying. Emergency haying had little long term effect on vegetation height/density, percent cover of live grass, or forb cover when compared to characteristics within non hayed fields. The presence of legumes [primarily alfalfa (medicago sativa L)] increased in response to haying, whereas, abundance of noxious weeds [chiefly Canada thistle (Cirsium arvense (L) Scop.)] diminished. Implications for long term management CRP grasslands to achieve wildlife habitat objectives are discussed.
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93. **Effects of field size and landscape composition on grassland birds in south-central Iowa.**
Horn, David Joseph; Koford, Rolf R.; and Braland, Malinda L.
Iowa Academy of Science, Journal 109(1-2): 1-7. (2002); ISSN: 0896-8381
Descriptors: Agelaius phoeniceus/ Ammodramus henslowii/ Ammodramus savannarum/ Carduelis tristis/ Cistothorus platensis/ Dolichonyx oryzivorus/ Geothlypis trichas/ Melospiza melodia/ Molothrus ater/ Spiza americana/ Spizella pusilla/ Sturnella magna/ Sturnella neglecta/ Passeriformes/ biogeography/ field size/ landscape composition/ communities/ grasslands/ ecosystems/ Iowa/ habitat use/ land zones/ red-winged blackbird/ Henslow's sparrow/ grasshopper sparrow/ American goldfinch/ sedge wren/ bobolink/ common yellowthroat/ song sparrow/ brown-headed cowbird/ dickcissel/ field sparrow/ eastern meadowlark/ western meadowlark
Abstract: Many species of grassland birds have been shown to avoid smaller fields. The avoidance of smaller fields, however, has not been consistently reported; avoidance may occur in one study, but not in another. To examine one possible reason for these inconsistencies, we examined how landscape composition influenced the relations between occurrence or abundance and field size. The study took place during the 1998 breeding season on 44 Conservation Reserve Program (CRP) fields located in Adair, Ringgold, and Union counties. The relations between occurrence, abundance, and field size were not influenced by landscape composition for any species. Grasshopper Sparrow, Ammodramus savannarum, Bobolink, Dolichonyx oryzivorus, and Eastern Meadowlark, Sturnella magna, were more likely to occur or were more abundant in larger fields. Field Sparrow, Spizella pusilla, Western Meadowlark, Sturnella neglecta, Brown-headed Cowbird, Molothrus ater, and American Goldfinch, Carduelis tristis, were less likely to occur or were less abundant in larger fields. Field size is an important factor influencing the occurrence and/or abundance of grassland songbirds in fields. Future studies that investigate the effects of landscape composition on area sensitivity should use landscapes that have similar habitat compositions other than the habitat being varied, and use similar sized fields in each landscape.
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94. **Effects of grazing and haying on arthropod diversity in North Dakota Conservation Reserve Program grasslands.**
Hoernemann, C. K.; Johnson, P. J.; and Higgins, K. F.
Proceedings of the South Dakota Academy of Science 80: 283-308. (2001)
NAL Call #: 500 So82; ISSN: 0096-378X
Descriptors: species diversity/ Conservation Reserve Program/ grazing/ arthropods/ conservation practices

95. **Effects of grazing Conservation Reserve Program lands in North Dakota on birds, insects, and vegetation.**
Kennedy, Carmen L.; Jenks, Jonathan A.; and Higgins, Kenneth F.
Proceedings of the South Dakota Academy of Science 80: 213-226. (2001)
NAL Call #: 500 So82; ISSN: 0096-378X
Descriptors: Aves/ grazing/ Conservation Reserve Program/ North Dakota/ deferred rotation grazing/ passerines/ lark bunting/ Calamospiza melanocorys/ grasshopper sparrow/ Ammodramus savannarum/ red-winged blackbird/ Agelaius phoeniceus/ brown-headed cowbird/ Molothrus ater/ species density/ insect biomass/ vegetation height
Abstract: Effects of two grazing systems on nongame birds, insect biomass, and vegetation structure in Conservation Reserve Program (CRP) grasslands were evaluated in North Dakota. Treatments included idle (controls), 3-pasture twice-over deferred rotation grazing, and season-long grazing systems. Twelve species of nongame passerine birds in 1992 and ten species in 1993 used CRP fields. The lark bunting (Calamospiza melanocorys), grasshopper sparrow (Ammodramus savannarum), red-winged blackbird (Agelaius phoeniceus) and brown-headed cowbird (Molothrus ater) dominated species composition in 1992 and 1993. CRP pastures under rotational or season-long grazing treatments maintained equal or higher mean male bird densities compared to idle CRP control fields. Mean density of male birds, terrestrial insect biomass and, for the most part, vegetation height, were lower in 1993 than 1992. Results indicated that high insect biomass in pastures with dense cover does not necessarily equate to higher nongame bird use. At moderate stocking rates (~2.1 AUM/ha), our results indicated that grazing of CRP lands could be included in contract terms or in negotiations in any extensions or modifications of future CRP contracts without any significant losses to nongame birds.
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96. **Effects of habitat manipulations on Texas horned lizards and their prey.**
Fair, W. Scott and Henke, Scott E.
Journal of Wildlife Management 61(4): 1366-1370. (1997)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Phrynosoma cornutum/ amphibians and reptiles/ ants/ Conservation Reserve Program/ fires-burns/ foods-feeding/ habitat alterations/ habitat use/ livestock/ Texas horned lizard/ Texas/ Duval County
Abstract: The effects of habitat manipulations on Texas horned lizards (Phrynosoma cornutum) and their main prey, harvester ants (Pogonomyrmex spp.) were studied in South Texas. The relative abundance of lizards, their scat, and active harvester ant mounds was assessed on 1-ha plots that were manipulated with either prescribed burning, disking, burning and disking combination, grazing, or land in the Conservation Reserve Program (CRP). We determined differential habitat use or avoidance using Chi-square analysis and Bonferroni Z-statistics to control the experiment-wise error probability at 10%. Lizards used burned plots disproportionately more, were neutral in their use of the disked and grazed plots, and under-utilized the burned and disked combination and CRP plots. Analysis of scat led to similar conclusions in relation to burned, grazed, and CRP plots, but scats were distributed on combination plots pro rata to availability and were underrepresented on the disked plots. No difference was detected in the relative abundance of active ant mounds among the 5 land management practices. Even though Texas horned lizards preferentially used areas that were recently burned, the process of burning may harm them due to the shallow depths in which they hibernate.
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97. **Effects of habitat on dickcissel abundance and nest success in Conservation Reserve Program fields in Kansas.**
Hughes, John P.; Robel, Robert J.; Kemp, Kenneth E.; and Zimmerman, John L.
Journal of Wildlife Management 63(2): 523-529. (1999)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Fringillidae/ Passeriformes/ Spiza americana/ behavior/ birds/ Conservation Reserve Program/ ecosystems/ edge habitat/ farmland/ habitat management/ habitat use/ management/ nesting sites/ nests-nesting/ productivity/ wildlife/ wildlife-habitat relationships/ wild birds/ reproduction/ federal programs/ wildlife conservation/ Kansas/ species abundance/ land development, land reform, and utilization (macroeconomics)/ dickcissel/ Kansas/ Riley County
Abstract: Declining avian populations in the Midwest have increased interest in various aspects of grassland habitats and their effects on grassland birds. We studied the effects of vegetation characteristics, woody field edges and surrounding land use on abundance and daily nest survival of the dickcissel (Spiza americana) in Conservation Reserve Program (CRP) fields in the northeastern Kansas. We observed 873 dickcissels during surveys on 11 CRP fields during the summers of 1994 and 1995. In those fields, we located 186 dickcissel nests of which 13.2% were successful in 1994 and 14.9% were successful in 1995. The vertical density of vegetation in CRP fields, wooded area surrounding the fields, and amount of woody edge bordering fields were associated with dickcissel abundance (P = 0.001). Live and dead canopy cover and litter cover were associated with daily nest survival (P = 0.005). Therefore, the habitat quality of CRP fields for dickcissels might be enhanced by modifying vegetation characteristics. The outcome of any modifications of CRP habitat for dickcissels should be judged on changes in the number and success of their nests rather than on the abundance of birds.
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98. **Effects of landscape composition and multi-scale habitat characteristics on the grassland bird community.**
McCoy, T. D.
Columbia, MO: Univ. of Missouri-Columbia, 2000.
Notes: Ph.D. Dissert.; Project Number: MO W0-013-R-54/Job 1/Study 43
Descriptors: habitat/ modeling/ grassland/ birds/ communities/ wildlife-habitat relationships/ species diversity/ conservation programs/ nests and nesting/ abundance/ sparrows/ reproduction/ statistics/ meadowlarks, blackbirds and orioles/ population density/ vegetation/ Missouri/ Adair County/ Know County/ Linn County/ Macon County/ Shelby County
Abstract: Measures of grassland bird demography on Conservation Reserve Program (CRP) fields were compared and modeled at several spatial scales to identify habitat factors associated with increased conservation value for grassland birds. Grassland bird populations and species richness were compared between fields located in landscapes with different amounts of CRP habitat and total grassland. Multi-scale habitat models were developed from and validated on two independent data sets to identify the primary habitat features that could predict the potential value of CRP and other idle grasslands for grassland bird conservation.
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99. **Effects of livestock grazing on neotropical migratory landbirds in western North America.**
Bock, C. E.; Sabb, V. A.; Rich, T. D.; and Dobkin, D. S.
In: Status and management of neotropical migratory birds. Estes Park, Colorado. Finch, D. M. and Stangel, P. W. (eds.)
Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, U.S. Dept. of Agriculture; pp. 263-309; 1993.
NAL Call #: aSD11.A42
Descriptors: Conservation Reserve Program/ regional conservation programs
Abstract: Examined the idea that moderate haying/grazing of CRP coupled with livestock enclosures on public land could enhance the value of public rangelands for wildlife.

100. **Effects of mammalian predator removal on waterfowl and non-game birds in North Dakota.**
Garrettson, P. R.; Rohwer, F. C.; Zimmer, J. M.; Mense, B. J.; and Dion, N.
Transactions of the North American Wildlife and Natural Resource Conference 61: 94-101. (1996)
NAL Call #: 412.9 N814; ISSN: 0078-1355.
Notes: Conference: 61st North American Wildlife and Natural Resources Conference: Facing Realities in Resource Management, Tulsa, OK , 22-27 Mar 1996.
Descriptors: aquatic birds/ predator control/ environmental impact/ nesting/ bird eggs/ nature conservation/ habitat improvement (physical)/ breeding sites/ environment management/ Aves/ North America/ species interactions: general/ conservation, wildlife management and recreation/ freshwater/ brackish water/ marine environment
Abstract: Waterfowl managers have long been concerned about low nest success on the North American prairies. A review of duck nesting success shows that, despite great variation between studies, there is a dramatic pattern of decline in nest success in the past 50 years (Beauchamp et al. 1996). The linear regression of success versus year shows that hatching rates dropped from 33 percent in 1935 to only 10-percent nest success in 1992. Low nest success, which reflects high nest predation, is viewed as the most significant limitation on waterfowl productivity in the prairies. Most of the management effort under the North American Waterfowl Management Plan (NAWMP) in the prairie region of the United States and Canada is an attempt to elevate nest success for upland-nesting ducks. Compounding habitat degradation is a major shift in numbers types of nest predator on the prairies. Extirpation of wolves (Canis lupus) and reduction of coyotes (Canis latrans) has allowed medium-sized predators, such as red fox (Vulpes vulpes), skunk (Mephitis mephitis) and raccoon (Procyon lotor); to flourish. Raccoons are a recent arrival to much of the prairies, though they now are abundant and the dominant nest predator for many prairie ducks. Abundance of medium-sized mammals and scarcity of nesting cover has been a very detrimental combination for breeding ducks. Most attempts to increase duck nesting success have focused on ways to make nests less accessible to predators. Dense nesting cover has been the dominant

management on United States Waterfowl Production Areas (WPA) and on NAWMP areas in Canada, yet this strategy typically has improved nest success by only a few percentage points, with highly variable results. Improved nest success associated with the Conservation Reserve Program (CRP) suggests that landscape-level additions of nesting cover improve recruitment, but habitat improvement on this scale is not economically feasible for wildlife groups. Intensive management efforts to make nests inaccessible, such as construction of islands and predator barrier fences, can increase nest success, but costs are high.
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101. **Effects of riffle-step restoration on hyporheic zone chemistry in n-rich lowland streams.**
Kasahara, Tamao and Hill, Alan R.
Canadian Journal of Fisheries and Aquatic Science 63(1): 120-133. (2006)
NAL Call #: 442.9 C16J; ISSN: 0706-652X
Descriptors: freshwater ecology: ecology, environmental sciences/ methods and techniques/ wildlife management: conservation/ piezometer/ field equipment/ riffle step restoration/ applied and field techniques/ hyporheic zone chemistry
Abstract: Stream restoration projects that aim to rehabilitate ecosystem health have not considered surface-subsurface linkages, although stream water and groundwater interaction has an important role in sustaining stream ecosystem functions. The present study examined the effect of constructed riffles and a step on hyporheic exchange flow and chemistry in restored reaches of several N-rich agricultural and urban streams in southern Ontario. Hydrometric data collected from a network of piezometers and conservative tracer releases indicated that the constructed riffles and steps were effective in inducing hyporheic exchange. However, despite the use of cobbles and boulders in the riffle construction, high stream dissolved oxygen (DO) concentrations were depleted rapidly with depth into the hyporheic zones. Differences between observed and predicted nitrate concentrations based on conservative ion concentration patterns indicated that these hyporheic zones were also nitrate sinks. Zones of low hydraulic conductivity and the occurrence of interstitial fines in the restored cobble-boulder layers suggest that siltation and clogging of the streambed may reduce the downwelling of oxygen- and nitrate-rich stream water. Increases in streambed DO levels and enhancement of habitat for hyporheic fauna that result from riffle-step construction projects may only be temporary in streams that receive increased sediment and nutrient inputs from urban areas and croplands.
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102. **Effects of the Conservation Reserve Program on selected wildlife populations in southeast Nebraska.**
King, Justin W.
Lincoln, NE: University of Nebraska, 1991.
Notes: Thesis (M.S.)--University of Nebraska, Lincoln--Forestry, Fisheries, and Wildlife, 1991. Includes bibliographical references.
NAL Call #: NBU LD3656 1991 K564
Descriptors: Wildlife conservation---Nebraska/ Wildlife management---Nebraska/ Conservation of natural resources---Nebraska
This citation is from AGRICOLA.

103. **Effects of the Conservation Reserve Program on soil duality and overall economic viability of Maryland's native grassland restoration projects.**
Koenig, Kristin A. and Sherman, Leslie A.
In: 229th National Meeting of the American Chemical Society. San Diego, CA ; Vol. 229 (Part 1).; pp. U505-U506; 2005.
Notes: 0065-7727 (ISSN).
Descriptors: soil science/ wildlife management: conservation/ cropland burning/ applied and field techniques/ cation exchange capacity/ grassland restoration/ cropland conversion/ loss on ignition
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104. **Effects of the Conservation Reserve Program on wildlife habitat in the Great Plains.**
Baker, Bryan Douglas. University of Minnesota, 1992.
Notes: Degree: PhD; Advisor: Gersmehl, Philip J.
Descriptors: geography/ wildlife/ birds/ climate/ behavior conservation/ predators/ erosion/ wildlife/ conservation practices/ agricultural practices/ South Dakota/ Nebraska/ Kansas/ Texas
Abstract: The Conservation Reserve Program (CRP), a ten-year federal agricultural land retirement program, returned several million acres of the Great Plains to grass by 1989. Improvement of wildlife habitat was a secondary but important rationale for the program. Enrollments are concentrated in the southern High Plains and the northern glaciated Plains. CRP fields increase in size from east to west, with many counties exceeding 320 acres for mean contract size. A study of Plains land use, soils, geology, and climate helped construct a list of expected effects of the CRP on the mammals and breeding birds. The list was revised based on comments from Plains biologists. Most of the species on the Plains depend on woodlands, wetlands, or other cover the CRP does not provide. Some species that use grassland or agricultural land will gain habitat, mainly for nesting. Nine-section study areas in six Plains counties detailed land cover changes associated with the CRP. Most areas have seen a net increase in cropland since the late 1960s despite the CRP retirements. In some counties, especially far western ones, CRP land is in larger blocks, isolated from woodland and shrubs. These areas favor small to medium sized grassland birds and mammals. CRP parcels in other counties, especially to the east, are well-interspersed with other cover. Mosaic species using grassland, cropland and woodland should benefit there. These include bobwhite quail, white-tailed deer, and some predators. A dynamic programming model was developed to help investigate the effects of landscape pattern on animal behavior and survival. A preliminary version calculated winter survival of bobwhite quail. Small demonstration areas selected from the study areas suggested that the configuration of CRP fields could be improved to maximize wildlife benefits. Many of the wildlife benefits of the CRP could vanish after the program expires if farmers return CRP fields to cropland. Other long-term alternatives could prove less costly. Limited federal buy-outs of erosion-prone land may be feasible, especially in expansion of National Grassland. Easements, purchase of cultivation rights, and subsidies for alternative agricultural practices are other tools for encouraging long-term conservation on the Great Plains.
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105. **Effects of the Conservation Reserve Program on wildlife in southeast Nebraska.**
King, J. W. and Savidge, J. A.
Wildlife Society Bulletin 23(3): 377-385. (Fall 1995)
NAL Call #: SK357.A1W5; ISSN: 0091-7648 [WLSBA6]
Descriptors: wild birds/ species diversity/ population density/ seasonal variation/ agricultural land/ federal programs/ wildlife conservation
This citation is from AGRICOLA.

106. **The effects of the Conservation Reserve Program on wildlife in southeastern Wyoming.**
Wachob, Douglas Glenn. University of Wyoming, 1997.
Notes: Degree: PhD; Advisor: Anderson, Stanley H.
Descriptors: alfalfa/ Aves/ birds/ habitat use/ small mammals/ sharp-tailed grouse/ Typanuchus phasianellus/ raptors/ carnivores/ big game/ grazing/ Conservation Reserve Program
Abstract: The primary objective of this study was to identify the vegetation and spatial characteristics of CRP that influence habitat use by non-game birds, small rodents, sharp-tailed grouse (Tympanuchus phasianellus), raptors, carnivores, and big game in a CRP/agricultural landscape. The study was conducted in Laramie, Platte, and Goshen counties in southeastern Wyoming, during 1993-5. The study area was dominated by intensively grazed native range land and winter wheat (Triticum sp.); CRP comprised 15% of the study area. Non-game bird use was higher in CRP with an alfalfa component, compared to CRP without alfalfa in 1994, but not in 1993. Fine scale selection by birds for specific vegetation structure was detected in 1994 but not in 1993. Bird use of CRP was independent of the spatial characteristics of CRP patches. Small mammal use of CRP and range lands was higher than winter wheat lands. Vegetation species richness, vegetation height, standard deviation of vegetation cover, and patch area were significant predictors of small mammal use of CRP patches. This small mammal community selected habitat at the landscape and patch scale but not at the intrapatch scale. I investigated use of CRP lands by sharp-tailed grouse during nesting and brood-rearing seasons. All nests were located in CRP. Hens selected nest sites in larger CRP patches. Hens with broods used CRP and irrigated alfalfa patches more often and wheat and rangeland patches less often than they were available. Hens with broods used CRP patches with high coverage of broad leafed weeds and annual grasses more often and patches without alfalfa less often than these patch types were available. I found that CRP was the vital reproduction habitat for sharp-tailed grouse in southeastern Wyoming. Sharp-tailed grouse dancing grounds (leks) were located closer to CRP and had greater coverage of CRP within 1 km, compared with the entire study area. I also found that CRP patch size, percent cover of CRP, and CRP patch number predicted the number of leks and the number of males at leks, at a scale of 100 km$/sp2$. I investigated the spatial relationship of CRP fields to bird and mammal species richness using computer simulations. I used observations of 28 common species as model input data. Computer simulations of a hypothetical landscape showed that species richness increased rapidly as CRP coverage increased from 0-15%, and less rapidly as CRP coverage increased from 15-50%.
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107. **Effects of the CRP on wildlife habitat: Emergency haying in the Midwest and pine plantings in the Southeast.**
Hays, R. L. and Farmer, A. H.
Transactions of the North American Wildlife and Natural Resource Conference (55th): 30-39. maps. (1990)
NAL Call #: 412.9 N814; ISSN: 0078-1355 [NAWTA]
Descriptors: afforestation/ farmland/ forest plantations/ haymaking/ nature reserves/ pinus/ planting/ remuneration/ Colinus virginianus/ United States, southeastern region/ Conservation Reserve Program (CRP)
This citation is from AGRICOLA.

108. **Effects of thinning CRP pine stands on nesting songbirds in Georgia.**
Schaefbauer, M. K. and Schweitzer, S. H.
In: 7th Annual Conference of the Wildlife Society. Nashville. TN (USA).); 2000.
Notes: Conference Sponsor: The Wildlife Society; World Meeting Number 003 0833.
Descriptors: biology/ Conservation Reserve Program/ CRP/ songbirds/ pine stands/ Pinus/ Georgia/ forest thinning
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109. **The effects of timber harvest in a South Carolina blackwater bottomland.**
Perison, Donna; Phelps, Joseph; Pavel, Christina; and Kellison, Robert
Forest Ecology and Management 90(2-3): 171-185. (1997)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ ecology/ terrestrial habitat/ land and freshwater zones/ Amphibia/ Reptilia: forestry/ harvest methods/ community structure/ timber harvest effects/ forest and woodland/ timber harvest/ South Carolina/ South Fork Edisto River/ blackwater forested wetlands/ amphibians/ chordates/ reptiles/ vertebrates
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110. **Effects of transgenic herbicide-resistant soybean varieties and systems on surface-active springtails (Entognatha: Collembola).**
Bitzer, Royce J.; Buckelew, Lamar D.; and Pedigo, Larry P.
Environmental Entomology 31(3): 449-461. (2002)
NAL Call #: QL461.E532; ISSN: 0046-225X
Descriptors: commercial activities/ ecology/ terrestrial habitat/ man-made habitat/ Collembola: farming and agriculture/ transgenic soybean farming/ community structure/ surface active community/ effects of transgenic herbicide resistant soybean varieties and systems/ soil habitat/ cultivated land habitat/ transgenic soybean fields/ Insecta/ arthropods/ insects/ invertebrates
Abstract: The degree of abundance and diversity of springtails (order Collembola) often indicates the extent of disturbance by various agricultural practices. We examined how transgenic herbicide-tolerant soybean varieties and their associated weed management systems affect the abundance of 21 surface-active springtail species during three successive soybean growing seasons. With six soybean varieties (three transgenic, three nontransgenic), we tested three weed management systems: (1) targeted application of specific herbicides to the corresponding tolerant transgenic varieties; (2) conventional pre- and postemergence herbicide applications; and (3) mechanical cultivation. Each method posed its own potential costs and

benefits to springtails. In targeted plots, springtail numbers were similar to or higher than those in conventional plots, suggesting that the later and repeated targeted applications to transgenic soybeans do not adversely affect springtail numbers in the short term. We attributed the observed treatment effect differences on springtail numbers to resultant differences in weed cover and degree of soil disturbance (indirect effects), rather than to any direct toxic effects of the herbicides. The treatments affected some species but not others; most of the affected species responded similarly to differences in weed treatment. Our results overall suggested no deleterious short-term effects of transgenic soybean targeted weed-management systems on abundance of the springtail species examined.
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111. **Effects of two haying provisions on duck nesting in Conservation Reserve Program (CRP) fields in South Dakota.**
Luttschwager, K. A.
Brookings, SD: South Dakota State University, 1991.
Notes: M.S. Thesis
Descriptors: Conservation Reserve Program/ State conservation programs/ South Dakota
Abstract: Evaluated the effects of emergency haying on duck nesting success in CRP fields.

112. **Effects of wheat-stubble height and weed control on winter pheasant abundance.**
Rodgers, R. D.
Wildlife Society Bulletin 30(4): 1099-1112. (2002)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Great Plains/ habitat/ herbicide/ High Plains/ Kansas/ Phasianus colchicus/ ring-necked pheasant/ stubble height/ tillage/ Triticum aestivum/ wheat/ wheat stubble/ abundance/ agricultural practices/ gamebird/ herbicide/ stubble/ weed control/ wildlife management/ United States/ Phasianus colchicus/ Triticum aestivum
Abstract: Recent changes in agriculture on the semi-arid central High Plains have serious implications for pheasants (Phasianus colchicus) and other farmland wildlife. Of greatest concern are increased herbicide use accompanying intensification of crop rotations and the shorter wheat (Triticum aestivum)-stubble heights produced by a shift to semi-dwarf wheat varieties and increasingly powerful combines. From 1990-1995, I investigated the effect of stubble height and post-harvest weed control on subsequent winter abundance of pheasants in wheat stubble. Increasing wheat cutting height from a mean of 22 cm to 46 cm produced a nearly 9-fold average increase in indices of winter pheasant abundance in wheat-stubble test blocks where no post-harvest weed control was performed. Post-harvest weed growth was positively affected by wheat-stubble height, probably due to taller stubble's ability to better conserve limited moisture by reducing ground-level air movement. Herbicide application to stubble reduced indices of winter pheasant abundance by >80%, and tillage reduced those indices by >90%, compared to untreated fields. Herbicide application to wheat stubble and reduced stubble height are considered major causes of the long-term decline of pheasants on the central High Plains. This research and a companion agronomic study have shown that increased stubble height and post-harvest weed growth in wheat stubble are integral components of a modified wheat-fallow rotation that provides superior habitat quality, soil conservation benefits, and greater profitability than other wheat-fallow systems currently in use. The benefits of greater wheat-stubble height can also be applied in more intensive wheat-row-crop-fallow rotations.
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113. **Enhancement of farmland biodiversity within set-aside land.**
Van Buskirk, J. and Willi, Y.
Conservation Biology 18(4): 987-994. (2004)
NAL Call #: QH75.A1C5; ISSN: 08888892
Descriptors: agriculture/ biodiversity/ conservation/ set-aside land
Abstract: The efficacy of agricultural set-aside policies for protecting farmland biodiversity is widely debated. Based on a meta-analysis of 127 published studies, we found that land withdrawn from conventional production unequivocally enhances biodiversity in North America and Europe. The number of species of birds, insects, spiders, and plants is 1-1.5 standard deviation units higher on set-aside land, and population densities increase by 0.5-1 standard deviation units. Set-aside land may be especially beneficial for desirable taxa because North American bird species that have exhibited population declines react most positively to set-aside agricultural land. Larger and older plots protect more species and higher densities, and set-aside land is more effective in countries with less-intensive agricultural practices and higher fractions of land removed from production. Although policies specifically designed to protect biodiversity might work even better, current incentives clearly improve the standing of plants and animals in farmland.
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114. **Environmental benefits of conservation buffers in the United States: Evidence, promise, and open questions.**
Lovell, S. T. and Sullivan, W. C.
Agriculture, Ecosystems and Environment 112(4): 249-260. (2006)
NAL Call #: S601.A34; ISSN: 01678809.
Notes: doi: 10.1016/j.agee.2005.08.002.
Descriptors: agricultural buffers/ agroecology/ Conservation Reserve Program/ riparian corridors/ sustainable agriculture/ agricultural ecosystem/ buffer zone/ United States
Abstract: Conservation buffers can have a tremendously positive impact on the ecological health of rural landscapes by reducing erosion, improving water quality, increasing biodiversity, and expanding wildlife habitats. Yet, in spite of our knowledge of their value, conservation buffers have not been fully embraced by landowners, or even by policy makers in the United States (US). In this critical review, we examine why conservation buffers remain underutilized in US agroecosystems. We examine the literature on the environmental benefits of buffers, the economic issues related to buffer adoption, and the importance of the aesthetic quality and design of buffers. We propose that many questions related to buffer design and management remain unanswered, and suggest a variety of areas in which future research is necessary to improve buffer functionality and adoption. The implications of this synthesis for designers, planners, scientists, policy makers, and citizens are discussed. Recommendations include: modifying policies to better reflect the preferences of

landowners and society, studying buffer systems at the watershed scale using multidisciplinary approaches, and designing buffers that consider aesthetic preferences and regional variation.
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115. **Environmental conservation and locust control: Possible conflicts and solutions.**
Peveling, R.
Journal of Orthoptera Research 10(2): 171-187. (2001); ISSN: 1082-6467.
Notes: Publisher: Orthopterists' Society.
Descriptors: pest control/ Insecticides/ habitat preferences/ Acrididae/ Orthoptera/ grasshoppers/ agriculture/ applied entomology
Abstract: In contrast to pests developing in close association with a particular host crop, locusts and grasshoppers are often controlled in natural or semi-natural landscapes, exposing structurally and functionally diverse communities to agrochemicals, chemicals to which they are not adapted. This suggests that insecticide-induced perturbations may be severe. On the other hand, with acridids being highly mobile, exposure of non-target biota at any one location tends to be rare, and insecticides might be seen as yet another component in a canon of stochastic and deterministic, natural or human-induced environmental catastrophes and selective forces, shaping communities and ecosystems. Moreover, habitat loss is by far the most important single threat to biodiversity, so why should doubt be cast on the potential and resilience of populations to recover from occasional insecticide stress? This paper reviews the environmental impact, as well as ecological and conceptual characteristics of acridid pest control. It concludes that ecologically significant risks may arise, in particular in ecosystems exposed to multiple stressors. Four priorities in ecological risk assessment and acridid pest management are proposed: 1) delimitation and characterization of sensitive areas within locust and grasshopper habitats, 2) ecosystem-specific, long-term field studies and operational monitoring, 3) real-time stewardship of control campaigns, with adequate participation of stakeholders, and 4) incorporation of the precautionary principle into decision-making and risk management.
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116. **Environmental Quality Incentives Program: Program summary and potential for wildlife benefits.**
Esser, A.; Molleur, R.; Buck, P.; and Rewa, C.
In: A comprehensive review of Farm Bill contributions to wildlife conservation, 1985-2000/ Heard, L. P; Hohman, W. L.; Halloum, D. J.; and Wildlife Habitat Management Institute (U.S.); Series: Technical Report USDA/NRCS/WHMI.
Madison, MS: U.S. Department of Agriculture, 2000; pp. 125-134.
NAL Call #: aS604.6 C66 2000
Descriptors: Environmental Quality Incentives Program/ conservation/ conservation buffers/ farming systems/ nutrient management/ erosion control/ wildlife management

117. **Estimating response of ring-necked pheasant to the Conservation Reserve Program .**
Nielson, R. N.; McDonald, L. L.; Howlin, S.; Sullivan, J. P.; Burgess, C.; and Johnson, D. S.
Cheyenne, WY: Western EcoSystems Technology, 2006. 55 p.
Notes: Technical report prepared for US Department of Agriculture Farm Service Agency, Contract Number 53-3151-5-8059.
http://www.fsa.usda.gov/Internet/FSA_File/ pheasant_study.pdf
Descriptors: ring-necked pheasant/ Conservation Reserve Program/ Breeding Bird Survey/ statistical analysis/ modeling
Abstract: We evaluated benefits of the Conservation Reserve Program (CRP) to ring-necked pheasant (Phasianus colchicus) populations by modeling Breeding Bird Survey (BBS) counts of ring-necked pheasants along 388 BBS routes in the US during 1987-2005.

118. **Estimating wildlife response to the Conservation Reserve Program: Bobwhite and grassland birds.**
Burger, L. W. and Riffell, S. K.
Solicitation Number: FSA-R-28-04DC, 2006.
ftp://ftp fc.sc.egov.usda.gov-/NHQ/nri/ceap/ quailandsongbirds.pdf
Descriptors: Conservation Reserve Program/ CRP databases/ Farm Service Agency/ forest habitats/ grasslands/ bird populations/ land managment/ monitoring program/ northern bobwhite/ quail populations/ shrubland/ wildlife species
Abstract: We provided retrospective analysis of correlative relationships among land use/land cover types, Conservation Reserve Program habitats and indices of grassland bird populations in response to FSA's request for "national and regional estimates of per acre CRP effects on wildlife populations for CRP conservation practices (RFP for FSA-R-28-04DC)." Although robust per acre estimates of the real effect of CRP on wildlife species can only be derived from an ongoing monitoring program based on probabilistic sampling design, correlative analyses are the only possibility with retrospective data.

119. **Evaluating potential effects of CRP on bobwhite quail in Piedmont Virginia.**
Stauffer, Dean F.; Cline, Gerald A.; and Tonkovich, Michael J.
Transactions of the North American Wildlife and Natural Resource Conference 55: 57-67. (1990)
NAL Call #: 412.9 N814; ISSN: 0078-1355
Descriptors: Galliformes/ Odontophoridae/ Colinus virginianus/ Conservation reserve programs/ habitat classification/ habitat management/ management/ modeling/ wildlife/ bobwhite/ habitat/ dispersion/ Virginia
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120. **An evaluation of Canada's Permanent Cover Program: Habitat for grassland birds?**
McMaster, D. Glen and Davis, Stephen K.
Journal of Field Ornithology 72(2): 195-210. (2001)
NAL Call #: 413.8 B534; ISSN: 0273-8570
Descriptors: birds/ census-survey methods/ ecosystems/ grasslands/ habitat management/ management/

productivity/ species diversity/ study methods/ techniques/ wildlife/ wildlife-habitat relationships/ Populus ssp./ Canada/ Nova Scotia/ Alberta/ Manitoba
Abstract: In the early 1990s Agriculture Canada's Permanent Cover Program (PCP) converted over 445,000 ha of cropland to perennial vegetative cover. The wildlife benefits of the PCP have not been the subject of previous research. We conducted grassland bird surveys on 629 PCP sites and 564 cropland sites across Alberta, Saskatchewan, and Manitoba between 25 May and 3 July 1998. PCP sites showed higher avian species richness than cropland, and nine of ten commonly detected grassland bird species occurred at higher frequencies in PCP than cropland. PCP sites were characterized by taller, denser vegetation and less bare ground than cropland sites. Hayed and grazed PCP sites differed significantly in their vegetative structure and avian community composition, but did not differ in species richness or evenness. Mean bird species richness at both cropland and PCP sites was significantly lower in the aspen parkland ecoregion than in the mixed and moist-mixed grassland ecoregions. Logistic regression identified 18 geographic and vegetative variables that significantly influenced the occurrence of individual species, but models for only two species predicted both presence and absence with greater than 50% accuracy. Avian productivity on PCP lands must be determined to appraise definitively the quality of this habitat for grassland birds.
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121. **Evaluation of select CRP lands as bobwhite quail habitat.**
Burger, L. W.; Kurzejeski, E. W.; Dailey, T. V.; and Ryan, M. R.
Proceedings, American Forage and Grassland Conference: 27-30. (1991)
NAL Call #: SB193.F59; ISSN: 0886-6899.
Notes: Meeting held April 1-4, 1991, Columbia, Missouri. Includes references.
Descriptors: quails/ colinus virginianus/ habitats/ conservation areas/ Missouri/ Conservation Reserve Program
This citation is from AGRICOLA.

122. **Evaluation of the effect of CRP on duck recruitment in the prairie pothole joint venture area of Fish and Wildlife Service Region 6.**
Reynolds, R.
Bismark, ND: U.S. Fish and Wildlife Service, 1992.
U.S. Fish & Wildlife Service Progress Report.
Descriptors: Conservation Reserve Program/ regional conservation programs/ state conservation programs/ Prairie Pothole Region/ Montana/ South Dakota/ North Dakota
Abstract: Reported the 1992 results of a pilot effort to evaluate waterfowl production in CRP grasslands compared to Waterfowl Production Areas.

123. **Evaluation of the landscape surrounding northern bobwhite nest sites: A multiscale analysis.**
White, C. G.; Schweitzer, S. H.; Moore, C. T.; Parnell, I. B.; and Lewis-Weis, L. A.
Journal of Wildlife Management 69(4): 1528-1537. (2005)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: Colinus virginianus/ Conservation Reserve Program/ Georgia/ habitat/ land-cover/ landscape/ multiscale analysis/ nest/ northern bobwhite
Abstract: Implementation of the Conservation Reserve Program (CRP) altered the interspersion and abundance of patches of different land-cover types in landscapes of the southeastern United States. Because northern bobwhites (Colinus virginianus) are experiencing significant population declines throughout most of their range, including the Southeast, it is critical to understand the impacts of landscape-scale changes in habitat on their reproductive rates. Our objective was to identify components of landscape structure important in predicting nest site selection by bobwhites at different spatial scales in the Upper Coastal Plain of Georgia. We used a Geographic Information System (GIS) and spatial analysis software to calculate metrics of landscape structure near bobwhite nest sites. Logistic regression was used to model the relationship of nest sites to structure within the surrounding landscape at 4 spatial scales. We found that patch density and open-canopy planted pine were consistently important predictor variables at multiple scales, and other variables were important at various scales. The density of different patch types could be increased by thinning rows of pines in large monotypic stands of closed-canopy planted pine stands. Thinning and creating openings in CRP pine plantations should provide increased nesting opportunities for bobwhites. We interpret the support for other variables in our analysis as an indication that various patch configuration lead to different combinations of landscape structure that provide an acceptable range of habitat conditions for bobwhites.
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124. **Evidence for a recent Henslow's sparrow population increase in Illinois.**
Herkert, James R.
Journal of Wildlife Management 71(4): 1229-1233. (2007)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: conservation measures/ ecology/ land zones/ Ammodramus henslowii: habitat management/ undisturbed grassland establishment/ effect on population trends/ population dynamics/ population trends/ undisturbed grassland effects/ Illinois/ Aves, Passeriformes, Emberizidae/ birds/ chordates/ vertebrates
Abstract: The Henslow's sparrow (Ammodramus henslowii) is a species of high conservation concern due to long-term population declines and a small global population. Habitat loss is considered to be the most likely cause of Henslows sparrow declines and the recent establishment of large acreages of undisturbed grasslands through the Conservation Reserve Program is considered to have the potential to benefit populations. I used data from Illinois' Spring Bird Count to estimate recent population trends and examine the association that changes in land-use, especially the establishment of Conservation Reserve Program lands, have had on local Henslow's sparrow population trends. My analysis shows that Henslow's sparrow populations have increased substantially within Illinois, USA over the last 10 years and that this population increase strongly coincides with the establishment of >400,000 ha of grasslands within the state by the Conservation Reserve Program. New rules allowing for managed haying and grazing on Conservation Reserve Program grasslands have the potential to reduce the

suitability of program fields for this species and, thus, Henslow's sparrow use of program fields should be monitored as the new rules are implemented.
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125. **Factors influencing mourning dove nest success in CRP fields.**
Hughes, John P.; Robel, Robert J.; and Kemp, Kenneth E.
Journal of Wildlife Management 64(4): 1004-1008. (2000)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Zenaida macroura/ dove, mourning/ zenaida macroura/ nests and nesting/ conservation programs/ grassland/ land use/ mating grounds/ survival/ cultivated farmland/ cover/ vegetation/ reproduction/ habitat management for wildlife/ mourning dove/ nest/ habitat/ agriculture/ ecological requirements/ Riley County/ Kansas/ United States
Abstract: Mourning doves (Zenaida macroura) nest primarily in trees. However, ground nesting is prevalent in the Great Plains region where mourning dove numbers have increased since the mid 1980s when the Conservation Reserve Program (CRP) was initiated. We monitored mourning dove nest success in CRP fields in Kansas during 1994 and 1995 to determine if that habitat could be a source for the increased numbers. Mourning dove nest success averaged 56% (n = 90) in our CRP fields. Daily nest survival rates in CRP fields were associated positively with height of live vegetation (P = 0.011) and negatively with percent grass cover (P = 0.001) and percent live vegetation cover (P = 0.005). Management practices that produce sparse overall cover but tall vegetation height may increase mourning dove nest success in CRP fields.
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126. **Farm Bill environmental program may threaten native prairie habitat.**
Baker, B.
Bioscience 50(5): 400. (May 2000)
NAL Call #: 500 Am322A; ISSN: 0006-3568 [BISNAS]
Descriptors: federal programs/ land management/ prairies/ environmental policy/ United States/ Conservation Reserve Program
This citation is from AGRICOLA.

127. **Farming practices influence wild pollinator populations on squash and pumpkin.**
Shuler, Rachel E.; Roulston, T'ai H.; and Farris, Grace E.
Journal of Economic Entomology 98(3): 790-795. (2005); ISSN: 0022-0493
Descriptors: commercial activities/ nutrition/ diet/ associations/ mutualism/ ecology/ man-made habitat/ land zones/ Apidae: farming and agriculture/ food plants/ Curcubita/ pollination/ farming practices/ wild pollinator populations/ pumpkin/ squash/ Virginia/ West Virginia/ population dynamics/ cultivated land habitat/ Maryland/ Insecta, Hymenoptera, Apocrita, Aculeata, Apoidea, Apidae/ arthropods/ hymenopterans/ insects/ invertebrates
Abstract: Recent declines in managed honey bee, Apis mellifera L., colonies have increased interest in the current and potential contribution of wild bee populations to the pollination of agricultural crops. Because wild bees often live in agricultural fields, their population density and contribution to crop pollination may be influenced by farming practices, especially those used to reduce the populations of other insects. We took a census of pollinators of squash and pumpkin at 25 farms in Virginia, West Virginia, and Maryland to see whether pollinator abundance was related to farming practices. The main pollinators were Peponapis pruinosa Say; honey bees, and bumble bees (Bombus spp.). The squash bee was the most abundant pollinator on squash and pumpkin, occurring at 23 of 25 farms in population densities that were commonly several times higher than tat of other pollinators. Squash bee density was related to tillage practices: no-tillage farms hosted three times as great a density of squash bees as tilled farms. Pollinator density was not related to pesticide use. Honey bee density on squash and pumpkin was not related to the presence of managed honey bee colonies on farms. Farms with colonies did not have more honey bees per flower than farms that did not keep honey bees, probably reflecting the lack of affinity of honey bees for these crops. Future research should examine the economic impacts of managing farms in ways that promote pollinators, particularly pollinators of crops that are not well served by managed honey bee colonies.
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128. **Farmlands for farming and nature.**
Freemark, Kathryn
In: Issues and Perspectives in Landscape Ecology
Wiens, J. A. and Moss, M. R.
New York: Cambridge University Press, 2005; pp. 193-200.
Notes: 0521830532 (ISBN).
Descriptors: commercial activities/ man-made habitat/ comprehensive zoology: farming and agriculture/ landscape scale farming practices/ Conservation significance/ cultivated land/ landscape scale farming practices significance/ cultivated land habitat
© Thomson Reuters Scientific

129. **Field evaluation of the northern bobwhite habitat suitability index model with implications for the Conservation Reserve Program.**
Tonkovich, Michael Joseph
Blacksburg, Va.: Virginia Polytechnic Institute and State University, 1995.
Notes: Thesis (Ph. D.); Bibliography: leaves 182-203.
NAL Call #: ViBlbV LD5655.V856 1995.T665
Descriptors: Colinus virginianus/ bobwhite quail/ wildlife habitats/ Conservation Reserve Program/ CRP
This citation is from AGRICOLA.

130. **Fine tuning the Conservation Reserve Program for biological diversity and native wildlife.**
Bidwell, Terrence G. and Engle, David M.
In: The Conservation Reserve Program Planting for the future: Proceedings of a National Conference.Fort Collins, Colorado.) Allen, Arthur W. and Vandever, Mark W. (eds.)
Reston, VA: U.S. Geological Survey; 6 pp.; 2005.
Notes: Scientific Investigations Report 2005-5145. http://www.fort.usgs.gov/Products/Publications/21490/21490.pdf
Descriptors: cropland/ Conservation Reserve Program (CRP)/ lesser prairie chicken/ Tympanuchus pallidicinctus/ prairies/ shrublands/ Great Plains/ bobwhite quail/ Colinus virginianus/ mountain plover/ Eupoda montana/ wildlife conservation/ wildlife habitat/ Okalahoma/ Texas/ ring-necked pheasant

Abstract: This paper provides as assessment of conservation programs in the Great Plains by the Conservation Reserve Program (CRP). The authors present major issues related to CRP lands created islands of habitat across the landscape that benefited native wildlife species but caused other native species to decline while favoring introduced wildlife species, such as the ring-necked pheasant. Guidelines to improve conservation programs are described. CRP decisions should be based on research formulated in the context of landscape composition and needs of habitat specialists (also known as indicator species). Indicator wildlife and plant species are those where abundance and distribution reflect a healthy landscape and ecosystem. In this setting, single species management (i.e., of indicator wildlife species) is appropriate within the context of restoring whole landscapes rather than of establishing vegetation cover on individual fields without considering the spatial influence of individual management decisions. Another key to restoration success is to reestablish ecological drivers of herbivory and fire with appropriate prescriptions to produce desired habitat elements and appropriate spatial extent of habitat to maintain population viability of the indicator wildlife species.

131. **The first distributional record of the least weasel, Mustela nivalis, in northeastern Missouri.**
Mock, O. B.; Sells, G. D.; Ellis, L. S.; and Easterla, D. A.
Transactions of the Missouri Academy of Science 35: 7-11. (2001)
NAL Call #: 500 K13T
Descriptors: geographical distribution/ Missouri/ mustela nivalis/ weasels/ Conservation Reserve Program
Abstract: This paper reports a significant range extension for the least weasel (Mustela nivalis). Failure to capture least weasels during the previous 50-year period in which the Adair County area has been intensely trapped for small mammals suggests that this species is a recent immigrant into northeastern Missouri, USA. The location of the capture sites near the break between the Missouri and Mississippi drainage systems does not support a riparian mode of dispersal. We speculate that changes in agricultural policies and practices that have reduced row-crop farming and increased meadows and USDA Conservation Reserve Program land are factors in the recent movement of M. nivalis into northeastern Missouri.
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132. **GIS analysis of the effects of habitat configuration and the Conservation Reserve Program (CRP) on the abundance of ringnecked pheasants, gray partridge, and meadowlarks.**
Lockman, Drake J. and Kimmel, R. O.
In: MN DNR Farmland Wildlife Population and Research Unit Report, 1994; pp. 33-39.
Descriptors: Phasianus colchicus/ Aves/ Perdix perdix/ common pheasant/ birds/ partridge/ dispersion/ prairie/ GIS/ United States/ geographic information systems
© NISC

133. **GIS-based evaluation of the Conservation Reserve Program in Texas County, Oklahoma.**
Awawdeh, Muheeb Mohammad
Stillwater, OK: Oklahoma State University, 2004.
Descriptors: correlation analysis/ potential resources/ soil erosion/ stream flow/ water quality/ watersheds/ Oklahoma
Abstract: The main goal of this research was to evaluate the long-term environmental benefits of the Conservation Reserve Program (CRP). The GIS-integrated hydrologic model, AVSWAT (ArcView-Soil and Water Assessment Tool), was used to evaluate the potential environmental benefits of the CRP in the Beaver River watershed, Texas County, Oklahoma. In this study SWAT model was used to simulate erosion rates and related stream water quality. The GIS interface of AVSWAT is ideally suited for input data management and output visualization purposes. The Beaver River Watershed was subdivided into 53 sub-basins using the digital elevation model as the base data source. Calibration results using monthly predicted values generally matched well with the observed values of two USGS gage stations in the watershed. The R2 values of 0.65, 0.61 and Nash-Sutcliffe efficiency 0.63, 0.55 of stream flow for the two stations were similar to values found in the literature. Although the simulated sediment yields was low, it correlated well with the CRP areas. The higher the CRP area the lower the sediment yield with an overall 30% reduction in annual sediment yield for Texas County. Sediment yield was highest from wheat, general agriculture and corn fields with an average of 9.25, 2.40, and 0.25 tons/ha/year respectively. Mapping sediment yield based on data from hydrologic response units determined priority areas for future CRP enrollment. The areal association between sediment yield and CRP area was calculated to be 53%. Correlation analysis also revealed a good inverse relationship between sediment yield and area under CRP. Wheat fields accounted for about 71% of total phosphorus and 77% of total nitrogen lost in Texas County. Results from Patch Analyst showed 7% increase in grassland area, 24% decrease in number of patches, and an increase in average patch size from 24 ha to 36 ha. Analysis of changes in landscape structure indicated that CRP can potentially improve the quality and quantity of wildlife habitat.
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134. **Good news for grouse.**
Hoffman, Rick
Colorado Outdoors 49(2): 10-13. (2000); ISSN: 0010-1699
Descriptors: Galliformes/ Phasianidae/ Tympanuchus phasianellus columbianus/ behavior/ birds/ conservation/ Conservation Reserve Program/ distribution/ habitat management/ management/ mining/ population ecology/ protection/ reclamation/ status/ wildlife/ Columbian sharp-tailed grouse/ Colorado
Abstract: Information is presented on the status and distribution of Columbian sharp-tailed grouse on Conservation Reserve Program lands in western Colorado. Methods are being developed to manage and conserve the population of grouse in a way that is compatible with existing land uses in the region.
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135. **Grassland bird abundance associated with Conservation Reserve Program grasslands.**
Haroldson, Kurt J.; Kimmel, Richard O.; and Riggs, Michael R.
Minnesota Department of Natural Resources Summaries of Wildlife Research Findings 2001: 69-79. (2002)
Descriptors: conservation measures/ ecology/ population dynamics/ terrestrial habitat/ land zones/ Perdix perdix/ Phasianus colchicus/ Sturnella: habitat management/ national parks and reserves/ population density/ distribution within habitat/ habitat utilization/ grassland/ grassland species abundance/ Conservation Reserve Program/ Minnesota/ Aves, Galliformes, Phasianidae/ birds/ chordates/ vertebrates
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136. **Grassland bird conservation: CP1 vs. CP2 plantings in Conservation Reserve Program fields in Missouri.**
McCoy, Timothy D.; Ryan, Mark R.; and Burger, Loren W.
American Midland Naturalist 145(1): 1-17. (Jan. 2001)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: conservation measures/ reproduction/ reproductive productivity/ ecology/ population dynamics/ terrestrial habitat/ land and freshwater zones/ Aves/ habitat management/ reproductive productivity/ nesting success/ Fecundity/ community structure/ population density/ nests/ grassland/ Cool season and warm season grass fields/ nesting success and fecundity/ conservation implications/ Missouri/ Knox County/ Macon County/ Linn County/ conservation biology/ birds/ chordates/ vertebrates
Abstract: To determine the relative value of different Conservation Reserve Program (CRP) plantings for breeding grassland and winter birds we measured vegetation structure, avian abundance and reproductive success, and estimated fecundity during 1993-1995 on CP1 (cool-season grass) and CP2 (warm-season grass) plantings in 16 fields in northern Missouri. CP1 fields had been planted to cool-season grasses or cool-season grass-legume mixtures and CP2 fields had been seeded with switchgrass (Panicum virgatum). Species richness, abundance and nesting success of grassland birds during the breeding season and total bird use in the winter did not differ between CPs. During the breeding season CP1 fields had higher abundances of grasshopper sparrow (Ammodramus savannarum), eastern meadowlark (Sturnella magna), Henslow's sparrow (Ammodramus henslowii) and American goldfinches (Carduelis tristis), whereas common yellowthroats (Geothlypis trichas) were more abundant in CP2 fields. Fecundity of dickcissels (Spiza americana) and nesting success and fecundity of red-winged blackbirds (Agelaius phoeniceus) were higher on CP2 than on CP1 habitat, but both CPs were likely sinks ($\lambda < 1$) for these species. Both CPs were likely source ($\lambda > 1$) habitat for grasshopper sparrows, whereas only CP1 habitat was likely a source for eastern meadowlarks and American goldfinches. In winter American goldfinches were more abundant in CP1 fields than CP2 fields. The shorter, more diverse, cool-season grass fields were equal or better habitat than taller, more vertically dense, switchgrass-dominated fields for grassland birds, including several species of high conservation concern. Single-species plantings of warm- or cool-season grasses should be avoided to increase the potential wildlife benefits of CRP and other grassland habitats.
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137. **Grassland bird use of Conservation Reserve Program fields in the Great Plains.**
Johnson, Douglas H.
In: Fish and wildlife benefits of Farm Bill conservation programs: 2000-2005 update, Technical Review 05-2/ Haufler, Jonathan B., editor; Bethesda, MD: The Wildlife Society, 2005. pp. 17-32.
http://www.nrcs.usda.gov/TECHNICAL/nri/ceap/fwbenefit.html
Descriptors: conservation programs/ USDA/ Farm Bill/ wildlife conservation/ wetlands/ wildlife/ fish/ Conservation Reserve Program
Abstract: An enormous area in the Great Plains is currently enrolled in the Conservation Reserve Program (CRP): 19.5 million acres (nearly 8 million ha) in Montana, North Dakota, South Dakota, Wyoming, Nebraska, Colorado, Kansas, Oklahoma, and Texas. Th is change in land use from cropland to grassland since 1985 has markedly infl uenced grassland bird populations. Many, but certainly not all, grassland species do well in CRP fields. Th e responses by birds to the program diff er not only by species but also by region, year, the vegetation composition in a fi eld, and whether or not a field has been hayed or grazed. The large scale and extent of the program has allowed researchers to address important conservation questions, such as the eff ect of the size of habitat patch and the infl uence of landscape features on bird use. However, most studies on nongame bird use of CRP in or near the Great Plains have been short-lived; 83% lasted only 1-3 years. Further, attention to the topic seems to have waned in recent years; the number of active studies peaked in the early 1990s and dramatically declined after 1995. Because breeding-bird use of CRP fields varies dramatically in response both to vegetational succession and to climatic variation, long-term studies are important. What was learned about CRP in its early stages may no longer be applicable. Finally, although the CRP provisions of the Farm Bill have been benefi cial to many grassland birds, it is critical that gains in grassland habitat produced by the program not be off set by losses of native prairie.

138. **Grassland bird use of Conservation Reserve Program fields in the Great Plains.**
Johnson, D. H.
In: A comprehensive review of Farm Bill contributions to wildlife conservation, 1985-2000/ Heard, L. P; Hohman, W. L.; Halloum, D. J.; and Wildlife Habitat Management Institute (U.S.); Series: Technical Report USDA/NRCS/WHMI.
Madison, MS: USDA, NRCS, Wildlife Habitat Management Institute, 2000; pp. 19-33.
NAL Call #: aS604.6 C66 2000
Descriptors: Conservation Reserve Program/ wildlife habitats/ wildlife management/ birds

139. **Grassland bird use of riparian filter strips in southeast Iowa.**
Henningsen, J. C. and Best, L. B.
Journal of Wildlife Management 69(1): 198-210. (2005)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2005)069 <0198:GBUORF>2.0.CO;2.
Descriptors: agriculture/ bird abundance/ buffer/ Conservation Reserve Program/ CRP/ filter strip/ Iowa/ nest success/ riparian grassland/ strip cover/ conservation management/ habitat management/ habitat use/ nest site/ nesting success/ passerines/ riparian zone/ Iowa/ Agelaius phoeniceus/ Aves/ Geothlypis trichas/ Melospiza melodia/ Poaceae/ Riparia/ Spiza/ Spiza americana/ Turdus merula
Abstract: The U.S. Department of Agriculture (USDA) under its Continuous Enrollment Conservation Reserve Program (CRP) has actively promoted establishment of conservation buffers. Although these programs are intended to benefit wildlife in addition to protecting soil and water resources, benefits to grassland birds may be compromised by narrow widths, presence of woody vegetation, and high predation pressure. During 2001 and 2002, we surveyed breeding grassland birds and searched for nests in 33 CRP filter strips that varied in planting mixture (cool-season vs. warm-season grasses) and adjacent edge type (non-wooded vs. wooded). The most abundant species in filter strips were red-winged blackbird (Agelaius phoeniceus), dickcissel (Spiza americana), song sparrow (Melospiza melodia), and common yellowthroat (Geothlypis trichas). Relative abundances of birds and nests were similar between cool-season and warm-season planting mixtures. Dickcissels and red-winged blackbirds and their nests were relatively less abundant at wooded than non-wooded sites. Our nest success estimates generally were low in all treatments, and nest success varied little with the variables we studied. Predation was the major cause of nest failure; 62% of all nests were depredated. Although the most common birds using filter strips are generalists, filter strips also have potential to provide breeding habitat for some species of management concern.
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140. **Grassland birds: Development and testing of models to predict species richness, abundance, and reproductive success at local and landscape levels.**
Schultz, J.
Columbia, MO: Missouri Dept. of Conservation, Wildlife and Research Div.; PB2001104751XSP, 2000. 180 p.
Notes: Study No. 43; Final Report to Research and Survey Projects as Required by Federal Aid in Wildlife Restoration Act, Missouri, Federal Aid Project no. W-13-R-54(2000). Contains Dissertation of Timothy McCoy on Effects of Landscape Composition and Multi-Scale Habitat Characteristics on the Grassland Bird Community; Prepared in cooperation with Missouri Univ.-Columbia. Graduate School.; Sponsored by Fish and Wildlife Restoration Program, Washington, DC.
Descriptors: endangered species/ models/ abundance/ reproduction biology/ conservation/ habitats/ landscapes/ birds/ wildlife management/ Conservation Reserve Program/ grassland birds/ natural resources and earth sciences natural resource management/ medicine/ biology/ ecology
Abstract: Measures of grassland bird demography on Conservation Reserve Program (CRP) fields were compared and modeled at several spatial scales to identify habitat factors associated with increased conservation value for grassland birds. Grassland bird populations and species richness were compared between fields located in landscapes with different amounts of CRP habitat and total grassland. Multi-scale habitat models were developed from and validated on two independent data sets to identify the primary habitat features that could predict the potential value of CRP and other idle grasslands for grassland bird conservation.

141. **The Great Plains: America's best chance for ecosystem restoration, Part 1.**
Licht, Daniel S.
Wild Earth 4(2): 47-53. (1994); ISSN: 1055-1166
Descriptors: Canis latrans/ Mephitis/ Microtus pennsylvanicus/ Procyon lotor/ Vulpes vulpes/ Ciconiiformes/ Fringillidae/ Passeriformes/ Scolopacidae/ Ammodramus bairdii/ Bartramia longicauda/ Catoptrophorus semipalmatus/ Gallinago gallinago/ Limosa fedoa/ Molothrus ater/ Phalaropus tricolor/ agricultural practices/ birds/ Conservation Reserve Program/ ecosystem management/ ecosystems/ farmland/ grasslands/ habitat alterations/ land, private/ mammals/ management/ restoration/ coyote/ red fox/ raccoon/ skunk/ meadow vole/ Baird's sparrow/ brown headed cowbird/ marbled godwit/ upland sandpiper/ common snipe/ Wilson's phalarope/ willet/ North America/ Great Plains
Abstract: The author discusses the Conservation Reserve Program (CRP) in the United States and its effect on Great Plains wildlife and ecosystems. Although a large number of acres are temporarily taken out of agricultural use under the CRP program, the individual tracts are small. Very often, farmers plant exotic grasses on the CRP tracts instead of native ones that would support native wildlife species.
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142. **Ground beetle (Coleoptera: Carabidae) assemblages in organic, no-till, and chisel-till cropping systems in Maryland.**
Clark, S.; Szlavecz, K.; Cavigelli, M. A.; and Purrington, F.
Environmental Entomology 35(5): 1304-1312. (2006)
NAL Call #: QL461.E532; ISSN: 0046225X
Descriptors: Carabidae/ chisel-till/ cropping systems/ no-till/ organic
Abstract: Ground beetle assemblages were compared in organic, no-till, and chisel-till cropping systems of the USDA Farming Systems Project in Maryland. The cropping systems consisted of 3-yr rotations of corn (Zea mays L.), soybean (Glycine max L. Merr.), and wheat (Triticum aestivum L.) that were planted to corn and soybean during the 2 yr of field sampling (2001-2002). Each year, ground beetles were sampled using pitfall traps during three 9- to 14-d periods corresponding to spring, summer, and fall. A total of 2,313 specimens, representing 31 species, were collected over the 2 yr of sampling. The eight most common species represented 87% of the total specimens collected and included Scarites quadriceps Chaudoir, Elaphrapus anceps (LeConte), Bembidion rapidum (LeConte), Harpalus pensylvanicus (DeGeer), Poecilus chalcites (Say), Clivina impressefrons LeConte, Agonum punctiforme (Say), and Amara aenea (DeGeer). Canonical variates analysis based on the 10 most abundant species showed that the carabid

assemblages in the three cropping systems were distinguishable from each other. The organic system was found to be more different from the no-till and chisel-till systems than these two systems were from each other. In 2002, ground beetle relative abundance, measured species richness, and species diversity were greater in the organic than in the chisel-till system. Similar trends were found in 2001, but no significant differences were found in these measurements. Relatively few differences were found between the no-till and chisel-till systems. The estimated species richness of ground beetles based on several common estimators did not show differences among the three cropping systems. The potential use of ground beetles as ecological indicators is discussed. © 2006 Entomological Society of America.
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143. **Gunnison sage-grouse use of Conservation Reserve Program fields in Utah and response to emergency grazing: A preliminary evaluation.**
Lupis, S. G.; Messmer, T. A.; and Black, T.
Wildlife Society Bulletin 34(4): 957-962. (2006)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2006)34 [957:GSUOCR]2.0.CO;2.
Descriptors: Centrocercus minimus/ Conservation Reserve Program/ Emergency grazing/ Gunnison sage-grouse/ habitat use/ Utah
Abstract: Little information is available on the use of areas enrolled in the Conservation Reserve Program (CRP) by Gunnison sage-grouse (Centrocercus minimus) or the impacts of grazing on their habitat selection and movement patterns. Using radiotelemetry, we monitored 13 Gunnison sage-grouse in San Juan County, Utah, USA during 2001-2002 to determine their use of CRP. Additionally, in 2002 some of the CRP land used by the birds in 2001 was grazed under a drought emergency declaration. This afforded us an opportunity to monitor their response to livestock grazing. Although Gunnison sage-grouse used CRP for nesting, brood-rearing, and summer habitat, it was not selected in greater proportion than its availability (P ≤ 0.10) on the landscape. Bird-use sites in the CRP did not entirely meet habitat guidelines recommended by the Gunnison sage-grouse Rangewide Steering Committee (2005). Most of the sage-grouse we monitored avoided CRP fields when livestock were present. The one exception to this was a hen with a brood. We believe long-term maintenance of CRP in San Juan County will result in achieving habitat conditions that are more desirable for Gunnison sage-grouse. Future livestock management practices in areas used by Gunnison sage-grouse should incorporate short-term, high-intensity deferred-grazing rotations.
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144. **Habitat associations of grasshopper species (Orthoptera : Acrididae) in winter wheat (Triticum aestivum L.) and adjacent rangeland.**
Gillespie, R. L. and Kemp, W. P.
Journal of the Kansas Entomological Society 68(4): 415-424. (1995)
NAL Call #: 420 K13; ISSN: 0022-8567
Descriptors: Acrididae/ Triticum aestivum/ rangelands/ species composition/ population density/ United States/ Orthoptera/ population ecology/ insects
Abstract: Thirty-one species of grasshoppers were collected in either winter wheat or adjacent rangeland/CRP, at ten study sites for three years. Eighteen species were collected in winter wheat fields while 29 species were collected in adjacent reseeded native rangeland or newly seeded Conservation Reserve Program (CRP) land, seeded to crested wheatgrass (Agropyron cristatum (L.) Gaertn. and alfalfa Medicago sativa L.). In native rangeland these two species were reseeded into Stipa comata Trin. and Rupr., Bouteloua gracilis (H.B.K). habitat. Melanoplus sanguinipes, M. bivittatus, and M. packardii, pest species of crops and rangeland in the Northern Great Plains, were the predominant species in winter wheat and together with Aulocara elliotti were the predominant species in adjacent rangeland or CRP. The number of M. sanguinipes collected per unit of effort in CRP was the same as the number collected in "established" reseeded rangeland. Fewer A. elliotti were collected per unit effort in CRP when compared to "established" reseeded rangeland. The results suggest that CRP supports a lower population of A. elliotti than "established" reseeded rangeland or there has been an insufficient span of time for A. elliotti to disperse into these areas.
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145. **Habitat management to conserve natural enemies of arthropod pests in agriculture.**
Landis, Douglas A.; Wratten, Stephen D.; and Gurr, Geoff M.
Annual Review of Entomology 45: 175-201. (2000)
NAL Call #: 421 An72; ISSN: 0066-4170.
http://arjournals.annualreviews.org/doi/pdf/10.1146/annurev.ento.45.1.175?
Descriptors: control/ conservation measures/ man-made habitat/ Insecta: biological control/ habitat management/ farm management/ cultivated land habitat/ arthropods/ insects/ invertebrates
Abstract: Many agroecosystems are unfavorable environments for natural enemies due to high levels of disturbance. Habitat management, a form of conservation biological control, is an ecologically based approach aimed at favoring natural enemies and enhancing biological control in agricultural systems. The goal of habitat management is to create a suitable ecological infrastructure within the agricultural landscape to provide resources such as food for adult natural enemies, alternative prey or hosts, and shelter from adverse conditions. These resources must be integrated into the landscape in a way that is spatially and temporally favorable to natural enemies and practical for producers to implement. The rapidly expanding literature on habitat management is reviewed with attention to practices for favoring predators and parasitoids, implementation of habitat management, and the contributions of modeling and ecological theory to this developing area of conservation biological control. The potential to integrate the goals of habitat management for natural enemies and nature conservation is discussed. [article abstract]
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146. **Habitat preferences of migrant and wintering northern harriers in northwestern Texas.**
Littlefield, C. D. and Johnson, D. H.
Southwestern Naturalist 50(4): 448-452. (2005)
NAL Call #: 409.6 So8; ISSN: 00384909.
Notes: doi: 10.1894/0038-4909(2005)050 [0448:HPOMAW]2.0.CO;2.
Descriptors: Circus cyaneus/ Triticum aestivum/ Texas/ harriers/ Conservation Reserve Program/ prairies/ grasslands
Abstract: We studied habitat preferences of northern harriers (Circus cyaneus) in 4 counties of the Southern High Plains of northwestern Texas from October 1989 to May 1995. Harriers generally arrived in late July and departed in April. They hunted over a variety of habitats in the study area but mainly in Conservation Reserve Program (CRP) grasslands and vegetated playa basins. CRP grasslands, playa basins, and shortgrass prairie were used disproportionately to their availability, whereas winter wheat was used less than its availability. Brown harriers (adult females or subadults of either sex) foraged in CRP about as often as adult males but more frequently in playas and prairies, whereas adult males foraged more in winter wheat. As underground water sources for irrigation continue to be depleted, agricultural practices are likely to change. Depending on how the land is used after irrigation ceases, harriers might benefit if CRP grasslands, vegetated playas, and shortgrass prairies persist. If dominant land use reverts to livestock grazing, however, the harrier population will be negatively affected.
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147. **Habitat restoration and agricultural production under land retirement.**
Purkey, D. R. and Wallender, W. W.
Journal of Irrigation and Drainage Engineering 127(4): 240-245. (2001)
NAL Call #: 290.9 Am3ps (IR); ISSN: 0733-9437
Descriptors: agricultural production/ endangered species/ groundwater/ groundwater flow/ habitats/ irrigation water/ land diversion/ nature conservation/ simulation/ simulation models/ wildlife conservation/ Dipodomys/ Sciuridae/ Vulpes
Abstract: Current land retirement programmes seek to address drainage management challenges in the western San Joaquin Valley of California, USA, using a willing seller strategy. In choosing between available parcels, the programme managers focus primarily on the drainage mitigation potential of retiring each parcel of land. The results of 50-year groundwater simulations suggest that retirement of parcels already underlain by shallow groundwater produces the largest drain flow reduction. However, the managers also want this land to provide useful habitat for threatened terrestrial organisms (Kit Fox, Giant Kangaroo-rat, blunt-nosed leopard lizard and Nelson's antelope ground squirrel). Using the depth of unsaturated material above a shallow water table as a proxy for habitat suitability, the model results reveal that only retirement of land that is currently well aerated and free from shallow groundwater will provide useful habitat in the long term. A secondary objective of land retirement is to minimize the negative local economic impact of removing a parcel from production. According to a productivity proxy drawn from model results, the retirement of land already overlying shallow groundwater could minimize the short-term productivity decline.
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148. **Herbicide and prescribed fire as habitat management tools for northern bobwhite in Conservation Reserve Program fields.**
Greenfield, Kirk C.; Burger, L. Wes; and Chamberlain, Michael J.
Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies 55: 445-455. (2001)
NAL Call #: SK1.S6; ISSN: 0276-7929
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ abiotic factors/ Chemical factors/ physical factors/ land zones/ Colinus virginianus: farming and agriculture/ habitat management/ Grassland habitat quality improvement/ herbicide and prescribed fire management tools assessment/ grassland/ fertilizers and pesticides/ pesticides/ fire/ Mississippi/ Lowndes County/ Aves, Galliformes, Phasianidae/ birds/ chordates/ vertebrates
Abstract: Kentucky-31 tall fescue (Festuca arundicacea) was a common planting established on Conservation Reserve Program (CRP) fields throughout the southeastern United States during the late 1980s and 1990s. Fescue-dominated grassland communities on CRP fields offer poor quality nesting, brood-rearing, and foraging habitat for northern bobwhite (Colinus virginianus) because of dense vegetation, high litter cover, low bare ground, and low plant diversity. Herbicide applications have been shown to reduce fescue and release early successional plant communities, and therefore may enhance bobwhite habitat quality. However, the relative efficacy of herbicide used in conjunction with fire has not been investigated. We tested singular and joint effects of herbicide (glyphosate) application and burning on vegetation in fescue CRP fields in east Mississippi. We tested the following 4 treatments: spring glyphosate application, spring burn, spring burn and glyphosate application, and control. All manipulations modified plant communities and enhanced bobwhite brood-rearing habitat to varying degrees. Spring burn increased bare ground and decreased litter cover ($P \leq 0.05$). Spring herbicide application increased forbs, legumes, and annual weeds, but decreased grass and fescue canopy ($P <= 0.05$). Spring burn/herbicide application increased forbs, legumes, annual weeds, and bare ground but decreased grass canopy, fescue canopy, and litter cover ($P \leq 0.05$). Canopy coverage of bobwhite food plants was greatest in spring burn/herbicide ($P \leq 0.05$). Herbicide applied alone and in conjunction with burning enhanced bobwhite brood-rearing habitat in fescue CRP fields in east Mississippi by promoting early successional plant communities. This information has implications for implementation of wildlife management in federal agricultural multiple-year land retirement programs and other cool season grasslands not enrolled in federal programs.
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149. **History and economics of Farm Bill legislation and the impacts on wildlife management and policies.**
Harmon, K. W.
In: Impacts of the Conservation Reserve Program in the Great Plains, General Technical Report-RM 158; Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1988. pp. 105-108.
Notes: 0277-5786 (ISSN); Proceedings of a Symposium on "Impacts of the Conservation Reserve Program in the Great Plains," held Sept 16-18, 1987, Denver, Colorado. Includes references.
NAL Call #: aSD11.A42
Descriptors: land diversion/ wildlife/ legislation/ revegetation/ habitats/ pheasants/ resource conservation/ soil conservation/ erosion control/ Conservation Reserve Program/ Food Security Act of 1985
This citation is from AGRICOLA.

150. **Home range and habitat use of coyotes in an area of native prairie, farmland and CRP fields.**
Kamler, J. F.; Ballard, W. B.; Lemons, P. R.; Gilliland, R. L.; and Mote, K.
American Midland Naturalist 153(2): 396-404. (2005)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: canid/ habitat use/ home range/ prairie/ Texas/ United States/ Canidae/ Canis latrans
Abstract: From 1999 to 2001 we monitored 12 coyotes (Canis latrans) in northwestern Texas to determine their home ranges and habitat use in a landscape interspersed with native prairie, farmland and Conservation Reserve Program (CRP) fields. Annual home range size was 10.1 km^2 for residents and 84.5 km^2 for transients. We determined habitat use at two spatial scales: within home ranges and within study area. Habitat use patterns were similar at both scales, as residents selected for native prairie and transients selected for CRP fields. Habitat use between residents and transients differed in both seasons, with residents selecting more native prairie, less farmland and less CRP (summer only) than transients. Habitat at natal den sites also differed from expected for residents, as most dens (8 of 10) were located in CRP fields. The CRP fields contained the only tall permanent vegetation on our study sites and appeared to provide important foraging habitat for transient coyotes, and denning habitat for resident coyotes.
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151. **Home range and seasonal movements of Columbian sharp-tailed grouse associated with Conservation Reserve Program and mine reclamation.**
Boisvert, J. H.; Hoffman, R. W.; and Reese, K. P.
Western North American Naturalist 65(1): 36-44. (2005)
NAL Call #: QH1.G7; ISSN: 15270904
Descriptors: Colorado/ Columbian sharp-tailed Grouse/ Conservation Reserve Program/ home range/ mine reclamation/ seasonal movements/ Tympanuchus phasianellus columbianus/ Pedioecetes phasianellus columbianus/ Phasianidae/ Tympanuchus phasianellus
Abstract: During 1999 and 2000 we trapped and radio-marked 156 Columbian Sharp-tailed Grouse (Tympanuchus phasianellus columbianus) on leks in Conservation Reserve Program (CRP, n = 73) and mine reclamation (MR, n = 83) lands in northwestern Colorado. Median spring-fall home range sizes using the 95% fixed kernal and minimum convex polygon estimators for 54 grouse were 86 ha and 61 ha, respectively. Median fixed kernal home range size did not differ between males (79 ha) and females (87 ha). Home ranges of grouse associated with CRP (112 ha) were larger than those of grouse in MR (75 ha). Directional orientation of movements from leks of capture to wintering areas was nonrandom, and there was a positive elevation gain (median = 102 m) associated with these movements. Movements did not differ between grouse captured in CRP and MR for any season but did differ between genders for the spring-fall period. Males exhibited stronger fidelity and less variation in their movements than females; 96% of males compared with only 77% of females remained within 2.0 km of their lek of capture from spring through fall. Ninety percent of females nested within 2.5 km of their lek of capture. During winter all grouse were found farther (median = 21.5 km) from lek sites than in any other season. Males remained on the breeding range longer in the fall and returned earlier in the spring than females even though they wintered similar distances away (median males = 21.5 km, median females = 21.4 km). Our findings support the 2.0-km radius used in the Habitat Suitability Index model for Columbian Sharp-tailed Grouse to assess nest and brood-rearing cover around leks, but not the 6.5-km radius used to evaluate winter cover.
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152. **Home ranges of ring-necked pheasants in northwestern Kansas.**
Applegate, Roger D.; Flock, Brian E.; Gipson, Philip S.; Mccoy, Matthew W.; and Kemp, Kenneth E.
Prairie Naturalist 34(1-2): 21-29. (2002)
NAL Call #: QH540.P7; ISSN: 0091-0376
Descriptors: Conservation Reserve Program [CRP]/ adaptive kernels/ brooding behavior/ habitat density/ home range size/ minimum convex polygons/ nesting behavior/ travel distance/ animals/ birds/ chordates/ nonhuman vertebrates/ vertebrates/ Phasianus colchicus [ring-necked pheasant] (Galliformes): female, male
Abstract: We studied the home ranges of 29 female and 9 male ring-necked pheasants (Phasianus colchicus) in northwestern Kansas during 1994 to 1995. Home ranges for hens varied from an average of 127 ha in high-density (25%) Conservation Reserve Program (CRP) to 155 ha on low-density (8 to 11%) CRP sites. Home ranges for cocks averaged 179 ha on the high-density CRP site and 105 ha on the low-density CRP site. The amount of CRP in areas where home ranges were located had no detectable effect on size of home ranges. Our estimates of hen home ranges during nesting and brooding periods were larger than reported from other regions. This might reflect the need for hens to travel greater distances in northwestern Kansas in order to obtain adequate food and cover for themselves and their broods.
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153. **A home to roam.**
Breining, Greg
Minnesota Conservation Volunteer 64(379) (2001).
URL: http://www.dnr.state.mn.us/volunteer/novdec01/prairie_chickens.html
Descriptors: Accipitridae/ Ciconiiformes/ Galliformes/ Phasianidae/ Strigidae/ Strigiformes/ Bubo virginianus/ Buteo jamaicensis/ Phasianus colchicus/ Tympanuchus cupido/ agricultural practices/ habits-behavior/ birds/

conservation/ ecosystems/ endangered-threatened species/ funding/ grasslands/ habitat alterations/ habitat management/ habitat use/ history/ management/ monitoring/ nest parasitism/ prairies/ predation/ predators/ protection/ restoration/ status/ stocking-transplanting/ survival/ techniques/ telemetry/ wildlife/ prairie chicken/ ring-necked pheasant/ red-tailed hawk/ great horned owl
Abstract: Prairie chickens once lived throughout the prairies of western and southern Minnesota, conspicuous on their spring booming grounds and popular with the state's hunters. The population of the bird started to grow for sometime but over-hunting over a period of time, loss of habitats of native grasses and small farm fields, as they were converted to larger acreages of row crops, led to their population decline. Prairie protection programs and federal grassland projects such as Conservation Reserve Program, which includes projects, like reintroduction and relocation of the species, restoration and protection of habitats has helped in rebuilding and stabilizing their population. Although the programs faced problems like "dump nest" by pheasants, (leaving of relocated areas to move into another area where the birds were reintroduced), and predators, many birds have managed to survive, which has led to an increase in population.
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154. **Human-imprinted northern bobwhite chicks and indexing arthropod foods in habitat patches.**
Palmer, W. E.; Lane, M. W.; and Bromley, P. T.
Journal of Wildlife Management 65(4): 861-870. (2001)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: agriculture/ arthropods/ Colinus virginianus/ corn/ feeding/ habitat/ northern bobwhite/ soybean/ arthropod/ diet/ foraging behavior/ gamebird/ patch use/ wildlife management/ Colinus virginianus
Abstract: Arthropods are an important diet resource for northern bobwhite (Colinus virginianus) chicks. Estimates of arthropod abundance using standard entomological sampling techniques may lack biological relevance for assessing potential foraging value of habitat patches because they do not incorporate a realistic availability measure of arthropods to bobwhite chicks. Assuming that human-imprinted (hereafter, imprinted) bobwhite chicks foraged similarly to wild bobwhite chicks, we estimated foraging rates (arthropods [g] consumed/30 min/chick) and mass (g) changes of imprinted chicks foraging in different habitat patches, and used these measures to index arthropod abundance. Ranks of arthropod abundance in soybean fields (n = 8) based on foraging rates of imprinted chicks were different from ranks based on arthropod counts from sweepnet sampling. Ranks of arthropod abundance in soybean fields (n = 10) based on mass changes of imprinted chicks were different from ranks based on dry mass (g) of arthropods collected by sweepnetting and pitfall trapping. However, ranks of habitat patches based on foraging rates and mass changes of imprinted chicks were similar. Estimated sample sizes for comparing chick foraging rates of 2 agricultural habitats, with power (1 - β) = 0.8 and α = 0.05, were reasonable (n ≤ 11) at observed levels of sampling error. Foraging rates of imprinted chicks in randomly selected, conventionally tilled soybean and corn fields were low (range 0.09-0.12 g/30 min/chick), but foraging rates were 2.1 and 3.8 times greater along field edges and in no-tilled fields, respectively. Our results suggest that using estimates of arthropod abundance to rank the foraging value of habitats may be unreliable without information on availability of arthropods to chicks. Indices of the foraging value of habitat patches based on imprinted bobwhite chicks were more biologically relevant than arthropod abundance information.
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155. **Illinois Wildlife Enhancement Bonus Program: Analysis of the Illinois Department of Natural Resources and Illinois Quail Unlimited Conservation Program.**
Hasstedt, S. C.
Edwardsville, IL: Southern Illinois University at Edwardsville, 2002.
Notes: Report numbers: CI01316, ADA398508XSP; Thesis
Descriptors: natural resources/ population/ preservation/ birds/ agriculture/ farms/ land areas/ Illinois/ silviculture/ conservation/ habitats/ wildlife/ bobwhite quails/ IWEBP/ wildlife enhancement bonus programs/ natural resource management/ medicine/ biology/ botany/ zoology/ ecology
Abstract: In 1998 the Illinois Department of Natural Resources (IDNR), Division of Wildlife Resources, Habitat Stamp Fund in conjunction with Illinois Quail Unlimited (QU) initiated the Illinois Wildlife Enhancement Bonus Program (IWEBP) . Financial incentives are available to property owners for implementation of wildlife friendly practices on land enrolled in the United States Department of Agriculture's (USDA) Conservation Reserve Program (CRP) and non-CRP acres are eligible under a fescue (Festuca arundinaceae) conversion initiative. Mail surveys following the Total Design Method (Salant and Dillman 1994) were used to gauge both land owner I operator and Natural Resources Conservation Service (NRCS) professional's perceptions regarding IWEBP efficacy in improving wildlife habitat, administrative costs of IWEBP, and characteristics of enrolled participants. Proportional response histograms and higher order analyses revealed IWEBP participants place a high intrinsic value on both habitat and the presence of wildlife on their land, and the financial incentive is most important to offset the high cost of re-establishing native grasses and forbs. NRCS personnel generally believe, compared to other state conservation programs, IWEBP provides similar or better habitat benefits for wildlife in general and is particularly beneficial to bobwhite quail (Colinus virginianus). Land owners and NRCS personnel alike appreciate the relative simplicity of IWEBP enrollment procedures, but further education efforts regarding the singular importance of habitat (Brennan 1991, Jenkins 2000) in improving upland wildlife populations could further the success of this program.

156. **Impact of agricultural management on carabid communities and weed seed predation.**
Menalled, Fabian D.; Smith, Richard G.; Dauer, Joseph T.; and Fox, Tyler B.
Agriculture, Ecosystems and Environment 118(1-4): 49-54. (2007)
NAL Call #: S601.A34; ISSN: 0167-8809
Descriptors: commercial activities/ nutrition/ diet/ ecology/ population dynamics/ man-made habitat/ land zones/ Carabidae: farming and agriculture/ agricultural management systems/ Effect on communities/ community structure/ population size/ cultivated land habitat/ Michigan/ Hickory Corners/ Insecta, Coleoptera, Adephaga,

Caraboidea/ arthropods/ beetles/ insects/ invertebrates
Abstract: This study evaluated the relationship between diversity and activity-density of carabid beetles and invertebrate weed seed predation in conventional, no-till, and organic management systems in the Midwest USA. Carabid beetles were sampled with pitfall traps and invertebrate seed predation rates of fall panicum and common lambsquarters were assayed with exclosure cages. Total carabid activity-density was over two times higher in the conventional systems compared to the no-till and organic management systems. In contrast, activity-densities of seed-predating carabid species were over three times higher in the no-till compared to the conventional and organic systems. Carabid diversity was higher in the no-till and organic systems compared to the conventional system, and a multivariate analysis showed that carabid community structure was distinct among the three systems. Predation of fall panicum and common lambsquarters seeds was often over two times higher in the no-till compared to the conventional and organic systems, and there was a strong correlation (r > 0.94) between seed removal rates and the total number of carabid seed predators captured in each system.
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157. **The impact of CRP on avian wildlife: A review.**
Ryan, M. R.; Burger, L. W.; and Kurzejeski, E. W.
Journal of Production Agriculture 11(1): 61-66. (Jan. 1998-Mar. 1998)
NAL Call #: S539.5.J68; ISSN: 0890-8524 [JPRAEN].
Notes: Literature review.
Descriptors: wildlife/ wild birds/ habitats/ government policy/ populations/ grasslands/ species diversity/ nests/ population growth/ land banks/ wildlife conservation/ Conservation Reserve Program
Abstract: We reviewed the literature to assess the impact of the Conservation Reserve Program (CRP) on bird populations in the central USA. The CRP replaced production agriculture fields with grassland habitat used by more than 90 species of birds. At least 42 bird species nested in CRP habitats. Bird species richness in CRP fields was similar to that in rowcrop fields, but relative abundance was 1.4 to 10.5 times higher in CRP plantings. Nest abundance was 13.5 times higher in CRP than crop fields, although nesting success of songbirds was only slightly higher in CRP fields (40% vs. 36% in crops). Limited evidence suggests that the CRP has positively affected the population growth rates of several nongame grassland bird species. Waterfowl nest densities and nesting success in CRP fields were similar to these occurring in grassland habitats managed specifically for waterfowl. The presence of CRP grassland has been postulated to have improved the quality of existing duck nest habitat by dispersing nests over a larger area. Ring-necked pheasant (Phasianus colchicus L.) populations seemingly increased substantially with CRP acres. Little evidence of positive population response by northern bobwhites (Colinus virginianus L.) to the CRP is available. Overall, grassland birds known to be declining throughout North America were seemingly the most benefitted by the CRP.
This citation is from AGRICOLA.

158. **Impact of different agricultural practices on the genetic structure of Lumbricus terrestris, Arion lusitanicus and Microtus arvalis.**
Kautenburger, R.
Animal Biodiversity and Conservation 29(1): 19-32. (2006)
NAL Call #: QL1.M87; ISSN: 1578665X
Descriptors: Arion lusitanicus/ DNA fingerprinting/ genetic structure/ land use/ Lumbricus terrestris/ Microtus arvalis
Abstract: Little attention has been given to date to the potential influence of agricultural land use methods or farming practice on the genetic variability of native species. In the present study, we measured the genetic structure of three model species - Microtus arvalis, Arion lusitanicus and Lumbricus terrestris - in an agricultural landscape with a diversity of land use types and farming practices. The aim of the study was to investigate whether different management strategies such as the method of land use or type of farming practice (conventional and ecological farming) have an impact on the species' genetic structure. We used RAPD markers and multilocus DNA fingerprints as genetic tools. Genetic similarity was based on the presence or absence of bands, which revealed a wide range of variability within and between the analysed populations for each model species. Cluster analysis and Mantel tests (isolation by distance) showed different genetic structures in the populations of M. arvalis from sampling sites with different land use. However, the main factors influencing the genetic variability of these vole populations were geographic distances and isolation barriers. The genetic variability observed in A. lusitanicus populations correlated with geographic distance and the type of land use method, but no correlation was found with different farming practices. Our preliminary results suggest that the genetic structure of L. terrestris populations is influenced by the agricultural land use method used at the different sampling sites but not by the geographic distance. © 2006 Museu de Ciencies Naturals.
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159. **The impact of haying Conservation Reserve Program lands on productivity of ducks nesting in the Prairie Pothole Region of North and South Dakota.**
Renner, R. W.; Reynolds, R. E.; and Batt, B. D.
Transactions of the North American Wildlife and Natural Resource Conference 60: 221-229. (1995)
NAL Call #: 412.9 N814; ISSN: 0078-1355 [NAWTA6].
Notes: Conference held 24-29 Mar 1995, Minneapolis. MN; Conference Sponsors: Ducks Unlimited and Wildlife Management Institute; World Meeting Number 951-0315.
Descriptors: Anatidae/ prairies/ conservation areas/ haymaking/ reproductive performance/ nature reserves/ land banks/ North Dakota/ South Dakota
Abstract: Compared nest success and duck production in hayed and non-hayed CRP fields.
This citation is from AGRICOLA.

160. **Impact of haying CRP lands on duck nesting in the Prairie Pothole Region.**
Renner, R. W. and Reynolds, R. E.
In: 60th North American Wildlife and Natural Resources Conference. Minneapolis. MN (USA).
Bismarck, ND: Ducks Unlimited; 1995.
Notes: Conference Sponsor: Wildlife Management Institute (Washington, DC); World Meeting Number 951-0315.
Descriptors: hay/ haying/ waterfowl/ ducks/ nesting/ Conservation Reserve Program/ Prairie Pothole region

161. **Impact of leafy spurge on post-Conservation Reserve Program land.**
Hirsch, S. A. and Leitch, J. A.
Journal of Range Management 51(6): 614-620. (Nov. 1998)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X [JRMGAQ]
Descriptors: euphorbia esula/ conservation areas/ weed control/ species diversity/ economic impact/ grazing/ carrying capacity/ wildlife/ North Dakota
Abstract: Leafy spurge (Euphorbia esula L.), a noxious weed infests some of the 1.2 million hectares of Conservation Reserve Program (CRP) land in North Dakota. Once established a leafy spurge monoculture will reduce expected CRP benefits and impact returns to some post-CRP land uses. The study estimated statewide direct economic impacts of about $351,000 on post-CRP land maintained in vegetative cover, $1.118 million on post-CRP grazing land, and negligible (assumed $0) on post-CRP cropland, for a total of $1.469 million. Total annual direct and secondary economic impacts to North Dakota's economy were estimated to be $4.665 million, which would support about 57 jobs.
This citation is from AGRICOLA.

162. **Impact of the Conservation Reserve Program on duck recruitment in the U.S. Prairie Pothole Region.**
Reynolds, R. E.; Shaffer, T. L.; Renner, R. W.; Newton, W. E.; and Batt, B. D.
Journal of Wildlife Management 65(4): 765-780. (2001)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: breeding success/ recruitment/ land use/ wildlife management/ Conservation Reserve Program/ habitat improvement/ breeding sites/ food availability/ hunting/ aquaculture/ Anas/ Montana/ South Dakota/ North Dakota/ Prairie Pothole Region/ Prairie Pothole Region/ Conservation Reserve Program/ Dabbling ducks/ management/ Culture of other aquatic animals/ United States
Abstract: The U.S. Department of Agriculture (USDA)'s Conservation Reserve Program (CRP) resulted in the conversion of about 1.9 million ha of cropland to perennial grass cover in the Prairie Pothole Region of North Dakota, South Dakota, and northeastern Montana by 1992. Many wildlife managers believed this cover would provide benefits to wildlife, including upland nesting ducks. During 1992-1995, we evaluated success of 5 duck species nesting in CRP fields and nearby Waterfowl Production Areas (WPA) throughout the region. We examined relationships between daily survival rates (DSR) of duck nests in CRP cover and landscape-level habitat and population parameters. We computed DSR of duck nests in other major cover types in our study area from data collected during 1980-1984 (pre-CRP) and 1990-1994 (CRP) periods. We then applied recruitment models to estimate duck production in our study area during peak CRP years (1992-1997) and compared these results with those that simulated the scenario in which cropland was in place of CRP cover (i.e., the CRP had not occurred). DSR were higher in all habitats combined during the CRP period compared to the pre-CRP period. Regressions of DSR in CRP cover on the percent of each study plot in perennial cover and geographic location were significant (P< 0.01) for 4 of 5 duck (Anas spp.) species. Estimated nest success and recruitment rates for the 5 species combined during 1992-1997 were 46% and 30% higher, respectively, with CRP cover on the landscape compared to a scenario where we simulated cropland in place of CRP. Our model estimated an additional 12.4 million recruits from our study area to the fall flight as a consequence of the CRP during 1992-1997. Our results document benefits to 5 duck species in the northern plains associated with a farm program that provided financial incentives to landowners for planting undisturbed grass cover as an alternative to annual crops.
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163. **Impact of the Conservation Reserve Program on wildlife conservation in the Midwest.**
Farrand, D. Todd and Ryan, Mark R.
In: Fish and wildlife benefits of Farm Bill conservation programs: 2000-2005 update, Technical Review 05-2/ Haufler, Jonathan B., editor; Bethesda, MD: The Wildlife Society, 2005. pp. 41-60.
http://www.nrcs.usda.gov/TECHNICAL/nri/ceap/fwbenefit.html
Descriptors: conservation programs/ wildlife conservation/ wildlife response/ United States, Midwest/ Conservation Reserve Program/ grasslands/ population stability
Abstract: Evidence that the Conservation Reserve Program (CRP) created habitat used by grassland birds in the Midwest is unquestionable. Evidence also is accumulating that suggests CRP is used by a variety of other terrestrial wildlife species. Reproductive and population-level benefits have been demonstrated for some, but not all, avian species; evidence for other terrestrial wildlife is lacking. Wildlife response to CRP is a multiscale phenomenon dependent upon vegetation structure and composition within the planting, practice-level factors such as size and shape, and its landscape context, as well as temporal factors. Thus, the benefits of CRP and the impacts of recent programmatic changes are location- and species-specific. Overall, CRP habitat in the Midwest likely contributes to the population stability and growth of many, but not all, grassland wildlife species.

164. **Impact of the Conservation Reserve Program on wildlife conservation in the Midwest.**
Ryan, M. R.
In: A comprehensive review of Farm Bill contributions to wildlife conservation, 1985-2000/ Heard, L. P; Hohman, W. L.; Halloum, D. J.; and Wildlife Habitat Management Institute (U.S.); Series: Technical Report USDA/NRCS/WHMI.
Madison, MS: USDA, NRCS, Wildlife Habitat Management Institute, 2000; pp. 45-54.
NAL Call #: aS604.6 C66 2000
Descriptors: Conservation Reserve Program/ wildlife habitats/ wildlife management/ Midwest

165. **Impacts of farm programs on bobwhites: ACR and CRP seedings as bobwhite nesting and brood-rearing habitat.**
Roseberry, J. L. Illinois Department of Conservation, 1992. 29 pp.
Notes: Cooperative Upland Wildlife Research; Final Report; Project Number: IL W-106-R/Job 4.1A/Study 4.
Descriptors: Colinus virginianus/ bobwhite/ seeding/ habitat management for wildlife/ farms/ habitat/ nests and nesting/ broods and brooding/ utilization/ cultivated farmland/ policies and programs/ transect survey/ vegetation/ cover, nesting/ population density/ Illinois/ Jasper County
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166. **Impacts of small mammals and birds on low-tillage, dryland crops.**
Sterner, R. T.; Petersen, B. E.; Gaddis, S. E.; Tope, K. L.; and Poss, D. J.
Crop Protection 22(4): 595-602. (2003); ISSN: 02612194.
Notes: doi: 10.1016/S0261-2194(02)00236-3.
Descriptors: bird/ corn/ Crop damage/ deer mouse/ dryland/ Great Plains/ low-tillage/ plant debris/ small mammal/ soybean/ avifauna/ crop pest/ dryland farming/ pest damage/ small mammal/ United States/ Calamospiza melanocorys/ Charadrius montanus/ Charadrius vociferus/ Eremophila alpestris/ Lepus californicus/ Lepus townsendii/ Odocoileus hemionus/ Odocoileus virginianus/ Onychomys leucogaster/ Peromyscus maniculatus/ Reithrodontomys megalotis/ Spermophilus tridecemlineatus/ Sturnella neglecta/ Zenaida macroura
Abstract: During 2000-2001, small mammals, birds, and potential corn/soybean damage were studied at a low-tillage, non-irrigated agricultural research site in the Colorado Piedmont. A small mammal survey involved four trapping sessions and 18, 12-live-trap grids each. Within years, two grids each were placed at random, fixed locations in experimental corn, fallow, millet, pea, soybean, sunflower, and wheat plots at the site; two off-plot grids each were set at random, fixed locations < 100 m from the north and south edge of these plots. In 2001, periodic bird observations were conducted, and damage to corn and soybean plants was assessed. Capture rates were low during all trap sessions (range 0.1%-3.3%, $\bar{x}$ = 2.2%). Sixty-three small mammals were captured and 39 were recaptured. Captures included deer mouse (Peromyscus maniculatus), northern grasshopper mouse (Onychomys leucogaster), thirteen-lined ground squirrel (Spermophilus tridecemlineatus), and western harvest mouse (Reithrodontomys megalotis). Deer mice accounted for 56 of the initial captures (88.9%). In-crop captures (n = 15) and recaptures (n = 16) were most frequent in wheat plots. Bird counts were low and included horned lark (Eremophila alpestris), killdeer plover (Charadrius vociferus), lark bunting (Calamospiza melanocorys), mountain plover (Charadrius montanus), mourning dove (Zenaida macroura), and western meadowlark (Sturnella neglecta). No direct seed removal, sprout removal, or plant clipping by small mammals or birds was observed, but some clipping of soybean plants was attributed to deer (Odocoileus virginianus and O. hemionus) and jack rabbits (Lepus townsendii or L. californicus). Plant debris accumulation is viewed as a key factor determining small mammal abundance and potential damage in low-till agriculture.
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167. **Impacts of tillage, cover crop, and nitrogen on populations of earthworms, microarthropods, and soil fungi in a cultivated fragile soil.**
Reeleder, R. D.; Miller, J. J.; Coelho, B. R. Ball; and Roy, R. C.
Applied Soil Ecology 33(3): 243-257. (2006)
NAL Call #: QH541.5.S6 A67; ISSN: 0929-1393
Descriptors: commercial activities/ ecology/ community structure/ terrestrial habitat/ man-made habitat/ abiotic factors/ land zones/ North America/ Canada/ Acari/ Aporrectodea turgida/ Collembola/ Microarthropoda: farming and agriculture/ soil population responses to tillage regime/ cover crop and nitrogen levels/ biomass/ relative abundance/ population dynamics/ soil habitat/ cultivated land habitat/ abiotic factors/ Ontario/ The Delhi/ Annelida, Oligochaeta/ Annelids/ Arachnids/ arthropods/ Chelicerates/ insects/ invertebrates
Abstract: The impacts of tillage regime, cover crop, and nitrogen on various soil organisms inhabiting a fragile sandy soil (Brunosolic Gray Brown Luvisol) were determined. Soil samples were collected between 2000 and 2003 from a long-term tillage experiment, established in 1988 to determine the effect of tillage systems on yield of corn (Zea mays), soil quality, and weed populations. Populations of several of the soil organisms studied were significantly affected by one or more agronomic treatments. A single earthworm species, Aporrectodea turgida, was found in the experimental area. Worm populations were generally low and dominated by juveniles. Spring-sampled populations were significantly higher in no-till plots than in conventionally tilled plots. Fall-sampled populations were not affected as greatly by tillage, but were generally higher in no-till plots not receiving additional nitrogen or in plots overseeded with a rye (Secale cereale) cover crop. Soil microbial biomass, as represented by extractable soil DNA, was higher in the spring than in the fall. Populations of the soilborne stramenopile Pythium were generally higher in conventionally tilled plots, and were increased by a rye cover crop. Higher rates of nitrogen increased populations of total soil fungi but nitrogen had little effect on prostigmatid or cryptostigmatid mites; prostigmatid populations were generally higher in no-till plots. Spring populations of mesostigmatid mites were higher in plots with a rye cover crop than in plots without an overwintering plant cover. Conventional tillage stimulated populations of astigmatid mites during periods of high rainfall. Collembola populations were dominated by the families Onychiuridae and Isotomidae, but neither was greatly affected by any tillage treatment. Principal component analysis showed that populations of A. turgida and soil aggregation tended to be positively associated with one another, but that variations in populations of Onychiuridae springtails, prostigmatid mites, and Pythium tended not to be associated with changes in other variables. Overall, effects of tillage treatments on soil organisms were found to differ from previous reports in several respects, suggesting that soil type may impose conditions that over-ride the impacts of agronomic cultivation systems on populations of soil organisms. [Crown Copyright 2005.]
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168. **The Imperial Valley of California is critical to wintering mountain plovers.**
Wunder, M. B. and Knopf, F. L.
Journal of Field Ornithology 74(1): 74-80. (2003)
NAL Call #: 413.8 B534; ISSN: 02738570
Descriptors: California/ Charadrius montanus/ Imperial Valley/ mountain plover/ shorebird/ Charadrius montanus
Abstract: We surveyed Mountain Plovers (Charadrius montanus) wintering in the Imperial Valley of California in January 2001, and also recorded the types of crop fields used by plovers in this agricultural landscape. We tallied 4037 plovers in 36 flocks ranging in size from 4 to 596 birds. Plovers were more common on alfalfa and Bermudagrass fields than other field types. Further, most birds were on alfalfa fields that were currently being (or had recently been) grazed, primarily by domestic sheep. Plovers used Bermudagrass fields only after harvest and subsequent burning. Examination of Christmas Bird Count data from 1950-2000 indicated that the Mountain Plover has abandoned its historical wintering areas on the coastal plains of California. Numbers in the Central Valley seem to have undergone recent declines also. We believe that the cultivated landscape of the Imperial Valley provides wintering habitats for about half of the global population of Mountain Plovers. We attribute the current importance of the Imperial Valley for Mountain Plovers to loss of native coastal and Central Valley habitats rather than to a behavioral switching of wintering areas through time. Future changes in specific cropping or management practices in the Imperial Valley will have a major impact on the conservation status of this species.
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169. **The importance of Conservation Reserve Program fields to breeding grassland birds at Buffalo Ridge, Minnesota.**
Leddy, Krecia L.; Higgins, Kenneth F.; and Naugle, David E.
South Dakota Academy of Science: Proceedings 76: 105-111. (1997)
NAL Call #: 500 SO82; ISSN: 0096-378X.
Notes: Papers presented at The 82nd Annual Meeting of the South Dakota Academy of Science, April 25-26, 1997, Northern State University, Aberdeen, South Dakota. Editor: Higgins, Kenneth F.
Descriptors: Passeriformes/ agricultural crops/ habits-behavior/ birds/ breeding/ Conservation Reserve Program/ density/ ecosystems/ farmland/ grasslands/ habitat management/ habitat use/ management/ pastures/ species diversity/ wildlife/ Minnesota, southwestern
Abstract: Nongame birds were surveyed during summer 1995 at Buffalo Ridge in southwestern Minnesota, to evaluate the importance of Conservation Reserve Program (CRP) grasslands to local avifauna. Bird abundance and composition were compared among three habitat types (CRP grasslands, pasturelands, and croplands) using an index to breeding bird density (i.e., number of singing males/transect area), percent species composition, and total species richness. Vertical height and density of vegetation were measured early in the growing season (mid-May) and during the peak of the growing season (mid-June) to determine whether vegetative structure was related to bird use of vegetation. Conservation Reserve Program fields had higher vegetation measurements and supported higher bird densities and species richness than pasturelands and croplands. Mean bird density (birds/100 ha) in CRP grasslands was 312.5 compared to 166.7 in pasturelands and only 75.0 in croplands. Ten bird species were present in CRP grasslands compared to eight in pasturelands and nine in croplands. The presence of three native bird species (sedge wren, dickcissel, and clay-colored sparrow) in CRP grasslands that were not found in pasturelands or croplands indicated that CRP grasslands were an important habitat type for maintaining avian diversity at Buffalo Ridge.
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170. **Improving Conservation Reserve Program pine plantations for songbirds.**
Drew Lanham, J.; Ellenberger, J. E.; and Schweitzer, S. H.
Forest Landowner 61(3): 16-19. (2002)
NAL Call #: SD144.A15F67; ISSN: 10879110
Descriptors: conservation/ deforestation/ ecosystems/ Global warming/ pesticides/ seed/ wildlife conservation/ forestry/ Biocides/ birds/ conservation/ ecosystems/ forestry/ seeds
Abstract: The improvements in the Conservation Reserve Program (CRP) for songbirds of pine plantations are discussed. These birds consume hordes of inspect pests, dispering seeds and pollinating plants and help in the sustainment of healthy forest ecosystems. The factors related to the declining numbers are natural population cycles, tropical deforestation, pesticide use, global warming and habitat alterations.
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171. **The influence of field age on mammalian relative abundance, diversity, and distribution on Conservation Reserve Program lands in Michigan.**
Furrow, Ly Thi
East Lansing, MI: Michigan State University, 1995.
Notes: Masters Thesis
Descriptors: conservation/ wildlife distribution/ prairies/ meadows/ agricultural conservation programs
Abstract: Past research evaluating wildlife use of Conservation Reserve Program (CRP) lands have focused primarily on avian populations as indicators of wildlife habitat quality. In addition to avian species, mammals may also serve as indicators of wildlife habitat quality and have not been adequately evaluated on CRP lands. Relative small mammal abundance, species composition, diversity, and vegetative characteristics were examined on replicated CP1 fields of 6 age classes and on agricultural fields in Gratiot County, Michigan in 1992 and 1993. Additionally, predator scent stations were used to monitor medium sized mammals associated with CRP fields. Results suggest that the structure and composition of various age classes of CRP fields influenced mammal abundance, richness, and diversity. Reverting CRP lands to cropland may have significant impacts on a diversity of mammal species that depend on habitat conditions provided by these grasslands.
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172. **Influence of intercropping canola or pea with barley on assemblages of ground beetles (Coleoptera: Carabidae).**
Butts, R. A.; Floate, K. D.; David, M.; Blackshaw, R. E.; and Burnett, P. A.
Environmental Entomology 32(3): 535-541. (2003)
NAL Call #: QL461.E532; ISSN: 0046225X
Descriptors: agroecosystems/ biological control/ Canada/ diversity/ intercropping/ polyculture/ agricultural practices/ agroecology/ beetle/ biological control/ community composition/ intercropping/ species diversity/ Amara/ Bembidion/ Brassica napus/ Carabidae/ Coleoptera/ Hordeum vulgare/ Pisum sativum
Abstract: Pitfall traps were used to compare assemblages of ground beetles (Coleoptera: Carabidae) among treatments of two intercrop trials replicated at each of two sites in each of three years. The first trial comprised canola (Brassica napus L.) and barley (Hordeum vulgare L.) in monoculture and three intercrop treatments of canola and barley. The second trial comprised pea (Pisum sativum L.) and barley in monoculture and three intercrop treatments of pea and barley. Treatment had little effect on species richness. For taxa combined, a significant effect of treatment was detected in 3 of 11 cases, reflecting greater captures of beetles in canola or pea than in barley. Captures of individual taxa were compared among canola or pea versus each of the three intercrops versus barley. For 14 of 15 cases showing significant differences between monocultures, more beetles were captured in canola or pea than in barley. For 12 of 14 cases showing significant differences between monocultures and intercrops, captures of beetles were highest in canola or pea. These cases primarily reflected different captures of Amara spp. and Bembidion spp. across treatments. Results show that under the experimental conditions of the current study in Alberta, Canada, intercropping barley into canola or pea did not increase the activity abundance of populations above that observed in the latter two crops.
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173. **Influence of landscape composition on bird use of rowcrop fields.**
Best, Louis B.; Bergin, Timothy M.; and Freemark, Kathryn E.
Journal of Wildlife Management 65(3): 442-449. (2001)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: wildlife management: conservation/ terrestrial ecology: ecology, environmental sciences/ principal component analysis/ analytical method/ landscape composition: influence/ rowcrop fields: bird use
Abstract: We evaluated the influence of landscape composition on bird use of rowcrop (corn and soybean) fields in 6 watersheds in Iowa from mid-May to late July 1993 and 1994. We counted birds within 50-m-radius circular plots positioned randomly within rowcrop fields and determined coverages for 21 habitats within 800-m-radius circles centered on each bird census plot. We evaluated the relationships between bird abundances in rowcrop fields and the habitat coverages in the landscape by using 2 multivariate procedures. We derived 3 landscape scenarios from a cluster analysis of the original habitat variables; the abundances of 7 bird species differed significantly among the 3 scenarios. Species abundances in rowcrop fields were greater in landscapes with more grassland block-cover and/or more wooded block-cover and strip-cover. Principal component analysis illustrated the responses of bird species to landscape composition; species responses depended upon the relative use (ranging from resident to occasional) that the birds made of the rowcrop fields. Habitat selection and use in birds is a multiscale phenomenon, and the landscape context should be considered when evaluating bird use of rowcrops.
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174. **Influence of the Conservation Reserve Program on landscape structure and potential upland wildlife habitat.**
Weber, Whitney L.; Roseberry, John L.; and Woolf, Alan
Wildlife Society Bulletin 30(3): 888-898. (Fall 2002)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: conservation measures/ land and freshwater zones/ comprehensive zoology/ habitat management/ Illinois: South and west central/ Conservation Reserve Program/ landscape structure/ upland wildlife habitat/ Phasianidae: Galliformes, Aves/ birds/ chordates/ vertebrates
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175. **The influence of the CRP on grasshopper sparrow population trends in the mid-continental United States.**
Herkert, James R.
Wildlife Society Bulletin 26(2): 227-231. (1998)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Fringillidae/ Passeriformes/ Ammodramus savannarum/ birds/ Conservation Reserve Program/ ecosystems/ habitat management/ land use/ land, private/ management/ population ecology/ techniques/ wildlife/ wildlife-habitat relationships/ conservation programs/ sparrows/ abundance/ evaluation/ habitat changes/ grasshopper sparrow
Abstract: Data suggest that a balance of both managed and undisturbed Conservation Reserve Program lands in the northcentral United States would be most beneficial to a wide variety of grassland birds, including the grasshopper sparrow.
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176. **Intercropping sunflower in organic vegetables to augment bird predators of arthropods.**
Jones, G. A. and Sieving, K. E.
Agriculture, Ecosystems and Environment 117(2-3): 171-177. (2006)
NAL Call #: S601.A34; ISSN: 01678809.
Notes: doi: 10.1016/j.agee.2006.03.026.
Descriptors: avian insectivory/ farmland birds/ Helianthus annuus/ intercrops/ predator augmentation
Abstract: Field experiments were used to test whether intercropping sunflower (Helianthus annuus) in organic vegetables would (1) attract insect-eating birds and encourage them to (2) forage in greater numbers and (3) for more time in cropped fields. Cropped areas with sunflower treatments of one or two rows per 0.4 ha exhibited significantly greater mean abundance of insectivorous birds than did control plots, across a variety of crop types. Additionally, both mean numbers of individual birds foraging on insect prey and mean insect-foraging time per hour in crops were significantly greater in plots with sunflower rows than without. Birds actively pursuing prey in study plots consumed economically important pest species

and did not damage crops during the study. The addition of sunflower intercrops proved to be an effective habitat modification for augmenting avian insectivore numbers and insect-foraging time in organic vegetables.
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177. **Land-use changes and hunter participation: The case of the Conservation Reserve Program.**
Langner, L. L.
Transactions of the North American Wildlife and Natural Resource Conference (54th): 382-390. (1989)
NAL Call #: 412.9 N814; ISSN: 0078-1355 [NAWTA]
Descriptors: erosion control/ land use/ soil conservation/ wildlife management/ United States
This citation is from AGRICOLA.

178. **Land-use policy change and the ramifications for stewardship and waterfowl conservation in Saskatchewan.**
Riemer, G.
Prairie Forum 30(1): 11-24. (2005); ISSN: 03176282
Descriptors: land use change/ land use planning/ nature conservation/ prairie/ waterfowl/ Canada/ North America/ Saskatchewan/ Anas/ Anatidae/ Anser
Abstract: Most agricultural producers in the northern Great Plains consider themselves to be good stewards of the land, whether they are ranchers or grain farmers. In European culture, the notion of stewardship is rooted in a biblical context in which the steward maintains the productivity of his master's money. Today, the conservation movement has expanded stewardship to mean the proper care of the natural system, and many farmers consider good stewardship to mean clean, healthy crops from fence line to fence line. In many ways, the biblical notion of stewardship works against the conservation of native habitats. Over much of the last century, when stewardship was coupled with pro-grain production policies, farmers reacted by bringing land into "production" and Saskatchewan's landscape changed dramatically to the detriment of waterfowl and wildlife habitat in general. However, since the 1980s, the landscape of Saskatchewan has changed significantly again as producers have adjusted how they farm the land. The amount of land in permanent cover is roughly the same now as it was in the 1960s and 1970s. While the land that has been reseeded to grass does not have the same ecosystem integrity as native prairie, it does provide more ecosystem functions than the cropland it replaced. That is great news for those concerned about waterfowl conservation, but it is not the whole picture. This paper examines economic and policy-based causes of landscape changes in Saskatchewan, the effects of these changes on waterfowl populations, and habitat evaluations undertaken as part of the North American Waterfowl Management Plan (NAWMP).
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179. **Landscape use and movements of wolves in relation to livestock in a wildland-agriculture matrix.**
Chavez, Andreas S. and Gese, Eric M.
Journal of Wildlife Management 70(4): 1079-1086. (2006)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: damage caused by animals/ conservation/ nutrition/ diet/ prey/ behavior/ activity patterns/ ecology/ man-made habitat/ land zones/ Canis lupus: damage to livestock/ conservation measures/ livestock conflicts management/ mammalian prey/ Bos taurus and Ovis aries/ Circadian activity/ home range/ habitat utilization/ potential livestock conflicts and management implications/ cultivated land habitat/ agricultural wildland matrix/ Minnesota/ Red River Valley/ Mammalia, Carnivora, Canidae/ carnivores/ chordates/ mammals/ vertebrates
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180. **Linking soil properties and nematode community composition: Effects of soil management on soil food webs.**
Sanchez Moreno, Sara; Minoshima, Hideomi; Ferris, Howard; and Jackson, Louise E.
Nematology 8(5): 703-715. (2006); ISSN: 1388-5545
Descriptors: commercial activities/ ecology/ trophic structure/ terrestrial habitat/ man-made habitat/ Nematoda: farming and agriculture/ tillage and continuous cropping/ Impact of soil management on food webs and community composition/ food webs/ soil fauna/ influence of soil management/ community structure/ soil habitat/ food webs and community composition/ impact of soil management/ cultivated land habitat/ soil food webs and community composition/ Nematoda/ invertebrates/ nematodes
Abstract: The purported benefits of conservation tillage and continuous cropping in agricultural systems include enhancement of soil ecosystem functions to improve nutrient availability to crops and soil C storage. Studies relating soil management to community structure allow the development of bioindicators and the assessment of the consequences of management practices on the soil food web. During one year (December 2003-December 2004), we studied the influence of continuous cropping (CC), intermittent fallow (F), standard tillage (ST) and no tillage (NT) on the nematode assemblage and the soil food web in a legume-vegetable rotation system in California. The most intensive systems included four crops during the study period. Tillage practices and cropping pattern strongly influenced nematode faunal composition, and the soil food web, at different soil depths. Management effects on nematode taxa depended on their position along the coloniser-persister (cp) scale and on their trophic roles. At the last sampling date (December 2004), Mesorhabditis and Acrobeloides were positively associated with NH4+, while Panagrolaimus and Plectus were negatively correlated with certain phospholipid fatty acids (PLFA). Microbial-feeders were in general associated with both bacterial and fungal PLFA, microbial biomass C (MBC) by chloroform fumigation-extraction, total C and N, NH4+ and NO3-, and were most abundant in the surface soil of the NTCC treatment. Fungal-feeders were more closely related to PLFA markers of fungi than to ergosterol, a purported fungal sterol. Discolaimus, Prionchulus, Mylonchulus and Aporcelaimidae, in contrast, were associated with intermittent fallow and deeper soil layers. The organisms in the higher levels of the soil food web did not respond to the continuous input of C in the soil and a long recovery period may be required for appropriate taxa to be reintroduced and to increase. At the end of the experiment, each treatment supported quite different nematode assemblages and soil food webs.
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181. **Male dickcissels feed nestlings in east-central Illinois.**
Maddox, J. D. and Bollinger, E. K.
Wilson Bulletin 112(1): 153-155. (Mar. 2000)
NAL Call #: 413.8 W692; ISSN: 0043-5643
Descriptors: feeding behavior/ paternal behavior/ nests/ food availability/ Illinois/ Spiza americana/ dickcissel/ birds/ United States
Abstract: We observed male Dickcissels (Spiza americana) commonly feeding nestlings in Conservation Reserve Program (CRP) fields in 1997 in east-central Illinois. Male Dickcissels fed nestlings at six of the eight nests we observed, accounting for 37% of the total nest visits. Overall, females made significantly more nest visits than males. However, at the six male-assisted nests, the number of male and female nest visits did not differ significantly. Male Dickcissel feeding behavior may have been prompted by low food abundance. Males were not observed feeding nestlings in 1998, when overall nest success was higher and nestling starvation was less than in 1997.
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182. **Mammalian species composition, diversity, and succession in Conservation Reserve Program grasslands.**
Hall, D. L. and Willig, M. R.
Southwestern Naturalist 39: 11-10. (1994)
NAL Call #: 409.6 So8; ISSN: 0038-4909
Descriptors: Mammalia/ species composition/ species diversity/ succession/ nature reserves/ Texas/ conservation/ United States
Abstract: Species diversity and composition of small mammals were each compared between Conservation Reserve Program (CRP) grasslands and native shortgrass prairie on the Southern High Plains of Texas. Small mammals were livetrapped in all four seasons during a one-year interval at six CRP sites (1, 2, and 3 years of age) and two control sites. Two factors (vegetational heterogeneity and age of habitat) known to affect species diversity were analyzed by a variety of quantitative methods. No significant differences in mammalian diversity (Fisher's log series alpha) were found among sites, and diversity was not significantly correlated with vegetational heterogeneity or site age. Species composition (proportional density of species) was significantly different among all sites in each season. Regardless of season, a priori hierarchical comparisons revealed significant differences in the proportional abundances of species between all CRP sites as a group and in the control sites. The CRP grasslands simulate shortgrass prairies in species diversity, but not in species composition. Differences in species composition between CRP grasslands and shortgrass prairie may be a result of the lack of natural disturbances (i.e., grazing, fire) on the CRP grasslands.
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183. **Management of field margins to maximize multiple ecological services.**
Olson, D. M. and Wackers, F. L.
Journal of Applied Ecology 44(1): 13-21. (2007)
NAL Call #: 410 J828; ISSN: 00218901.
Notes: doi: 10.1111/j.1365-2664.2006.01241.x.
Descriptors: ecological services/ Insect conservation/ northern bobwhite/ plant succession/ vegetative buffers
Abstract: 1. Vegetative buffers in agricultural landscapes can provide a range of important ecological services, including conservation of native flora and fauna, enhancement of biological pest control and reduction of agrochemical drift. Typically, studies addressing the impact of such vegetative elements focus on one particular benefit. We investigated whether the benefits of field margins that had been established for conservation of northern bobwhite quail Colinus virginianus populations extended to the enhancement of biological pest control in adjacent conservation tillage cotton fields. 2. Densities of a selection of insect species and the predation and parasitism rates of insect pest species were measured in first- and second-year field margins established for bobwhite quail as well as in an adjacent cotton crop. 3. Second-year field margins yielded higher densities of all species sampled, with the exception of staphylinids and cotton aphids. Despite this, thrips and their predator, Orius insidiosus, were the only species that were also more abundant in the adjacent cotton field. Tachinids and Trichogramma and Lygus species, appeared to prefer the field margin vegetation over the cotton. 4. Overall, the impact of second-year margins on the cotton crop did not significantly differ from first-year margins with regard to pest occurrence or biological control. 5. Analysis of the sugar content in Meteorus autographae, a generalist parasitoid of Lepidoptera larvae, suggested that this species is severely food-limited in the field margins established for bobwhite quail. 6. Synthesis and applications. This study shows that field margins designed to specifically benefit bobwhite quail may be unsuitable for providing other ecological services. By making small adjustments in the vegetative composition of these field margins, such as adding early season nectar-producing plants, it may be feasible to combine biodiversity and pest-control benefits and thereby optimize the overall ecological services to be gained. © 2006 British Ecological Society.
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184. **Management of fields for nocturnal use by wintering American woodcock.**
Welch, James R.; Krementz, David G.; and Berdeen, James B.
Georgia Journal of Science 59(2): 101-107. (2001); ISSN: 0147-9369
Descriptors: commercial activities/ conservation measures/ ecology/ man-made habitat/ land and freshwater zones/ Scolopax minor (Scolopacidae): farming and agriculture/ habitat management/ habitat utilization/ cultivated land habitat/ Georgia/ Greene, Morgan and Oconee Counties/ old field management strategy/ nocturnal use/ wintering birds/ Scolopacidae/ Charadriiformes, Aves/ birds/ chordates/ vertebrates
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185. **Managing farmlands for wildlife.**
Warner, Richard E.; Walk, Jeffery W.; and Hoffman, Catherine L.
In: Techniques for wildlife investigations and management/ Braun, C. E.; 6th ed.
Bethesda, MD: Wildlife Society, 2005.
Notes: 0933564155 (ISBN).
Descriptors: commercial activities/ conservation measures/ man-made habitat/ comprehensive zoology: farming and

agriculture/ farming impact on wildlife/ habitat management/ Farmland management for wildlife/ cultivated land habitat/ Farmlands/ habitat management for wildlife
© Thomson Reuters Scientific

186. **Managing your CRP for wildlife.**
United States Department of Agriculture, Natural Resources Conservation Service (NRCS), 2002
http://www.greatplains.org/resource/1999/mancrp/mancrp.htm
Descriptors: Conservation Reserve Program/ United States/ cropland/ habitat management/ wildlife habitat management/ wildlife
Abstract: Addressed the issue of wildlife habitat management and enhancement practices to better target CRP objectives.

187. **Managing your forest for bobwhite quail: Build and maintain a habitat that works.**
Chamberlain, Michael J.
Forest Landowner 59(3): 35-37. (2000)
NAL Call #: SD144.A15F67; ISSN: 1087-9110
Descriptors: Galliformes/ Odontophoridae/ Colinus virginianus/ birds/ Conservation Reserve Program/ ecosystems/ farmland/ habitat management/ management/ wildlife/ bobwhite quail
Abstract: High quail populations are traditionally associated with farmland and cultivated areas, but bobwhite numbers can be successfully managed on forested land as well. Frequent soil and vegetation disturbance is critical to maintaining good quail habitat. The author discusses the limitations of the Conservation Reserve Program and timber management on the production of bobwhite quail.
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188. **Modeling the effects of Conservation Reserve Program lands on the diversity and abundance of wildlife and plant species in a temperate agro-ecosystem.**
Minnis, Richard B.
East Lansing, MI: Michigan State University, 1996.
Notes: Degree: MSc
Descriptors: Conservation Reserve Program/ abundance/ diversity/ models/ conservation/ land use
Abstract: The Conservation Reserve Program (CRP) provides the opportunity to model changes in wildlife and plant species composition in agricultural landscapes when land use practices are altered. Avian, mammalian, invertebrate, and vegetation characteristics were examined in 5 age classes (1-5 growing seasons) of CRP fields in Gratiot County, Michigan in 1992. Models developed from the data indicate that both field specific and landscape variables are important in predicting wildlife abundance and diversity. Field specific variables that describe the successional changes in vegetation composition and structure of CRP fields were important in predicting the relative abundance and diversity of invertebrate and avian species. Landscape variables such as the proportion and juxtaposition of different cover types within the landscape also significantly (P $< $ 0.10) affected wildlife diversity and abundance. Maintaining a diversity of CRP age classes within a landscape, through enrollment or periodic manipulation of fields, produces the highest and most stable overall wildlife diversity.
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189. **A multivariate analysis of bird species composition and abundance between crop types and seasons in southern Ontario, Canada.**
Kirk, D. A.; Boutin, C.; and Freemark, K. E.
Ecoscience 8(2): 173-184. (2001)
NAL Call #: QH540.E366; ISSN: 11956860
Descriptors: Canada/ Farmland birds/ Ontario/ use of crops/ abundance/ agricultural land/ avifauna/ community composition/ crop plant/ habitat use/ multivariate analysis/ seasonality/ Canada/ Glycine max/ Malus/ Vitis/ Zea mays
Abstract: Many farmland bird species are declining in North America and Europe, yet there are few data documenting bird use of agricultural landscapes, especially in Canada. This information is needed in order to identify candidate factors contributing to declines. We examined the influence of crop type and adjacent habitat on birds in fields of four crop types in three southern Ontario counties during the 1988 breeding (May-July) and 1987 and 1988 migration (August-September) seasons, using canonical correspondence analysis (CCA). Crops included apple Malus spp. orchards in Norfolk, soybeans Glycine max in Essex, vineyards Vitae spp. in Niagara and corn Zea mays (maize) in all three countries. Bird assemblages differed between counties because corn in Norfolk had more adjacent wetlands and woodlands than those in Essex. During the breeding season (1988), significant habitat variables explaining variation in bird assemblages (in order of importance) were adjacent apple orchards, wetlands, and "other" wooded habitats and apple as the crop (as distinct from adjacent apple orchards). During migration, apple as the crop was most important, followed by crop type corn (distinct from adjacent corn). Adjacent wetlands and adjacent other crops in 1988. Apple as the crop was most important, followed by grape as the crop (distinct from adjacent vineyards) and wetlands in 1987. Based on median vector distances in ordination space as a measure of the difference between breeding and migration periods. Bird assemblages in soybean and corn in Essex changed most, while birds assemblages in apple orchards changed least, although differences were not significant among crops. Our results emphasize the importance of non-crop and crop habitats for birds during both breeding and migration seasons.
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190. **National survey of Conservation Reserve Program (CRP) participants on environmental effects, wildlife issues, and vegetation management on program lands.**
Allen, A. W. and Vanderever, M. W.
Fort Collins, CO: U.S. Geological Survey, Fort Collins Science Center ; USGS BSR 2003-001, 2003. 56 p.
Notes: ADA418145XSP; Biological Sciences Report; Prepared in cooperation with Johnson Controls World Services, Inc., Fort Collins, CO 80526-8118.
http://www.fort.usgs.gov/products/publications/21075/21075.pdf
Descriptors: ground water/ Air quality/ soil erosion/ wildlife/ plants Botany/ fire hazards/ surveys/ long range Time/ environmental impact/ land use/ Conservation Reserve

Program/ natural resources and earth sciences/ agriculture and food agricultural equipment facilities and operations/ medicine/ biology/ ecology/ environmental pollution and control

Abstract: A national survey of Conservation Reserve Program (CRP) contractees was completed to obtain information about environmental and social effects of the program on participants, farms, and communities. Of interest were observations concerning wildlife, attitudes about long-term management of program lands, and effectiveness of U.S. Department of Agriculture (USDA) assistance in relation to these issues. Surveys were delivered to 2,189 CRP participants with a resultant response rate of 64.5%. Retired farmers represented the largest category of respondents (52%). Enhanced control of soil erosion was the leading benefit of the CRP reported. Over 73% of respondents observed increased numbers of wildlife associated with lands enrolled in the program. The majority of respondents reported CRP benefits, including increased quality of surface and ground waters, improved air quality, control of drifting snow, and elevated opportunities to hunt or simply observe wildlife as part of daily activities, income stability, improved scenic quality of farms and landscapes, and potential increases in property values and future incomes also were seen as program benefits. Negative aspects, reported by a smaller number of respondents, included seeing the CRP as a source of weeds, fire hazard, and attracting unwanted requests for trespass. Over 75% of respondents believed CRP benefits to wildlife were important. A majority of respondents (82%) believed the amount of assistance furnished by USDA related to planning and maintaining wildlife habitat-associated with CRP lands was appropriate. Nearly 51% of respondents would accept incorporation of periodic management of vegetation into long-term management of CRP lands to maintain quality of wildlife habitats. Provision of funds to address additional costs and changes in CRP regulations would be required to maximize long-term management of program lands.

191. **Natural resources and users benefit from the Conservation Reserve Program.**

Ribaudo, M. O.; Colacicco, D.; Langner, L. L.; Piper, S.; and Schaible, G. D.

Washington, DC: Economic Research Service, Resources and Technology Div.; USDAAER627; ERSAER627XSP, 1990 . 54 p.

Notes: Replaces PB90-167452; Also available from Supt. of Docs.

NAL Call #: A281.9 Ag8A no.627

Descriptors: protection/ erosion control/ planting/ grasses/ trees plants/ agriculture/ improvement/ ground water/ wildlife/ water quality/ air quality/ evaluation/ losses/ benefit cost analysis/ models/ tables data/ soil conservation/ natural resources/ land retirement programs/ habitats/ natural resources and earth sciences/ soil sciences

Abstract: The Conservation Reserve Program (CRP) may generate $6-14 billion (present value) in benefits to natural resources if 45 million acres of highly erodible or environmentally sensitive cropland are removed from agricultural production by 1990. Protecting the soil by retiring and planting permanent grasses and trees on such land for 10 years will improve soil productivity, water quality, air quality, wildlife habitat, and groundwater supply. But the magnitude and distribution of benefits can be altered by changing the emphasis of the program. The report estimates how retiring cropland benefits natural resources under three scenarios of CRP enrollment.

192. **Nest and brood survival of lesser prairie-chickens in west central Kansas.**

Fields, T. L.; White, G. C.; Gilgert, W. C.; and Rodgers, R. D.

Journal of Wildlife Management 70(4): 931-938. (2006)

NAL Call #: 410 J827; ISSN: 0022541X.

Notes: doi: 10.2193/0022-541X(2006)70[931:NABSOL]2.0.CO;2.

Descriptors: brood survival/ Conservation Reserve Program/ greater prairie-chicken/ Kansas/ lesser prairie-chicken/ nest survival/ radiotelemetry/ Tympanuchus cupido/ Tympanuchus pallidicinctus

Abstract: We evaluated the effect of habitat use and other sources of variation on survival of lesser prairie-chicken (Tympanuchus pallidicinctus) and greater prairie-chicken (Tympanuchus cupido) nests and broods. Daily nest and brood-survival probabilities were a function of a quadratic time trend, and both declined as the season progressed. Daily nest survival was negatively associated with nest age, and daily brood survival was positively associated with brood age. Lastly, broods tended by adult females had higher daily survival rates than broods reared by subadult females. The probability of a nest surviving from 10 May to 1 June was 0.72 (SE = 0.06). The probability of a brood surviving from 1 June to 30 July (hatch to 60 days posthatch) was 0.49 (SE = 0.19) and 0.05 (SE = 0.03) for broods reared by adults and subadults, respectively. Although nesting females and females with broods were using Conservation Reserve Program grasslands, there appeared to be no benefit to nest and brood survival during our study. Instead, age of the nest and brood, timing during the season, age of the brooding female, and precipitation during brooding were more important predictors of survival. Further experimentation is needed to determine the mechanisms responsible for decreased nest and brood survival throughout the season. Results from such research could be used to formulate management strategies to improve nest and brood survival.

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193. **Nest success of mountain plovers relative to anthropogenic edges in eastern Colorado.**

Mettenbrink, C. W.; Dreitz, V. J.; and Knopf, F. L.

Southwestern Naturalist 51(2): 191-196. (2006)

NAL Call #: 409.6 So8; ISSN: 00384909.

Notes: doi: 10.1894/0038-4909(2006)51[191:NSOMPR]2.0.CO;2.

Descriptors: Charadrius montanus/ Colorado/ mountain plovers/ nest success

Abstract: We monitored nest success of mountain plovers (Charadrius montanus) relative to distance from the nearest anthropogenic edges, such as fence lines, roads, and perimeters of crop fields, in 2003 and 2004. We located and observed 163 mountain plover nests in eastern Colorado (USA). At least one egg hatched in 81 of 163 nests. Successful nests occurred at a mean distance of 93.94 m ± 8.87 SE, whereas unsuccessful nests were located 84.39 m ± 8.95 SE from the nearest edge. Based on our model selection criteria (AIC c), nests farther from edges were not necessarily more successful than those closer to edges.

The logistic regression coefficient for edge effects (0.13 ± 0.12 SE) suggests that nests farther from edges are more successful. However, the standard error for the edge coefficient was large and the 95% confidence interval (-0.08, 0.35) encompassed zero, suggesting nest success was independent of distance from an anthropomorphic edge. We conclude that phenomena determining nest success of mountain plovers cannot be attributed to the single factor of anthropogenic edges in this fragmented landscape.
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194. **New Mexico's CRP and wildlife habitat improvement.**
Schmidt, Robert J.; Mullins, Charles J.; Woody, Monty; and Knight, Jim
Transactions of the North American Wildlife and Natural Resource Conference 55: 68-73. (1990)
NAL Call #: 412.9 N814; ISSN: 0078-1355
Descriptors: Conservation Reserve Programs/ habitat management/ management/ wildlife/ New Mexico
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195. **Nongame bird nesting on CRP lands in the Texas Southern High Plains.**
Berthelsen, Peter S. and Smith, Loren M.
Journal of Soil and Water Conservation 50(6): 672-675. (1995)
NAL Call #: 56.8 J822 ; ISSN: 0022-4561.
Notes: Special issue on wetlands. Includes references.
Descriptors: Fringillidae/ Passeriformes/ Agelaius phoeniceus/ Aimophila cassinii/ Ammodramus savannarum/ Sturnella neglecta/ agricultural practices/ birds/ clutches/ communities/ conservation programs/ Conservation Reserve Program/ distribution/ ecosystems/ grasslands/ habitat management/ land use/ management/ nesting sites/ nests-nesting/ nongame wildlife/ productivity/ species diversity/ Texas, Southern/ wildlife/ agricultural land/ land diversion/ environmental impact/ permanent grasslands/ wild birds/ species/ diversity/ density/ habitats/ federal programs/ nest density/ agricultural economics/ land development, land reform, and utilization (macroeconomics)/ natural resources land resources/ western meadowlark/ red-winged blackbird/ grasshopper sparrow/ Cassin's sparrow
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196. **Nonmarket economic benefits provided by increased recreational fishing from Conservation Reserve Program (CRP) related water quality improvement.**
Douglas, A. J. and Johnson, R. L.
Fort Collins, CO: U.S. Geological Survey, 2001. 38 p.
Notes: Mid-continent Ecological Science Center.
Descriptors: economic effects/ fishing, public/ conservation programs/ economic value/ water resources management/ socio-economic studies/ rivers/ cost analysis/ modeling/ statistics/ rehabilitation/ surveys/ California/ Klamath River Basin
Abstract: The estimates of CRP related nonmarket benefits presented in this study focus on angler responses to improvements in water quality. A targeted basin approach is used in which contingent use survey data for northern California's lower Klamath River Basin is used to estimate annual recreation benefits for the removal of adverse agricultural impacts on water quality for the nation. A series of calculations based on national data is used to extend the recreation benefits estimates for the Klamath River basin to all of the nation's rivers and streams, lakes and reservoirs, and coastal waters. Angling benefits are estimated as a major component of all water related recreation benefits.
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197. **Observations of avian nesting activity in burned and non-burned weeping lovegrass CRP.**
Oberheu, D.; Mitchell, R.; Dabbert, B.; and Davis, S.
Texas Journal of Agriculture and Natural Resources 12: 14-17. (1999)
NAL Call #: S1.T49; ISSN: 0891-5466.
Notes: Publisher: Agriculture Consortium of Texas: Kingsville, TX.
Descriptors: eragrostis curvula/ wild birds/ habitats/ nesting/ nature conservation/ nests/ prescribed burning/ species/ drought/ ground cover/ endangered species/ Texas
This citation is from AGRICOLA.

198. **Occurrence and productivity of songbirds in prairie farmland under conventional versus minimum tillage regimes.**
Martin, Pamela A. and Forsyth, Douglas J
Agriculture, Ecosystems and Environment 96(1-3): 107-117. (2003)
NAL Call #: S601.A34; ISSN: 0167-8809
Descriptors: agriculture/ biodiversity/ wildlife management: conservation/ conventional tillage/ applied and field techniques/ minimum tillage regime/ applied and field techniques/ statistical analysis/ mathematical and computer techniques/ cover type/ endemism/ mate attraction/ prairie farmland/ species abundance/ species productivity/ summer fallow
Abstract: Abundance and productivity of common bird species in prairie cropland under either conventional or minimum tillage were examined in southern Alberta, Canada. Cover types included spring cereals, winter wheat and summerfallow. Productivity was assessed using observations of nesting and brood-rearing behavior. Five species were sufficiently abundant to allow for some statistical analyses: horned lark (Eremophila alpestris), savannah sparrow (Passerculus sandwichensis), Baird's sparrows (Ammodramus bairdii), chestnut-collared longspur (Calcarius ornatus) and McCown's longspur (Calcarius mccownii). Abundance varied between conventional and minimum tillage regimes for most species in at least one cover type. Savannah sparrows in spring cereal and winter wheat and chestnut-collared longspurs in summerfallow tended to prefer minimum tillage. McCown's longspurs and horned larks occurred more frequently on conventional than minimum till spring cereal plots in at least 1 of the 2 years. For savannah sparrows, minimum till spring cereal and winter wheat were more productive than conventional till habitat. Summerfallow of either tillage regime did not appear to be as productive as minimum till cereal fields for this species. Chestnut-collared longspurs occurred predominantly in minimum till summerfallow and spring cereal habitat and showed almost no productivity in conventionally managed plots. McCown's longspurs tended to have higher productivity in minimum till plots. Horned larks had high productivity in minimum till winter wheat in 1996. Male Baird's sparrows occupied territories in

minimum till winter and spring cereal fields in 1995, but did not attract mates; they were not detected in 1996. Minimum tillage appeared to confer benefits in productivity to species that nested in farmland.
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199. **Opportunities for bird conservation through agricultural conservation programs.**
Gray, R. L.
Transactions of the North American Wildlife and Natural Resource Conference 70: 385-394. (2005)
NAL Call #: 412.9 N814; ISSN: 0078-1355
Descriptors: wild birds/ wildlife management/ Farm Bill/ Conservation Reserve Program/ natural resources, environment, general ecology, and wildlife conservation/ laws, legislation and regulations
This citation is from AGRICOLA.

200. **Opportunities for enhancing wildlife benefits through the Conservation Reserve Program.**
Isaacs, B. and Howell, D.
Transactions of the North American Wildlife and Natural Resource Conference (53rd): 222-231. (1988)
NAL Call #: 412.9 N814; ISSN: 0078-1355 [NAWTA]
Descriptors: wildlife conservation/ conservation areas/ farmland/ windbreaks/ woody plants/ United States
This citation is from AGRICOLA.

201. **An overview of some tillage impacts on earthworm population abundance and diversity: Implications for functioning in soils.**
Chan, K. Y.
Soil and Tillage Research 57(4): 179-191. (2001)
NAL Call #: S590.S48 ; ISSN: 0167-1987.
Notes: Literature review.
Descriptors: conservation tillage/ diversity/ ecology/ no-tillage/ populations/ tillage/ earthworms/ Oligochaeta/ Annelida/ invertebrates/ animals
Abstract: Conflicting reports in the literature on the effects of tillage on earthworms are reviewed in the light of their roles in agro-ecosystem functioning. Tillage can change the abundance (by 2-9 times) as well as the composition (diversity) of earthworm populations. The actual impact is dependent on soil factors, climatic conditions and the tillage operations but hitherto this information was seldom provided in research reports. The declines in earthworm population often reported in conventionally tilled soils are associated with undesirable changes in the soil environmental conditions resulting from excessive tillage. Different species of earthworm respond differently to tillage. While the abundance of the deep burrowing species (anecic) tends to decline under tillage, particularly under deep ploughing, endogeic species can actually increase in number especially when there is increased food supply. Under conservation tillage systems, earthworms can potentially play a more important role than under conventional tillage in the functioning of the farming systems because of their abilities to modify the soil physical environment and nutrient cycling. However, adoption of conservation tillage does not automatically result in an optimal earthworm population in terms of abundance and diversity. There are opportunities to introduce more beneficial species to improve the ecological performance of agro-ecosystems. More research is needed to fully understand the ecology of different earthworm species, their interactions and their potential roles in promoting more sustainable farming systems.
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202. **Perceptions of wildlife damage by Conservation Reserve Program contract holders in Riley County, Kansas.**
Hughes, J. P. and Gipson, P. S.
Proceedings, Vertebrate Pest Conference: 154-157. (1996)
NAL Call #: SB950.A1V4; ISSN: 0507-6773 [PVPCBM]
Descriptors: vertebrate pests/ crop damage/ surveys/ Kansas/ Conservation Reserve Program
This citation is from AGRICOLA.

203. **Plains sharp-tailed grouse return to Colorado.**
Colorado Division of Wildlife
Colorado Department of Natural Resources, Division of Wildlife Newsletter (May): 1. (2004).
Full Text Available at:
http://dnr.state.co.us/news/press.asp?pressid=2748
Descriptors: Tympanuchus phasianellus/ birds/ birdwatching/ breeding grounds/ displays/ drought/ environmental factors/ habitat use/ habits-behavior/ land, private/ landowners/ lek behavior/ movements/ population ecology/ restoration/ tagging/ traps-trapping/ sharp-tailed grouse/ Colorado/ Colorado, Northeastern
Abstract: Colorado Division of Wildlife biologists are trapping sharp-tailed grouse in Wyoming and Nebraska and releasing them in Colorado. The aim is to restore the species to its historic Colorado range. The species has remained in isolated pockets of Douglas County and northern Weld County. These sharp-tailed grouse are being released on private land, in which the landowners convert highly erodable and environmentally sensitive croplands to vegetative cover and provide high-quality habitat for wildlife. The movements of the released sharp-tailed grouse are watched to determine the success of the species in establishing breeding grounds and nests. The health of the grassland will decide the success of the establishment of the species. During the beginning of the 20th century the species population declined due to prolonged drought conditions, unregulated hunting, and conversion of grassland to cropland. Landowners and district wildlife managers of Conservation Reserve Program have been working together to provide a variety of opportunities for maximizing the habitat and wildlife potential. The species could become a major attraction during the congregation of individuals on lekking grounds at sunrise and sunset between February and mid-May. In an attempt to establish dominance and attract females, the males display their plumage, stomp their feet, and produce a variety of hoots, cackles, and chortles through air sacs on their necks.
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204. **Plant diversity in three types of hedgerows adjacent to cropfields.**
Boutin, C.; Jobin, B.; Belanger, L.; and Choiniere, L.
Biodiversity and Conservation 11(1): 1-25. (2002)
NAL Call #: QH75.A1B562; ISSN: 09603115.
Notes: doi: 10.1023/A:1014023326658.
Descriptors: Eastern Canada/ Farmland/ field margin/ natural woody hedgerow/ plant diversity/ plant species richness/ planted hedgerow/ windbreak/ conservation

management/ field margin/ hedgerow/ plant community/ species diversity/ Canada/ Aves/ Coniferophyta
Abstract: The farming landscape of eastern Canada is dotted with three main types of hedgerows: (1) natural woody, (2) planted woody and (3) herbaceous. The objective of this study was to compare the value of these habitats as a repository of plant biodiversity in agricultural areas of southern Quebec. The overall plant diversity was higher in natural hedgerows and they contained more plant species of conservation values than other hedgerow types. Plant species richness per quadrat was, however, higher in planted woody hedgerows, and together with the species composition, lead to the conclusion that planted hedgerows in their entirety consisted of an ecotone type of vegetation such as is found in field edges which usually support high plant diversity and productivity but where transient plant species predominate. Consequently, this study indicated that natural hedgerows fare better than planted hedgerows in terms of diversity of plants of conservation interest. In spite of that, planted woody hedgerows contained plant (and bird) species of some interest and should be favoured over more desolate herbaceous hedgerows. In areas where hedgerows were removed and are not re-establishing naturally, a mixture of deciduous trees and conifers should be encouraged in further windbreak planting programs so as to conciliate both the conservation and agronomic objectives. Furthermore, management practices should optimise the growth of establishing plants of conservation values.
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205. **Plants and breeding bird response on a managed Conservation Reserve Program grassland in Maryland.**
Gill, D. E.; Blank, P.; Parks, J.; Guerard, J. B.; Lohr, B.; Schwartzman, E.; Gruber, J. G.; Dodge, G.; Rewa, C. A.; and Sears, H. F.
Wildlife Society Bulletin 34(4): 944-956. (2006)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2006)34 [944:PABBRO]2.0.CO;2.
Descriptors: Ammodramus savannarum/ Conservation Reserve Program/ grasshopper sparrow/ grassland restoration/ habitat/ invasive species/ management/ prescribed burning/ species richness/ vegetation structure/ warm-season grasses
Abstract: Currently over 14.6 million ha of land at an annual cost of US$1.76 billion are enrolled in the Conservation Reserve Program (CRP). The habitat benefits of CRP frequently are lauded, but documentation that wildlife is responding as hoped is urgently needed. We evaluated plant and breeding bird responses to 92.4 ha of CRP grasslands at Chino Farms in northeastern Maryland, USA. In 1999 we seeded 12 contiguous CRP fields with 5 mixtures of warm-season grasses representing various growth-form heights in a replicated experimental design, and used mowing and topical herbicide applications to control noxious weeds and facilitate stand establishment. In 6 years cumulative plant species richness increased to 261, 105 of which were species exotic to the region. During the third growing season, we initiated a schedule of prescribed burning on a 3-year rotation to remove accumulated litter and to retard woody succession, and in 2003 we added additional management to control aggressive plant species. Several at-risk bird species colonized the restored grasslands in the first year and established sustainable breeding populations. We implemented a comprehensive observation and banding program, which included mapping male territories for selected bird species and recording nest locations. We marked 1,985 grasshopper sparrows (Ammodramus savannarum; GRSPs) in 7 years. Breeding GRSP populations ranged annually from 70 to 90 socially monogamous pairs with an additional 40 non-territorial males. Annual return rates in the last 5 years were 57% for adult males, 41% for adult females, and 12% for hatch-year individuals. Adults and young birds exhibited high site fidelity, but overgrown fields left unburned for 2-3 years were unpopulated by GRSPs but attracted several shrub-land bird species. Habitat preference for territories was influenced more by vegetation structure than by plant species composition. We recommend the management of grasslands restored for birds include spatial and temporal rotation of prescribed fire and herbicide applications to sustain vegetation physical structure rather than species composition.
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206. **Plow: Lessons learned from CRP - Counterpoint, negative impacts of the Conservation Reserve Program on prairie wildlife.**
Bidwell, T. G.
In: 50th Annual Meeting of the Society for Range Management. Rapid City. SD (USA); 1997.
Notes: Conference Sponsor: South Dakota Section of the Society for Range Management; HQ: Society for Range Management (Denver, CO);
World Meeting Number 971 0113.
Descriptors: grazing/ livestock/ range management/ Conservation Reserve Program/ prairie wildlife
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207. **Population dynamics of ambient and altered earthworm communities in row-crop agroecosystems in the Midwestern U. S.**
Shuster, William D.; Shipitalo, Martin J.; Bohlen, Patrick J.; Subler, Scott; and Edwards, Clive A.
Pedobiologia 47(5-6): 825-829. (2003)
NAL Call #: 56.8 P343; ISSN: 0031-4056
Descriptors: commercial activities/ ecology/ man-made habitat/ land zones/ Megadrili: farming and agriculture/ community structure/ population dynamics/ natural and altered communities/ cultivated land habitat/ row crop agroecosystems/ Ohio/ Piketon/ Annelida, Oligochaeta/ Annelids/ invertebrates
Abstract: Earthworms affect agroecosystem processes and few studies have addressed population dynamics when earthworms are intentionally introduced. Handsorting and formalin extraction were used semi-annually from fall 1994 to fall 1997 to measure populations in plots with and without added earthworms under chisel till in a corn-soybean rotation (CT) and a ridge-till system in a corn-soybean-wheat rotation (RT) in Ohio, USA. Earthworm communities were altered by adding ≃76 Lumbricus terrestris (L.) m-2 each spring and fall into plots with no, or very few of these anecic earthworms. Increases in L. terrestris were small (≃7 m-2) compared to the number added and their establishment was at the expense of the epigeic earthworm L. rubellus (Hoff.), which declined four and two-fold in CT and RT, respectively. Populations of the endogeic earthworm Octolasion tytaeum (Sav.) were unaffected by the addition of L. terrestris. Sampling 5 years after the additions indicated that L. terrestris persisted only in the RT

plots. The decline in L. rubellus populations in plots with added anecic worms was no longer evident. We understand that the increased number and amounts of residues and the minimal level of disturbance found in RT probably increased the extent and quality of earthworm habitat over CT plots, which had fewer crops, less cover, and periodic disturbance. Apparently, population dynamics and competitive relationships among different earthworm functional groups were regulated by agroecosystem type, and their correspondent disturbance regimes and resource distributions.
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208. **Population trends of the Henslow's sparrow in relation to the Conservation Reserve Program in Illinois, 1975-1995.**
Herkert, J. R.
Journal of Field Ornithology 68(2): 235-244. (1997)
NAL Call #: 413.8 B534; ISSN: 0273-8570
Descriptors: Ammodramus henslowii/ population status/ agricultural practices/ government policy/ conservation/ Illinois/ birds/ United States
Abstract: Data from Illinois' Spring Bird Count was used to estimate long-term population trends of Henslow's Sparrows in Illinois and to examine if the Conservation Reserve Program has affected these trends. Spring Bird Count data suggest that Henslow's Sparrow populations in Illinois have declined significantly over the last 21 yr, with an estimated average rate of decline of 7.1% per year between 1975-1995. These data corroborate analyses of other long-term data sets and provide additional support for the general impression that populations of this species have declined in many parts of its range. Analyses of the potential benefits of the Conservation Reserve Program for Henslow's Sparrows revealed that recent population trends (1987-1995) in counties with high enrollment in this program were significantly greater than trends in counties with little Conservation Reserve Program enrollment. Although these data suggest that the Conservation Reserve Program may have benefitted Henslow's Sparrows in Illinois, this benefit has been insufficient to offset long-term declines due to other factors. Other conservation actions, beyond those associated with efforts aimed at reauthorizing and improving the Conservation Reserve Program, will likely be needed to achieve adequate protection for this species.
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209. **Post-breeding season habitat use and movements of eastern meadowlarks in southwestern Wisconsin.**
Guzy, M. J. and Ribic, C. A.
Wilson Journal of Ornithology 119(2): 198-204. (2007)
NAL Call #: QL671.W55 ; ISSN: 15594491.
Notes: doi: 10.1676/06-081.1.
Descriptors: birds/ eastern meadowlarks/ Sturnella magna/ Conservation Reserve Program/ wildlife habitat/ Wisconsin
Abstract: We used radio telemetry to study post-breeding movements of adult female and juvenile Eastern Meadowlarks (Sturnella magna) in southwestern Wisconsin in 2002-2004. Twenty-one adult females were found 58% of the time in their nest field regardless of nest fate. Three adult females were not found outside of the field where their nests were located. Fifteen of 18 females that moved from the nest field at least once moved to Conservation Reserve Program fields or pasture. The average maximum distance females moved was 662 m. Once females left the nest field, 61% did not return. Twelve juveniles from different broods survived to the end of the post-breeding season. Two juveniles did not move from their nest fields during the monitoring period. Eight of 10 juveniles that moved at least once moved into Conservation Reserve Program fields, remnant prairie or pasture. The average maximum distance moved by juveniles was 526 m. Once juveniles started to leave the nest field, 67% did not return. Grassy habitats appear to be important in the post-breeding period for Eastern Meadowlarks. Management should be directed toward maintaining or enhancing the amount and quality of those habitats.
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210. **Potential effects on grassland birds of converting marginal cropland to switchgrass biomass production.**
Murray, L. D.; Best, L. B.; Jacobsen, T. J.; and Braster, M. L.
Biomass and Bioenergy 25(2): 167-175. (2003); ISSN: 0961-9534
Descriptors: biotechnology/ applied microbiology/ biomass/ birds/ energy crops/ switchgrass (Panicum virgatum)/ watershed/ wildlife/ Conservation Reserve Program/ habitat selection/ CRP fields/ communities/ abundance/ Missouri
Abstract: Habitat loss is a major reason for the decline of grassland birds in North America. Five habitats (pastures, hayfields, rowcrop fields, small-grain fields, Conservation Reserve Program fields) compose most of the habitat used by grassland birds in the Midwest United States. Growing and harvesting switchgrass (Panicum virgatum) as a biomass fuel would create another habitat for grassland birds. Bird abundance information from studies conducted in Iowa and adjacent states and land-use data for the Rathbun Lake Watershed in southern Iowa were used in a Geographic Information System to model the potential effects on bird abundances of converting rowcrop fields to biomass production. Abundances of bird species that are management priorities increased in both biomass scenarios. Common yellowthroat (Geothlypis trichas) abundance in the watershed also increased greatly in both scenarios. Other species (e.g., horned lark (Eremophila alpestris), killdeer (Charadrius vociferous)) were more abundant in the existing land use than in the biomass scenarios, and conversion of fields from rowcrop to biomass production could be detrimental to these species. In general, biomass fields will provide habitat for grassland birds that are management priorities, but future monitoring of birds in such fields is needed as conversion of rowcrop fields to biomass production continues.
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211. **Potential of winter cover crops to increase abundance of Solenopsis invicta (Hymenoptera: Formicidae) and other arthropods in sugarcane.**
Woolwine, A. E. and Reagan, T. E.
Environmental Entomology 30(6): 1017-1020. (2001)
NAL Call #: QL461.E532; ISSN: 0046-225X
Descriptors: commercial activities/ ecology/ population dynamics/ man-made habitat/ land and freshwater zones/ Arthropoda: farming and agriculture/ winter cover crops/ vegetation management/ population density/ cultivated land habitat/ sugarcane fields/ winter cover crops/ abundance/ Louisiana/ Gastropoda/ Mollusca/ arthropods/ hymenopterans/ insects/ invertebrates/ molluscs

Abstract: A 3-yr study was conducted in Louisiana sugarcane field plots to determine the potential of vegetation management and winter cover crops to enhance abundance of the fire ant, Solenopsis invicta Buren, other arthropods, gastropods, and spring sugarcane density. Treatments included pea, clover, and vetch cultivars, a weed-free herbicide treatment, a vetch with herbicide on the row tops; and a mixed weeds treatment arranged in a randomized complete block design. Compared with similar studies conducted during the summer months, spring collections of arthropods in pitfall traps were very low and few differences in arthropod densities occurred. Neither cover crop cultivar nor biomass substantially influenced arthropod density or cane stand density. Slugs (Limacidae) and earwigs (Dermaptera) were most abundant in mixed weed plots. The highest numbers of carabids in 1994 were found in vetch plots, which tended to have higher biomass than other treatments. Soybean oil-soaked bait cards attracted more ants in clover plots than in the plots with vetch plus herbicide. Compared with previous summer studies, we feel that harsher winter weather and other density independent mortality factors during this study period superseded effects of cover crops, vegetation management and quantity of biomass on arthropod densities during the winter. Although positive impacts of winter cover crops were not detected for the variables measured during the study period these data should not be used to suggest that cover crops do not provide agronomic benefit to farmers.
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212. **Prairie grouse population response to Conservation Reserve Program grasslands: An overview.**
Rodgers, R. D. and Hoffman, R. W.
In: Conservation Reserve Program Planting for the Future: Proceedings of a National Conference.Fort Collins, CO.
Allen, A. W. and Vandever, M. W. (eds.)
Reston, VA: USGS; pp. 120-128; 248 pp.; 2005.
Notes: U.S. Geological Survey, Biological Resources Discipline, Scientific Investigations Report 2005-5145. http://www.fort.usgs.gov/Products/Publications/21490/21490.pdf
Descriptors: prairie grouse/ grassland birds/ population responses/ Conservation Reserve Program/ CRP/ set-aside program lands
Abstract: Authors describe population responses of greater prairie chicken (*Tympanuchus cupido*), lesser prairie chicken (*T. pallidicinctus*), and sharp-tailed grouse (*T. phasianellus*) to establishment of CRP grasslands in Colorado, Illinois, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota. Generally the greatest benefits to prairie grouse occurred where CRP stands were established near pre-existing grasslands augmenting coverage and habitat diversity of the grassland complex. Common issues are associated with successes and failures of prairie grouse populations in their response to the CRP. CRP grasslands 12-30 inches in height appear most valuable to prairie grouse. Stands less than 12 inches generally furnish inadequate concealment and protection from the weather. Grass stands greater than 30 inches in height does provide thermal cover but such stands are often otherwise avoided. Multi-species plantings that are structurally diverse in height and growth forms are grasslands of the greatest value to these species. Presence of a high diversity of forbs, particularly legumes greatly enhance the quality of grasslands as habitat for prairie grouse. Native grasses furnish habitat of greater quality than do stands dominated by introduced species. Recommendations of management of individual grassland stands and landscape level management are presented.

213. **Predation rates on real and artificial nests of grassland birds.**
Davison, W. B. and Bollinger, E.
Auk 117(1): 147-153. (Jan. 2000)
NAL Call #: 413.8 AU4; ISSN: 0004-8038
Descriptors: nests/ predation/ site selection/ human impact/ grasslands/ Illinois/ Aves/ birds/ United States
Abstract: We estimated nesting success at real and artificial nests of grassland birds to test the influence of nest type, nest position, and egg size on predation rates. We distributed wicker nests and realistic woven-grass nests baited with a clay egg and either a Northern Bobwhite (Colinus virginianus) egg or a House Sparrow (Passer domesticus) egg in four grasslands that were part of the Conservation Reserve Program in east-central Illinois. Nesting success averaged 86.5% for 12 days of exposure for artificial nests. For real nests, nesting success was markedly lower, averaging 39% over the entire nesting cycle and 59% during approximately 12 days of incubation. Wicker nests were depredated more often than woven-grass artificial nests (18% vs. 8%), and nests baited with House Sparrow eggs were depredated more often than nests baited with Northern Bobwhite eggs (22% vs. 9%). Elevated and ground nests were depredated at the same rate. Patterns of nest predation on wicker nests were markedly different from depredation patterns on real nests over time and among fields. In contrast, patterns of nest predation on realistic woven-grass nests corresponded much more closely with predation rates of real nests over time and among fields. We suggest that future artificial nest studies use nests and eggs that mimic as closely as possible the real nests and eggs of target species. Use of unrealistic artificial nests and eggs, at least in grasslands, may result in patterns of predation that do not accurately reflect those of real nests. Artificial nests of any type appear to underestimate predation rates on nests of grassland birds, possibly because of a lack of snake predation on artificial nests.
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214. **Predicting juniper encroachment and CRP effects on avian community dynamics in southern mixed-grass prairie, USA.**
Coppedge, B. R.; Engle, D. M.; Masters, R. E.; and Gregory, M. S.
Biological Conservation 115(3): 431-441. (2004)
NAL Call #: S900.B5; ISSN: 0006-3207
Descriptors: environment-ecology/ breeding bird survey/ Conservation Reserve Program/ grassland/ juniper/ logistic regression/ Oklahoma/ Conservation Reserve Program/ great plains grasslands/ woody plant invasion/ population trends/ breeding birds/ cover type/ fields/ vegetation
Abstract: The probability of occurrence of 30 bird species was modeled as a function of landscape covertype in northwestern Oklahoma, USA. This grassland region has been extensively fragmented by agricultural activity, and remnant grassland patches are undergoing severe degradation from encroaching juniper (Juniperus virginiana

L.). In addition, many marginal or highly erodable croplands have been placed into perennial pasture dominated by exotic grasses under the Conservation Reserve Program (CRP). Based on temporal patterns of landscape change observed between 1965 and 1995, we estimated the covertype composition of the landscapes in the year 2015 under various CRP administrative and juniper expansion/control scenarios. We then used logistic regression to predict bird responses to these landscape composition estimates. Our estimates suggest that at the current rate of expansion, juniper will overtake substantial areas of remnant grassland even with extensive control measures. As a result, some obligate and facultative grassland birds are projected to decline, while numerous species tolerant of or partially reliant on woody vegetation will increase. Landscape dynamics due to changes in the CRP might be significant and could be designed to benefit declining grassland birds, but these benefits thus far are relatively minor compared to the effects encroaching juniper woodlands will have on the landscape and the avian community. © 2003 Elsevier Ltd. All rights reserved.
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215. **The quest for quantifying Conservation Reserve Program benefits.**
Yost, Michael
Transactions of the North American Wildlife and Natural Resource Conference 69: 20-29. (2004)
NAL Call #: 412.9 N814; ISSN: 0078-1355.
Notes: ISSN: 0078-1355; Meeting Information: 69th North American Wildlife and Natural Resources Conference, Spokane, WA, USA; March 16 -20, 2004; Sponsor: Wildlife Management Institute.
Descriptors: agronomy: agriculture/ conservation/ conservation/ soil erosion/ United States Department of Agriculture/ water runoff/
United States Farm Service Agency
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216. **A regional assessment of windbreak habitat suitability.**
Hess, G. R. and Bay, J. M.
Environmental Monitoring and Assessment 61(2): 237-254. (2000)
NAL Call #: TD194.E5; ISSN: 01676369
Descriptors: agriculture/ data quality control/ EMAP/ habitat assessment/ habitat suitability index/ regional assessment/ shelterbelt/ wildlife/ windbreak/ agriculture/ conservation/ data acquisition/ ecology/ management information systems/ natural resources/ data quality control/ environmental monitoring and assessment program/ environmental protection/ environmental monitoring/ habitat use/ wind break/ environmental monitoring/ United States
Abstract: The Environmental Monitoring and Assessment Program was initiated in 1989 by the United States Environmental Protection Agency to collect, analyze, and report quantitative, statistically unbiased information about the state of the nation's environment on a regional basis. During a pilot program in Nebraska we measured a habitat suitability index for a probability sample of 40 windbreaks and expanded the results to estimate the potential value of windbreaks as wildlife habitat in Nebraska. The index estimates the suitability of a windbreak as habitat for wildlife including breeding birds, small mammals, and deer. Index values range from zero to one, where a value of one indicates maximal habitat value. We estimated that 50% (1/4 3% at 90% confidence) of windbreaks in Nebraska have a habitat suitability index of 0.25 or less and that no windbreaks have a suitability index greater than 0.6. Our results indicate that increasing the area of individual windbreaks is the most effective way to improve their value as wildlife habitat. Monitoring windbreak condition over time would alert wildlife managers to changes in the resource that might affect wildlife populations. Because our data were highly variable, the power to detect change in habitat condition between two measurement periods was low. A much larger sample would be required to detect small changes in habitat condition. Variability may be reduced, and power increased, by carefully and consistently constructing the sampling frame, keeping data collection as simple as possible, appropriately stratifying sample selection, and using a small number of well-trained data collection teams. However, we suggest adapting the index for use with aerial photography in future efforts to evaluate windbreaks as wildlife habitat in extensive areas.
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217. **Relation of grassland bird abundance to mowing of Conservation Reserve Program fields in North Dakota.**
Horn, D. J. and Koford, R. R.
Wildlife Society Bulletin 28(3): 653-659. (2000)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Grasslands/ mowing/ conservation/ population decline/ North Dakota/ Cistothorus platensis/ Passerculus sandwichensis/ sedge wren/ Savannah sparrow/ conservation/ birds/ United States
Abstract: One factor that may be contributing to declines of several grassland bird species is mowing of grassland fields. We compared the relative abundance of birds in idled and mowed portions of grassland fields to investigate the influence of mowing in the previous summer on the grassland bird community. The study occurred in central North Dakota in 12 reseeded cropland fields enrolled in the Conservation Reserve Program. Sedge wrens (Cistothorus platensis) were more abundant in idled portions of grassland fields, whereas savannah sparrows (Passerculus sandwichensis) were more abundant in portions of fields that were mowed the previous year. Our findings are similar to other studies indicating that several grassland bird species in the central United States and Canada respond consistently to mowing.
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218. **Relationship of habitat patch size to predator community and survival of duck nests.**
Sovada, Marsha A.; Zicus, Michael C.; Greenwood, Raymond J.; Rave, David P.; Newton, Wesley E.; Woodward, Robert O.; and Beiser, Julia A.
Journal of Wildlife Management 64(3): 820-831. (2000)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Canis latrans/ Mephitis mephitis/ Spermophilus franklinii/ Taxidea taxus/ Vulpes vulpes/ Anatidae/ Anseriformes/ Anas platyrhynchos/ birds/ ecosystems/ habitat islands/ habitat use/ mammals/ nest predation/ nests-nesting/ prairies/ predator-prey relationships/ predators/ productivity/ survival/ upland habitat/ wetlands/ zoogeography/ red fox/ coyote/ American badger/ striped skunk/ Franklin's ground squirrel/ mallard/

Minnesota/ North Dakota/ South Dakota
Abstract: The authors studied duck nest success and predator community composition in relation to size of discrete patches of nesting cover in the Prairie Pothole Region (PPR) of the United States in 1993-95. They focused on nests in uplands that were seeded to perennial grasses and forbs and enrolled in the Conservation Reserve Program (CRP) in Minnesota, North Dakota, and South Dakota. They estimated daily survival rates (DSRs) of upland duck nests and indices of activity for red foxes (Vulpes vulpes), coyotes (Canis latrans), American badgers (Taxidea taxus), striped skunks (Mephitis mephitis), and Franklin's ground squirrels (Spermophilus franklinii), and related these variables to habitat patch size. The effect of patch size (small vs. large) on estimated annual mean DSR was dependent on date of nest initiation (early vs. late) and year. Examination of within-year comparisons for early and late nests suggested that DSR was generally greater in larger habitat patches. Activity indices for the five mammalian nest predators were influenced differently by year, location, and patch size. Activity indices of the red fox were greatest in small patches. Coyote indices were the most inconsistent, demonstrating a year X location X patch size interaction. Activity indices of the striped skunk and American badger varied only among years. Franklin's ground squirrel indices were affected by study area location, with higher indices in the southeast than the northwest. Red fox activity was weakly correlated with that of the striped skunk and coyote. Although a positive relationship between habitat patch size and nest success probably exists, the authors believe the experiment to fully test this hypothesis will continue to be elusive.
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219. **Relationship of soil management history and nutrient status to nematode community structure.**
Wang, K. H.; McSorley, R.; and Gallaher, R. N.
Nematropica 34(1): 83-95. (2004); ISSN: 0099-5444
Descriptors: commercial activities/ ecology/ man-made habitat/ abiotic factors/ land zones/ Nematoda: farming and agriculture/ soil management strategies/ trophic structure/ soil management/ community structure/ cultivated land habitat/ soil community/ chemical factors/ soil nutrient content/ Florida/ Alachua County/ invertebrates/ nematodes
Abstract: Historical effects of long-term yard-waste compost and tillage treatments on nematode community structure were compared separately between soils receiving high-yard-taste compost (HYWC) and no-yard-waste compost (NYWC) for 5 years; or between soils under no-tillage (NT) and conventional tillage (CT) for 25 years at the time of soil sampling. All the field sites had been left fallow for 1-5 years since the last soil cultivation. Tillage did not affect most nematode trophic groups, except for some fungivores. The yard-waste compost treatment increased the soil organic matter (OM) content greatly, and had a significant impact on many nematode genera. Most of the nematodes affected (P = 0.05) by yard-waste compost were bacterivores and predators. The lower fungivore to bacterivore ratio, and lower channel index, but higher enrichment index also suggested that the HYWC soil was N-enriched and was undergoing a bacteria-dominated decomposition channel. Population densities of several genera of bacterivorous and predatory nematodes were positively correlated kith most nutrient concentrations and OM, but were negatively correlated with concentration of Cu and Fe. Population densities of most genera of fungivorous nematodes correlated with concentrations of most nutrient elements except N, K and Mg and were always negatively correlated with OM. While effects of tillage practices on the soil nematode community were generally short-lived, the long-tern yard-taste compost applications that enhanced OM had a lasting impact on nematode community structure and nutrient cycling.
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220. **Relationships of habitat patch size to predator community and survival of duck nests.**
Sovada, M. A.; Zicus, M. C.; Greenwood, R. J.; Rave, D. P.; Newton, W. E.; Woodward, R. O.; and Beiser, J. A.
Journal of Wildlife Management 64(3): 820-831. (2000)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: patches/ habitat/ predators/ survival/ nests/ United States, Minnesota/ United States, North Dakota/ United States, South Dakota/ community composition/ aquatic birds/ breeding success/ area/ Anatidae/ Mammalia/ United States, Minnesota/ United States, North Dakota/ United States, South Dakota/ ducks/ mammals/ patch size/ Prairie Pothole Region/ mammals/ environmental effects
Abstract: We studied duck nest success and predator community composition in relation to size of discrete patches of nesting cover in the Prairie Pothole Region (PPR) of the United States in 1993-95. We focused on nests in uplands that were seeded to perennial grasses and forbs and enrolled in the Conservation Reserve Program (CRP) in Minnesota, North Dakota, and South Dakota. We estimated daily survival rates (DSRs) of upland duck nests and indices of activity for red foxes (Vulpes vulpes), coyotes (Canis latrans), American badgers (Taxidea taxus), striped skunks (Mephitis mephitis), and Franklin's ground squirrels (Spermophilus franklinii), and related these variables to habitat patch size. The effect of patch size (small vs. large) on estimated annual mean DSR was dependent on date of nest initiation (early vs. late) and year. Examination of within-year comparisons for early and late nests suggested that DSR was generally greater in larger habitat patches. Activity indices for the 5 mammalian nest predators were influenced differently by year, location, and patch size. Activity indices of the red fox were greatest in small patches. Coyote indices were the most inconsistent, demonstrating a year x location x patch size interaction. Activity indices of the striped skunk and American badger varied only among years. Franklin's ground squirrel indices were affected by study area location, with higher indices in the southeast than the northwest. Red fox activity was weakly correlated with that of the striped skunk and coyote. Although a positive relationship between habitat patch size and nest success probably exists, we believe the experiment to fully test this hypothesis will continue to be elusive.
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221. **Relationships of swift foxes and coyotes in northwest Texas.**
Kamler, Jan Frederick. Texas Tech University, 2002.
Notes: Advisor: Ballard, Warren B.; Thesis/ Dissertation
Descriptors: swift foxes/ Vulpes velox/ coyotes/ Canis latrans/ mating/ density/ depredation/ distribution/ wildlife/ plains/ mortality/ prairies, meadows/ survival/ habitat use

Abstract: Due to severe reductions in their distribution and numbers, the swift fox (Vulpes velox) was classified as warranted, but precluded as a threatened species by the U.S. Fish and Wildlife Service from 1995 to 2001. Several factors were likely responsible for the decline of the swift fox in the western Great Plains, including habitat loss and competition with coyotes (Canis latrans). From 1998 to 2001, we radio-collared and monitored 88 swift foxes and 29 coyotes at 2 study sites in northwestern Texas to investigate the ecology and relationships of both species. Initial results suggested that higher coyote numbers on site 1 resulted in lower survival, lower density, and lower recruitment of swift foxes compared to site 2. To test this hypothesis, we experimentally removed coyotes on site 1 during the final year of the study. Subsequently, swift foxes had increased survival, increased density, increased recruitment, and exhibited a source population due to lower predation by coyotes. We also found that high mortality from coyote predation affected the spatial distribution, mating system, and group structure of swift foxes. These results indicate that high coyote numbers can suppress swift fox populations due to heavy predation. To determine if habitat loss also negatively affected swift foxes, we examined habitat selection of swift foxes at 2 spatial scales on site 2, which was comprised of short-grass prairies grazed by cattle (46% of area), non-native (CRP) grasslands that were ungrazed (23%), and agricultural fields (31%). Habitat use was similar at both spatial scales, as swift foxes exhibited a strong preference for short-grass prairies and nearly complete avoidance of CRP grasslands and agricultural fields. These results indicate that swift foxes are habitat specialists, thus protection of native short-grass prairies might be necessary for their long-term existence. We documented that the social organization of swift foxes was based entirely on female territories, as adult males emigrated after adult female deaths, but not vice versa. A female-based social organization, previously unknown among canids, likely evolved in swift foxes from the reduced importance of food provisioning by males.
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222. **Reproductive success of grasshopper sparrows in relation to edge.**
Delisle, Jennifer M and Savidge, Julie A.
Prairie Naturalist 28(3): 107-114. (1996)
NAL Call #: QH540.P7; ISSN: 0091-0376
Descriptors: Conservation Reserve Program/ ecology/ edge relation/ reproductive success/ Nebraska, southeastern/ wildlife management/ animals/ birds/ chordates/ nonhuman vertebrates/ grasshopper sparrow (Passeriformes)/ Ammodramus savannarum (Passeriformes)
Abstract: Using an index based on observations of breeding behaviors, we estimated reproductive success of 31 territorial grasshopper sparrows (Ammodramus savannarum) on Conservation Reserve Program fields in southeast Nebraska. Reproductive success was 52%, and no difference was detected between birds holding interior (>100 m from the edge) vs. edge territories. However, grasshopper sparrows appeared to avoid nesting within 50 m of edge habitats. Territories ranged from 0.36-1.24 ha, and territory size did not differ between successful and unsuccessful males.
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223. **Response of timber growth and avian communities to quality vegetation management in mid-rotation CRP pine plantations.**
Sladek, Brandon G.; Munn, Ian A.; Burger, L. Wes; and Roberts, Scott D.
In: Proceedings of the 13th Biennial Southern Silvicultural Research Conference, General Technical Report-SRS 92/ Connor, Kristina F.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2006. pp. 30-33.
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land zones/ Aves: forestry/ forest and woodland/ loblolly pine plantations/ Mississippi/ upper and lower coastal plain/ vegetation management in pine plantations/ birds/ chordates/ vertebrates
Abstract: Provisions of the 2002 Farm Bill gave Conservation Reserve Program (CRP) participants greater flexibility to implement mid-contract management activities that encourage wildlife habitat improvement and timber production. Quality Vegetation Management (QVM) is one such technique that utilizes the selective herbicide Imazapyr and prescribed burning. Timber growth (d.b.h., total/merchantable heights, and cubic foot volume per acre) and summer avian community responses (relative abundance, species richness, and total conservation value) to the QVM treatment are being evaluated in mid-rotation CRP loblolly pine plantations in two physiographic regions of Mississippi. By 2-years post-treatment, significant increases in the relative abundance of six early successional bird species were detected on treated sites. Although not significant, mean pine growth increment increases were slightly greater on treated plots than on control plots.
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224. **Reuse of annual set-aside lands: Implications for wildlife.**
Frawley, B. J. and Walters, S.
Wildlife Society Bulletin 24(4): 655-659. (Winter 1996)
NAL Call #: SK357.A1W5; ISSN: 0091-7648 [WLSBA6]
Descriptors: agricultural land/ land management/ wildlife/ conservation/ Indiana/ Conservation Reserve Program
This citation is from AGRICOLA.

225. **Reverting Conservation Reserve Program lands to wheat and livestock production: Effects on ground beetle (Coleoptera: Carabidae) assemblages.**
French, B. Wade; Elliott, Norman C.; and Berberet, Richard C.
Environmental Entomology 27(6): 1323-1335. (1998)
NAL Call #: QL461.E532; ISSN: 0046-225X
Descriptors: agricultural lands/ grazing lands/ Conservation Reserve Program/ ground beetles
Abstract: Highly erodible lands enrolled in the Conservation Reserve Program soon will revert to agricultural production. This study was designed to determine the effects of reversion of Conservation Reserve Program lands to wheat and livestock production on ground beetle assemblages. Reversion strategies included no reversion of Conservation Reserve Program grass (unmanaged bluestem), simulated grazing of Conservation Reserve Program grass (managed bluestem), minimum-tillage practices for wheat production, and no-tillage practices for wheat production. A randomized block experimental design was established with 4 replicates.

More ground beetles were captured in pitfall traps in 1995 than in 1996, and abundances within years differed among reversion strategies. Of the 73 ground beetle species collected, 9 species accounted for 61.7% of total abundance. Abundances of these 9 species differed with respect to reversion strategy. Species diversity and evenness differed among the reversion strategies in 1995, but only evenness differed in 1996. Canonical correspondence analysis showed that annual and monthly variation were the predominant factors in separating ground beetle assemblages. Lack of rainfall may have accounted for a large portion of differences in abundances between years. A partial canonical correspondence analysis showed that simulated grazing and no-tillage wheat were the predominant reversion strategies in separating ground beetle assemblages. These treatments represent disturbance levels intermediate to unmanaged bluestem and minimum-tillage wheat.
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226. **A review and synthesis of habitat use by breeding birds in agricultural landscapes of Iowa.**
Best, L. B.; Freemark, K. E.; Dinsmore, J. J.; and Camp, M.
American Midland Naturalist 134(1): 1-29. (July 1995)
NAL Call #: 410-M58; ISSN: 0003-0031 [AMNAAF]
Descriptors: wild birds/ species diversity/ breeding places/ habitat selection/ vegetation types/ agricultural land/ checklists/ conservation/ Iowa/ species abundance
This citation is from AGRICOLA.

227. **Ring-necked pheasant nesting ecology and production on CRP lands in the Texas Southern High Plains.**
Berthelsen, Peter S.; Smith, Loren M.; and George, Ronnie R.
Transactions of the North American Wildlife and Natural Resource Conference 55: 46-56. (1990)
NAL Call #: 412.9 N814; ISSN: 0078-1355
Descriptors: Galliformes/ Phasianidae/ Phasianus colchicus/ birds/ behavior/ Conservation Reserve Programs/ management/ nests/ nesting/ productivity/ wildlife/ common pheasant/ fertility/ recruitment/ density/ northwestern Texas
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228. **A roadmap to more quail.**
Gallagher, Elsa
Missouri Conservationist 65(7): 4-7. (2004);
ISSN: 0026-6515.
http://mdc.mo.gov/conmag/2004/07/10.htm
Descriptors: Colinus virginianus/ agricultural practices/ birds/ conservation/ conservation programs/ ecosystems/ edge habitat/ fencerows/ habitat alterations/ habitat management/ habitat use/ hunting and anti-hunting/ landowners/ management/ population ecology/ restoration/ succession/ urbanization/ wildlife/ wildlife-habitat relationships/ northern bobwhite quail/ Missouri
Abstract: This article has notes about quails and their habitat in Missouri. Missourians naturally associate quail with open lands and brushy draws, fencerows, and crop field edges. These types of habitat are disappearing from the Missouri landscape. A diversified landscape is slowly being replaced by urban developments, larger crop fields, and pastures dominated by fescue and brome. These choke out the forbs, legumes, and bare ground necessary for quail survival. Fortunately, farmers and landowners are learning that they play an important role in restoring quail populations in Missouri. Landowners willing to devote 5 to 10 percent of their property to quail management will often see an immediate response of higher quail numbers. The South East Quail Study Group developed the Northern Bobwhite Conservation Initiative (NBCI) to meet the conservation and management needs of northern bobwhite. The NBCI is a landscape-scale habitat restoration plan, the first plan to address habitat needs of bobwhite. Improving habitat is the key to restoring quail and other grassland species. In most cases, bobwhite quail habitat can be created or enhanced with some combination of discing, burning, brush pile building, edge feathering, spraying, and shrub planting. The conservation department offers one-on-one consulting services and access to several programs to help landowners develop quality quail habitat. The Northern Bobwhite Conservation Initiative has helped the department include quail management into their planning and made it easier to integrate all bird conservation into these efforts.
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229. **The role of farm policy in achieving large-scale conservation: Bobwhite and buffers.**
Burger, L. W.; Mckenzie, D.; Thackston, R.; and Demaso, S. J.
Wildlife Society Bulletin 34(4): 986-993. (2006)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2006)34 [986:TROFPI]2.0.CO;2.
Descriptors: Colinus virginianus/ Conservation Reserve Program/ Farm Bill/ Farm policy/ habitat buffers for upland birds/ northern bobwhite/ Northern Bobwhite Conservation Initiative
Abstract: The Farm Bill provides a policy vehicle for implementing conservation programs with the potential to alter land use on a large spatial scale. The conservation payments under the Farm Bill dwarf the collective investment of the North American Wetlands Conservation Act, Endangered Species Act, Pittman-Robertson Act, and Conservation and Reinvestment Act. However, the ecological value of past policy has varied by program, practice, region, and wildlife species, resulting in a broad array of wildlife habitat and population effects ranging from positive to negative. We argue the conservation provisions of the Farm Bill can produce more consistent positive wildlife habitat benefits when policy (program statutes, rules, practices, and practice standards) is developed in the context of explicit goals identified as part of large-scale conservation initiatives. For example, initiatives like the North American Waterfowl Management Plan, Partners in Flight, and the Northern Bobwhite Conservation Initiative (NBCI) set science-based goals and objectives to facilitate wildlife species population recovery and sustainability at the landscape scale. We contend that the best ecological and societal cost/benefit ratio is achieved when Farm Bill conservation programs and practices are developed to address these specific habitat goals. We present a case study illustrating how a Conservation Reserve Program option (Conservation Practice 33-Habitat Buffers for Upland Birds) specifically addresses NBCI goals and objectives. We discuss the successes, failures, and lessons learned by NCBI in policy formulation, practice development, programmatic delivery, and evaluation.
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230. **The role of the Conservation Reserve Program in relation to wildlife enhancement, wetlands and adjacent habitats in the northern Great Plains.**
Higgins, K. F.; Nomsen, D. E.; and Wentz, W. A.
In: Impacts of the Conservation Reserve Program in the Great Plains, General Technical Report-RM 158/ Mitchell, J. E.; Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1987. pp. 99-104.
Descriptors: Conservation Reserve Program/ regional conservation programs/ northern Great Plains
Abstract: Focused on the value of CRP grasslands directly related to wetlands and their associated wildlife (primary migratory birds).

231. **The role of trees and shrubs as economic enterprises and wildlife habitat development in the Great Plains.**
Hoefer, P. and Bratton, G. F.
In: Impacts of the Conservation Reserve Program in the Great Plains, General Technical Report-RM 158; Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1988. pp. 109-112.
Notes: 0277-5786 (ISSN); Proceedings of a Symposium on "Impacts of the Conservation Reserve Program in the Great Plains," held Sept 16-18, 1987, Denver, Colorado.
NAL Call #: aSD11.A42
Descriptors: soil conservation/ resource conservation/ revegetation/ erosion control/ shrubs/ trees/ wildlife/ habitats/ northern plains states of USA/ southern plains states of USA/ Conservation Reserve Program
This citation is from AGRICOLA.

232. **The role of wildlife as an economic input into farming or ranching operation.**
Bryant, F. C. and Smith, L. M.
In: Impacts of the Conservation Reserve Program in the Great Plains, General Technical Report RM 158; Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1988. pp. 95-98.
Notes: Report Series ISSN: 0277-5786; Proceedings of a Symposium on "Impacts of the Conservation Reserve Program in the Great Plains," held Sept 16-18, 1987, Denver, Colorado. Includes references.
NAL Call #: aSD11.A42
Descriptors: farming/ wildlife/ wildlife management/ economic impact/ Texas/ Conservation Reserve Program/ high plains/ rolling plains
This citation is from AGRICOLA.

233. **Rotational grazing demonstration with beef cattle on conservation reserve land in Adams County, Iowa, USA.**
Barnhart, S. K.; Peterson, B.; Nelson, C. O.; Bredahl, R. ; Klein, J.; and Sprague, R.
In: XX International Grassland Congress: Offered Papers. Wageningen, Netherlands: Wageningen Academic Publishers, 2005; pp. 787.
Notes: 20th International Grassland Congress, Dublin, Ireland; June 26 -July 01, 2005; 9076998817 (ISBN).
Descriptors: animal husbandry: agriculture/ wildlife habitat/ soil erosion/ United States Department of Agriculture/ rotational grazing/ Conservation Reserve Program
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234. **Rural economic effects of the Conservation Reserve Program in North Dakota.**
Bangsund, D. A.; Leistritz, F. L.; and Hodur, N. M.
Fargo, N. D.: Department of Agribusiness and Applied Economics, North Dakota State University, 2002. viii; 117 p. Agribusiness and Applied Economics Report (AAER).
Descriptors: agricultural production/ agricultural situation/ economic impact/ expenditure/ hunting/ income/ land diversion/ land use/ losses/ opportunity costs/ outdoor recreation/ rural areas/ rural economy/ rural recreation/ wildlife conservation
Abstract: This study addressed the net economic effects of decreased agricultural activity and increased recreational activity associated with the Conservation Reserve Program or CRP (enacted in 1985) in six rural areas of North Dakota, USA, from 1996-2000. The negative effects of the CRP on agricultural revenues were based on the level of economic activity that would have occurred in the absence of the programme. The net change in revenues from CRP land returning to agricultural production in the six study areas was estimated at $76 million or about $56 per CRP-acre. However, returning CRP lands to agricultural production was estimated to lower commodity prices and reduce agricultural revenues on non-CRP lands by $25.9 million. The combined effect was estimated at $50.2 million annually or $37 per CRP-acre in the study areas. The CRP affects many types of outdoor recreation. However, hunting was identified as the most influenced type of recreation in North Dakota. Recreational impacts were determined by comparing pheasant, waterfowl, and deer hunter numbers before and after the CRP, assigning the relative role the CRP has played in the change in hunter numbers, allocating a percentage of the change in hunter numbers to each study area, and applying seasonal hunter expenditure patterns to the change in hunter numbers. Average annual CRP-related hunter expenditures in the six study areas were estimated at $12.8 million or $9.45 per CRP-acre. Overall, recreational revenues averaged 26% of the agricultural losses. The degree to which CRP-based hunting revenues in rural areas offset agricultural losses varied throughout the state. In several cases, hunting expenditures offset a substantial portion of the agricultural losses, while in other areas, the net economic loss from the programme remains high. The net economic effects of the programme in western and central North Dakota were the most favourable, whereas the effects were least favourable in eastern areas of the state. In North Dakota, the net economic effect of losses in agricultural revenues and gains in hunting-based recreational expenditures indicated that several areas of the state are not as economically burdened by the CRP as previous research has suggested.
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235. **Scale-dependent dispersal and distribution patterns of spiders in agricultural systems: A review.**
Samu, F.; Sunderland, K. D.; and Szinetár, C.
Journal of Arachnology 27(1): 325-332. (1999)
NAL Call #: QL451.J6 ; ISSN: 0161-8202.
Notes: Literature review.
Descriptors: farming systems/ dispersal/ distribution/ effects/ habitats/ pest control/ predation/ prey/ survival/ tillage/ Araneae/ arthropods/ Arachnida/ invertebrates
Abstract: A conceptual framework is presented for the study of the factors affecting the distribution, dispersal and abundance of spiders in agricultural systems. It is useful to

consider how factors operate at three levels of a spatial hierarchy, namely micro-habitat, habitat and landscape. The size and distribution of spider populations are determined by factors influencing survival, reproduction and dispersal. Modes of dispersal vary in terms of the efficiency of sampling new habitats and the level of risk. A literature survey of proximal factors (micro-climate, habitat structure, disturbance, prey availability, predation, and territoriality) affecting micro-habitat usage by spiders showed that the relative importance of these factors varied according to spider species. Spider abundance and diversity were found, in general, to be positively correlated with environmental diversity at different spatial scales. Within-field habitat diversifications were found to be more effective in increasing spider populations when interspersed throughout the crop (e.g., polycultures and reduced tillage) than when spatially segregated (e.g., strip management). Two approaches (modeling and experimental) to studying the effects of landscape level phenomena on spider distribution and abundance are discussed. Manipulation of habitats at the edge of fields has not, in the main, resulted in increased spider density within fields. Opportunities were identified for increasing regional populations of spiders, and optimizing pest control, by management of the annual shift in the crop mosaic to maximize spider transfer rates from senescing crops to young crops.
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236. **Sea of grass in New Mexico: A perspective on CRP.**
Garcia, H. B.
Rangelands 15(1): 18-21. (Feb. 1993)
NAL Call #: SF85.A1R32; ISSN: 0190-0528
Descriptors: sown grasslands/ range management/ prescribed burning/ introduced species/ wildlife management/ erosion control/ grazing systems/ New Mexico
This citation is from AGRICOLA.

237. **Seasonal use of Conservation Reserve Program fields by white-tailed deer in eastern South Dakota.**
Gould, J.
Brookings, SD: South Dakota State University, 1991.
Notes: M.S. Thesis
Descriptors: Conservation Reserve Program/ State conservation programs/ South Dakota
Abstract: CRP land cover and maintenance practices, where white-tailed deer populations nested in eastern South Dakota, were examined.

238. **Seasonal use of Conservation Reserve Program lands by white-tailed deer in east-central South Dakota.**
Gould, Jeffrey H. and Jenkins, Kurt J.
Wildlife Society Bulletin 21(3): 250-255. (1993)
NAL Call #: SK357.A1W5; ISSN: 0091-7648.
Notes: Project Number: SD W-075-R/Study 7541.
Descriptors: Odocoileus virginianus/ behavior/ Conservation Reserve Programs/ habitat use/ management/ mammals/ season/ wildlife/ odocoileus virginianus/ habitat selection/ seasonal variation/ diurnal variation/ conservation areas/ telemetry/ natural resources/ agriculture (general)/ deer, white tailed/ land, private/ cultivated farmland/ policies and programs/ habitat/ utilization/ seasons/ seasonal activities/ white tailed deer/ South Dakota/ East central region/ Brookings County/ Kingsbury County/ Lake County/ United States
Abstract: Objectives were to describe variation in deer use of Conservation Reserve Program (CRP) lands by season, diel period, and deer activity class as a means of assessing seasonal importance of CRP fields to white-tailed deer in the agricultural midwest. Use of CRP fields was determined by locating radiomarked female deer from 15 September 1989 to 31 December 1990.
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239. **Seed availability in grazed pastures and Conservation Reserve Program fields during winter in Kansas.**
Klute, D. S.; Robel, R. J.; and Kemp, K. E.
Journal of Field Ornithology 68(2): 253-258. (1997)
NAL Call #: 413.8 B534; ISSN: 0273-8570
Descriptors: grasslands/ seeds/ abundance/ winter/ agricultural practices/ government policy/ Kansas/ management/ United States
Abstract: Studies have documented the importance of Conservation Reserve Program (CRP) fields to breeding birds, but few have examined them as food sources for wintering birds. We compared the biomass of seeds in CRP fields to that in grazed native grass pastures in northeastern Kansas during two winters. Log transformed total seed biomass was significantly lower in grazed pastures than in CRP fields during the first winter but not the second. Total seed biomass in CRP fields was highly variable, and decreased between November and February. Seeds that were typically abundant in CRP fields are important food items of wintering grassland birds. In conclusion, CRP fields are superior to grazed native grass pastures in northeastern Kansas as winter foraging habitat for birds.
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240. **Selected effects of the Conservation Reserve Program on program participants: A report to survey respondents.**
Vandever, M. W.; Allen, A. W.; and Sexton, N. R.
Fort Collins, CO: U.S. Geological Survey, Fort Collins Science Center; USGSOFR02476, 2003. 30 p.
Notes: USGS Open file rept. 2476; Sponsored by Farm Service Agency, Lakewood, CO.
http://www.fort.usgs.gov/products/publications/10023/10023.pdf
Descriptors: surveys/ natural resources conservation/ conservation/ wildlife/ habitats/ social effect/ public opinion/ Conservation Reserve Program/ natural resources and earth sciences natural resource management/ agriculture and food agricultural economics
Abstract: In the summer of 2001, we drew a random sample of 2,212 persons holding active Conservation Reserve Program (CRP) contracts across all USDA Farm Production Regions because we wanted information from people intimately familiar with the program's effects on their land and communities, we did not send surveys to contracts held in the name of trusts, banks, or other non-personal ownership (49 contracts). To carry out the survey, we followed a dependable step-by-step process designed to maximize the quality and quantity of responses for mail surveys (Dillman 1978, 2000). As a result, the overall

response rate for the survey was 65%. Of the 35% who did not respond, only 1% (29 people) formally refused to participate. We were able to summarize the survey results nationally and by USDA Farm Production Region.

241. **Short-term bird response to harvesting switchgrass for biomass in Iowa.**
Murray, L. D. and Best, L. B.
Journal of Wildlife Management 67(3): 611-621. (July 2003)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: biomass/ birds/ energy crops/ grassland/ Iowa/ nest success/ Panicum Virgatum/ switchgrass/ Conservation Reserve Program/ grassland birds/ nest success/ North Dakota/ CRP fields/ abundance/ habitat/ vegetation/ Pheasants/ survival
Abstract: Conservation Reserve Program (CRP) provides habitat for grassland birds, but as contracts expire, some CRP fields might be returned to rowcrop production. One alternative to returning CRP fields to rowcrops is to produce switchgrass (Panicum virgatum) for use as a biomass fuel. Because the biomass is harvested during the fall and winter, breeding birds would not be directly affected by mowing the fields but might be influenced by changes in vegetation structure resulting from the harvest. We evaluated bird abundances and nest success in totally, harvested, partially harvested (alternating cut and uncut strips), and nonharvested CRP switchgrass fields in southern Iowa, USA, in 1999 and 2000. Species richness did not differ among harvest treatments. Abundances of most species (16 of 18) were not affected by the harvesting of switchgrass fields, and strip width did not affect bird numbers in strip- harvested fields. Grasshopper sparrows (Ammodramus savannarum) were more abundant in harvested portions of fields, and more sedge wrens (Cistothorus platensis) were recorded in nonharvested areas. The residual vegetation in nonharvested areas provided nest cover for species that begin nesting early in the season (e.g., northern harrier [Circus cyaneus] and ring-necked pheasant [Phasianus colchicus]). Nest success rates of grasshopper sparrows and common yellowthroats (Geothlypis trichas) were similar to those reported by other studies in switchgrass fields and might be sufficient to maintain stable populations. In general, switchgrass biomass fields create breeding habitat for some grassland birds, and a Mixture of harvested and nonharvested fields would be more beneficial to grassland birds than totally harvesting or partially harvesting all switchgrass fields.
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242. **Short-term impacts of aboveground herbivory (grasshopper) on the abundance and 14C activity of soil nematodes in conventional tillage and no-till agroecosytems.**
Fu, Shenglei; Kisselle, Keith W.; Coleman, David C.; Hendrix, Paul F.; and Crossley, D. A.
Soil Biology and Biochemistry 33(9): 1253-1258. (2001)
NAL Call #: S592.7.A1S6; ISSN: 0038-0717
Descriptors: nutrition/ behavior/ ecology/ population dynamics/ terrestrial habitat/ man-made habitat/ land and freshwater zones/ Nematoda: activity patterns/ population density/ soil habitat/ cultivated land habitat/ tilled and untilled agroecosystems/ Georgia/ abundance and activity/ effect of insect herbivory levels/ arthropods/ helminths/ insects/ invertebrates/ nematodes
Abstract: This study was designed to monitor the responses of soil nematodes to different levels of aboveground herbivory and to test the hypothesis that the low level of aboveground herbivory facilitates soil nematode activities and high herbivory suppresses soil nematode activities. Three herbivory levels were established by introducing four pairs, two pairs and no grasshoppers to graze on corn plants (Zea mays) for 2 h. The experiment was conducted in conventional tillage (CT) and no-till (NT) agroecosystems at Georgia piedmont. In NT, bacterivorous and fungivorous nematode numbers were more abundant 24 h after herbivory treatment at high grazing level compared to controls, but this was not observed at low grazing level. In NT, the 14C activity of soil nematodes was significantly higher at both low and high grazing levels than the controls. In CT, however, we did not observe any effects caused by aboveground herbivory on the abundance and 14C activity of soil nematodes. The abundance of other trophic groups of soil nematodes (phytophages, predators and omnivores) was not affected by aboveground herbivory treatments under either NT or CT regimes. The curvilinear relationship between the nematode activity and the grazing intensity was not found in this study, we suggested that a grazing gradient of leaf area loss ranging from 0 to 100% might be more desirable for future research. We hypothesized that root associated materials might be more important to soil organisms in NT than in CT since the effect of aboveground herbivory on soil nematodes was only observed in NT.
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243. **Small mammal populations occurring in a diversified winter wheat cropping system.**
Olson, R. A. and Brewer, M. J.
Agriculture, Ecosystems and Environment 95(1): 311-319. (2003)
NAL Call #: S601.A34
Descriptors: diversification/ ecology/ grasslands/ small mammals/ species diversity/ species richness/ vegetation/ wheat/ winter wheat
Abstract: Some Triticum aestivum (winter wheat) growers in the western region of the Northern Great Plains, USA, use a 3-year rotational, diversified dryland cropping system consisting of alternating strips of T. aestivum, fallow, and an additional spring sown crop such as Avena sativa (oats) or Zea mays (corn). Small mammal population characteristics (species richness, abundance, diversity) of the crops associated with this cropping system are unknown. Small mammal populations and vegetation characteristics (habitat) were evaluated at two sites in June 1998 and 1999 in three crops of the rotation and on undisturbed Conservation Reserve Program (CRP) grasslands. Small mammal abundance and diversity were highest in T. aestivum and grassland at both sites each year. Peromyscus maniculatus (deer mouse) was the most abundant species. Percent vegetation cover was significantly higher in T. aestivum and grassland, respectively, at both sites each year. Regression analyses using pooled data indicated a significant relationship between percent vegetation cover and small mammal species richness, abundance, and diversity. T. aestivum provided valuable habitat for small mammals in winter, spring, and early summer. Alternate grain crops in the

diversified cropping system, which is absent in traditional 2-year systems, probably offered additional valuable protective cover for small mammals following T. aestivum harvest.
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244. **Small mammal response to farming as practiced on the Franklin Island Wildlife Area.**
Clawson, R. L. and Smith, J. W. Missouri Dept. of Conservation; MO W-013-R-39/Job 1/Study No. 69, 1985. 21 p.
Descriptors: wetlands/ cotton-rat/ food crops/ mammals/ mice, deer/ mice, harvest/ mice, white-footed/ mouse, house/ rodents/ species diversity/ state wildlife management areas/ tillage/ voles/ Triticum spp./ Missouri/ Howard County
Abstract: Objective was to determine small mammal populations in corn, soybean, and wheat fields on a Missouri Department of Conservation wetland area.
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245. **Soil management to enhance bacterivore and fungivore nematode populations and their nitrogen mineralisation function.**
Ferris, H; Venette, R. C.; and Scow, K. M.
Applied Soil Ecology 25(1): 19-35. (2004)
NAL Call #: QH541.5.S6 A67; ISSN: 0929-1393
Descriptors: commercial activities/ ecology/ terrestrial habitat/ land zones/ Nematoda: farming and agriculture/ soil management/ bacterivore and fungivore populations/ nitrogen mineralization function/ relationships/ element cycles/ soil management effects/ population dynamics/ effect of soil management/ impact on habitat/ soil habitat/ California/ University of California/ agronomy/ farm/ nematoda/ invertebrates/ nematodes
Abstract: We tested the hypotheses that management of the soil food web in the fall would enhance grazing on bacteria and fungi by microbivorous nematodes in the spring, consequently increasing N availability in cover-crop driven organic and low-input farming systems. The food web was manipulated by irrigating the dry soil of late summer and/or providing carbon sources. By creating conditions conducive for biological activity, we increased the abundance of bacterivore and fungivore nematodes in the fall and the following spring. Greater biological activity in the soil enhanced concentrations of mineral N available to the subsequent summer tomato crop. Mineral N concentration in the spring was associated with abundance of bacterivore nematodes, and with the corresponding Enrichment Index (EI) provided by nematode community analysis. Because environmental conditions that favour increase of bacterivore nematodes probably also favour other microbial grazers, including protozoa, the abundance of bacterivore nematodes may be an indicator of overall grazing activity and N mineralisation rates from soil fauna. Decomposition pathways in the spring, inferred from nematode bioindicators, were dominated by bacteria in plots that had been irrigated the previous fall while fungi were more prevalent in those that had not. The responses of omnivore and predator nematodes to our treatments were not consistent and there was no evidence that regulation of opportunist species by predators would be enhanced by the management practices imposed.
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246. **Soil organic carbon changes after 12 years of no-tillage and tillage of Grantsburg soils in southern Illinois.**
Olson, K. R.; Lang, J. M.; and Ebelhar, S. A.
Soil and Tillage Research 81(2): 217-225. (2005)
NAL Call #: S590.S48; ISSN: 0167-1987
Descriptors: biochemistry and molecular biophysics/ soil science/ economics/ agronomy: agriculture/ wildlife management: conservation/ tillage/ applied and field techniques/ moldboard plowing/ applied and field techniques/ no tillage/ applied and field techniques/ chisel plowing/ applied and field techniques/ yearly crop rotation system/ applied and field techniques/ Conservation Reserve Program/ applied and field techniques/ soil erosion/ crop production/ soil organic carbon changes/ grantsburg soil/ tall fescue hayland/ rooting zone/ subsurface layer/ surface layer
Abstract: Many factors including management history, soil type, climate, and soil landscape processes affect the dynamics of soil organic carbon (SOC). The primary objective of this research was to determine the effects of no-tillage and tillage systems on the SOC content after 12 years of controlled treatments. A tillage experiment with three treatments (no-till (NT), chisel plow (CP) and moldboard plow (MP)) was initiated in the spring of 1989 in southern Illinois. The plot area was previously in a tall fescue hayland for 15 years and had a 6% slope. Maize (Zea mays L.) and soybean (Glycine max L. Merr.) were grown in the plot area on a yearly rotation system starting with maize. Periodically, the SOC content of various soil layers, to a depth of either 30 or 75 cm, was measured and expressed on both a gravimetric and volumetric basis. After 12 years, the 0-15 cm surface soil layer of MP was significantly lower in SOC than the NT and CP plots. For all but 2 values, the significance of findings did not change with the form of expression (gravimetric versus volumetric). The surface layer (0-15 cm), subsoil (15-75 cm), and rooting zone (075 cm) of all treatments had reduction in SOC on a volumetric basis when compared to the pre-treatment values for sod. At the end of the 12-year study, the MP system had significantly less SOC in the surface layer, subsurface layer and rooting zone than the NT system at comparable depths. After 12 years of tillage under a maize-soybean rotation, the NT treatment sequestered or maintained more SOC stock (47.0 Mt ha^{-1}) than the CP (43.7 Mt ha^{-1}) and MP (37.7 Mt ha^{-1}) treatments. The annual rate of SOC stock build up in the root zone (0-75 cm), above the MP system base, was 0.71 Mt ha^{-1} $year^{-1}$ for the NT system and 0.46 Mt ha^{-1} $year^{-1}$ for the CP system. For land coming out of the Conservation Reserve Program and returning to row crop production, NT and CP systems would maintain more SOC stock than MP system and reduce CO2 emissions to the atmosphere.
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247. **Spatial and temporal dynamics of hedgerows in three agricultural landscapes of southern Quebec, Canada.**
Schmucki, R.; De Blois, S.; Bouchard, A.; and Domon, G.
Environmental Management 30(5): 651-664. (2002)
NAL Call #: HC79.E5E5 ; ISSN: 0364152X.
Notes: doi: 10.1007/s00267-002-2704-9.
Descriptors: corridors/ field margin/ hedgerow network/ landscape dynamics/ noncrop habitat/ agriculture/ ecology/

principal component analysis/ hedgerows/ environmental impact/ agricultural land/ field margin/ habitat corridor/ spatial variation/ temporal variation/ agricultural management/ ecosystem/ environmental protection/ tree/ Canada/ agriculture/ conservation of natural resources/ ecosystem/ trees

Abstract: Noncrop areas such as hedgerows in agricultural landscapes can perform several ecological and agronomic functions (e.g., habitat, movement corridors, wind-break, etc.), but their dynamics and drivers of changes are often poorly known. We conducted a study in three agricultural landscapes of southern Quebec, Canada, to assess and compare the spatial and temporal (1958-1997) dynamics of three hedgerow networks in relation to geomorphic conditions (marine, glacial, and mixed deposit) and land-use changes. Hedgerow networks were mapped and described in terms of their structure (density, degree of connectivity, and presence of trees or shrubs) and their relationship to other components of the landscape (connection to woodland). Relationships were assessed in time and space using nonparametric correlation, Mantel test, and principal components analysis (PCA). Results show significant differences between hedgerow structure for the three landscapes and distinct temporal and spatial dynamics that can be related to changes in management practices and agricultural policies. On marine deposits, increases in hedgerow density did not always correspond to an increase in their degree of connectivity, suggesting a possible reduction in network quality. On glacial deposits, hedgerow density declined following abandonment of agricultural land, but rather than disappearing, these linear structures were integrated into adjacent brush or forested areas. Our analysis reveals the complex spatial and temporal dynamics of the hedgerow networks and highlights the need to take into account spatial attributes such as connectivity and connection to woodland to evaluate more accurately overall network quality.
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248. **Spatial ecology and habitat selection of breeding male pheasants.**
Leif, A. P.
Wildlife Society Bulletin 33(1): 130-141. (2005)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: dispersal/ habitat selection/ home range/ Phasianus colchicus/ ring-necked pheasant/ survival/ survival/ South Dakota/ Phasianidae

Abstract: In contrast to the management of European pheasants (Phasianus spp.), the spatial dynamics and habitat selection of breeding male ring-necked pheasants (P. colchicus) have received little attention in North America. To evaluate these parameters, I radiomarked 95 male pheasants over 5 years (1997-2001) on 2 study areas in eastern South Dakota. In spring 73% of radiomarked pheasants dispersed and moved an average of 3.2±0.3 km (SE) from wintering sites. Home range sizes of breeding male pheasants were bimodally distributed. One group of male pheasants exhibited localized movements and had relatively small (18.4±0.9 ha) home ranges, whereas a second group was intermittently sedentary and mobile and had relatively large (45.4±2.9 ha) home ranges. Males preferred to establish breeding home ranges in association with idled herbaceous and woody cover. The proportional abundance of woody cover decreased the size of male home ranges, whereas higher proportions of cropland resulted in larger pheasant home ranges. Within home ranges male pheasants preferred woody cover to other available habitats. While subjugated males assumed sedentary, submissive roles in Europe, in South Dakota males sought unoccupied spaces on landscapes to establish territories. Complexes of idled herbaceous and woody cover will maximize the capacity of landscapes to support male pheasant territories.
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249. **Spring burning: Resulting avian abundance and nesting in Kansas CRP.**
Robel, R. J.; Hughes, J. P.; Hull, S. D.; Kemp, K. E.; and Klute, D. S.
Journal of Range Management 51(2): 132-138. (Mar. 1998)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X [JRMGAQ]
Descriptors: fire ecology/ prescribed burning/ brush control/ wild birds/ nests/ Kansas

Abstract: Spring burning is used to control invasion by woody vegetation of rangelands in eastern Kansas and also of Conservation Reserve Program (CRP) fields planted to native grasses. We measured the effects of spring burning of CRP fields on vegetation structure and avian populations in northeastern Kansas during the summers of 1992 through 1995. Several vegetation characteristics differed between burned and unburned CRP fields in May, but few differed in July. Mean avian abundance on burned CRP fields was 5.6 birds km-1 of survey transect, significantly less (P < 0.01) than the 8.6 km-1 on unburned fields. The avian-assemblages on burned and unburned fields differed more in May/June [Morisita's Index to Similarity (MIS) = 0.86] than in June/July or July/August (MIS = 0.98 and 0.97, respectively). Avian species richness ranged from 12 to 21 on burned fields and from 10 to 19 on unburned fields. A total of 27 nests was found on burned fields, significantly less (P < 0.01) than the 372 found on unburned fields. The 22.2% nesting success on burned fields was not significantly different (P = 0.205) than the 34.1% success on unburned fields. Spring burning reduced bird-nest numbers in the summer of the same year, but did not reduce significantly (P = 0.235) the number of nests found in those fields the following summers nor the abundance of birds or nesting success. Avoidance of annual burning would reduce adverse impacts on bird populations relying on CRP fields for nesting habitat.
This citation is from AGRICOLA.

250. **Spring dispersal patterns of red-winged blackbirds, Agelaius phoeniceus, staging in eastern South Dakota.**
Homan, H. J.; Linz, G. M.; Engeman, R. M.; and Penry, L. B.
Canadian Field Naturalist 118(2): 201-209. (2004)
NAL Call #: 410.9 Ot8; ISSN: 00083550
Descriptors: Agelaius phoeniceus/ breeding range/ color-marking/ dispersal patterns/ northern Great Plains/ red-winged blackbird/ spring migration/ sunflower damage/ South Dakota/ Taxidea taxus/ Turdus merula

Abstract: Red-winged Blackbirds (Agelaius phoeniceus) are very abundant summer residents throughout the Prairie Pothole Region of central North America. In late summer they assemble in post-breeding flocks that cause significant amounts of agricultural damage, particularly in sunflower fields near natal sites. In April 2001, we aerially color-marked ~370 000 Red-winged Blackbirds near Badger,

South Dakota (44°48'N, 97°21'W), to determine if migrants staging here were summer residents in sunflower production areas ~ 350 km to the northwest. We measured patterns of migratory dispersal by collecting birds in 54 randomly selected blocks in the northcentral U.S. and the Prairie Provinces of Canada. The marked specimens (n = 33) were categorized into three polygons based on analyses of banding and re-sighting data and proximity to concentrated sunflower production. We estimated that 82% of the migrants that had staged in eastern South Dakota resided within or on the periphery of the sunflower growing area. These birds probably stay near their breeding territories until at least late August and cause early damage to sunflower, which comprises the majority of damage. Resident birds in Alberta and most of Saskatchewan (18%) might arrive too late in the damage season to impact the sunflower crop significantly.
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251. **Stable isotopes provide evidence for poor northern pintail production on the Canadian prairies.**
Hebert, C. E. and Wassenaar, L. I.
Journal of Wildlife Management 69(1): 101-109. (2005)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2005)069 <0101:SIPEFP>2.0.CO;2.
Descriptors: agriculture/ Anas acuta/ Anas platyrhynchos/ cropland/ geographic origin/ landscapes/ mallard/ northern pintail/ stable isotopes/ agricultural practices/ breeding population/ nesting success/ population decline/ population estimation/ stable isotope/ waterfowl/ Alberta/ Canada/ North America/ Saskatchewan/ Aves/ Platyrhynchos
Abstract: Concerns have been raised regarding declines in western North American northern pintail (Anas acuta L.) populations over the past 30 years. Elucidating the natal origins of pintails and identifying production areas of pintails are important steps in determining the cause of the observed declines. Here, we used stable isotope (sulphur, hydrogen, carbon, nitrogen) featherprints to determine the geographic origins of northern pintail ducks shot by hunters in southern Alberta and Saskatchewan, Canada. Based on the best data available for inferring the distribution of breeding pintails, the proportion of hatch-year pintails originating from Prairie regions was small-er than expected. Our results suggest that production of northern pintails on the Canadian Prairies may be significantly lower than predicted by the number of breeding birds and may be related to human-induced reductions in nest success as a result of agricultural practices.
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252. **Stakeholder opinions regarding management of Conservation Reserve Program lands to address environmental and wildlife issues.**
Vandever, Mark W. and Hoag, Dana L.
Human Dimensions of Wildlife 11(2): 147-149. (2006); ISSN: 1087-1209
Descriptors: Conservation Reserve Program/ wildlife/ survey/ environmental benefits/ stakeholders
Abstract: The article presents an abstract for the study Stakeholder Opinions Regarding Management of Conservation Reserve Program Lands to Address Environmental and Wildlife Issues by Mark W. Vandever and Dana L. Hoag.
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253. **Status and management of the greater prairie-chicken Tympanuchus cupido pinnatus in North America.**
Svedarsky, W. D.; Westemeier, R. L.; Robel, R. J.; Gough, S.; and Toepher, J. E.
Wildlife Biology 6(4): 277-284. (Dec. 2000)
NAL Call #: SK351.W663; ISSN: 0909-6396
Descriptors: management/ biogeography/ grasslands/ conservation/ North America/ Tympanuchus cupido pinnatus
Abstract: Greater prairie-chickens Tympanuchus cupido pinnatus are grouse of the tallgrass prairie of North America. Their range expanded greatly following the spread of early European agriculture into the grasslands and logging in forested areas. When the optimum mix of cropland and grass was exceeded, their range generally contracted to the regions where climatic and/or soil factors favoured the retention of grassland. Historically they probably occurred in 20 states of the United States and four Canadian provinces, but presently they only occur in 11 states and no longer in Canada. Their current status throughout the range varies considerably depending on habitat conditions, population levels, management capabilities and local land-use economic factors. A variety of conservation efforts, including translocation, are underway in the states where they occur, the intensity of which is generally inverse to numbers remaining. Noteworthy, is the Conservation Reserve Program (CRP) which has increased grassland cover on private land through incentive payments.
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254. **Strategies for conserving mason bees.**
Stubbs, Constance S. and Drummond, Francis A.
In: Bees and Crop Pollination: Crisis, Crossroads, Conservation/ Stubbs, C. S. and Drummond, F. A.
Lanham, MD: Entomological Society of America, 2001; pp. 95-112.
Notes: 0938522965 (ISBN).
Descriptors: commercial activities/ conservation measures/ associations/ mutualism/ man-made habitat/ land zones/ Osmia: farming and agriculture/ habitat management/ pollination/ Vaccinium angustifolium/ pollinator conservation and agricultural significance/ cultivated land habitat/ Maine/ Insecta, Hymenoptera, Apocrita, Aculeata, Apoidea, Megachilidae/ arthropods/ Hymenopterans/ Insects/ invertebrates
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255. **Structural characteristics of vegetation in CRP fields in northern Missouri and their suitability as bobwhite habitat.**
Burger, Loren W.; Kurzejeski, E.; Dailey, Thomas V.; and Ryan, Mark R.
Transactions of the North American Wildlife and Natural Resource Conference 55: 74-83. (1990)
NAL Call #: 412.9 N814; ISSN: 0078-1355
Descriptors: Galliformes/ Odontophoridae/ Colinus virginianus/ Conservation Reserve Program/ habitat classification/ habitat surveys/ management/ wildlife/ bobwhite/ cultivated farmland/ habitat/ vegetation/ conservation programs/ cover/ habitat management for wildlife/ land, private/ agriculture/ Missouri
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256. **Success of artificial nests in CRP fields, native vegetation, and field borders in southwestern Montana.**
Clawson, M. R. and Rotella, J. J.
Journal of Field Ornithology 69(2): 180-191. (1998)
NAL Call #: 413.8 B534; ISSN: 0273-8570
Descriptors: nests/ survival/ site selection/ environment management/ grasslands/ United States, Montana/ Aves/ birds/ management/ Birds
Abstract: In 1993-1994, we used artificial nests to study relationships between nest success and various spatial, temporal, and vegetation variables in three grassland types: Conservation Reserve Program (CRP) fields, field borders and watercourses, and native vegetation. Nest success was higher and vegetation was structurally more complex in CRP fields than in other grassland types. Nest success was 63% in CRP fields but only 24% in native vegetation. Results of univariate and multivariate analyses indicated that nests surrounded by taller, thicker cover were more likely to survive than nests with less concealing vegetation. Nests initiated later in the season, when vegetation volume was greater, survived at higher rates than nests initiated earlier. Spatial variables were not strongly related to nest success. Field size was directly related to nest success in CRP fields but not in other grassland types. However, field size not included in the most parsimonious, multivariate model of factors related to nest success in CRP fields. Similarly, proximity to field borders was not related to nest success in any grassland type. Our results suggest that CRP fields, which cover a large area in the Northern Great Plains and attract a greater diversity of grassland birds than the cropfields they replaced, provide secure nesting cover for ground-nesting species.
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257. **Summer avian abundance, invertebrate biomass, and forbs in Kansas CRP.**
Hull, Scott D.; Robel, Robert J.; and Kemp, Kenneth E.
Prairie Naturalist 28(1): 1-12. (1996)
NAL Call #: QH540.P7; ISSN: 0091-0376
Descriptors: invertebrate biomass/ Kansas Conservation Reserve Program/ species abundance/ species richness/ terrestrial ecology/ bird/ Aves/ animals/ birds/ chordates/ nonhuman vertebrates/ vertebrates
Abstract: Conservation Reserve Program (CRP) fields planted to native grasses have the potential to provide summer habitat for grassland bird populations in the Great Plains. Forbs in native grasslands are thought to increase the suitability of grasslands for birds. We measured invertebrate biomass (summer food for birds) and avian abundance in Kansas CRP fields planted to native grasses to determine if they were correlated with forb abundance in those fields. Sweep nets were used to collect invertebrate samples and avian abundance was estimated along line transects in six CRP fields from May through August 1992. Correlation analysis did not detect a statistically significant relationship between forb abundance and invertebrate biomass or avian abundance, or between avian abundance and invertebrate biomass. Avian species richness did not vary with forb abundance and the avian community assemblages on CRP fields with low and high forb abundance were similar.
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258. **Summer Meleagris gallopavo silvestris use of a landscape dominated by agriculture and Pinus spp. plantations.**
Morgan, J. J.; Schweitzer, S. H.; and Carroll, J. P.
Southeastern Naturalist 5(4): 637-648. (2006)
NAL Call #: IPSP11706 ; ISSN: 15287092
Descriptors: eastern wild turkey/ turkeys/ Meleagris gallopavo silvestris/ habitat quality/ pine plantations
Abstract: Meleagris gallopavo silvestris (Eastern Wild Turkey) habitat was altered in the Southeast by the introduction of Pinus spp. plantations to agricultural areas through the Conservation Reserve Program. However, the preponderance of M. gallopavo silvestris research has focused on extensive Pinus spp. plantations that lack the cover-type diversity that typifies the Southeast. From May-July 1998 and 1999, we monitored 36 radio-tagged M. gallopavo silvestris in Burke County, GA to investigate habitat use in landscapes intensively managed for agriculture and silviculture. We used compositional analysis to identify habitats selected by male and female M. gallopavo silvestris during summers. Proportions of habitat types within the home range were different from habitats at radio-locations of males and females. Hardwood stands and fields were the most-selected habitat types by M. gallopavo silvestris in the summer. However, within home ranges, males and females also selected closed-canopy Pinus spp. habitats. Hens with broods did not preferentially select planted Pinus spp. habitats, but their use of Pinus spp. stands was greater than use of agricultural fields. The replacement of agricultural fields by closed-canopy Pinus spp. plantations may have improved habitat quality for M. gallopavo silvestris in some areas of the Southeast by diversifying the landscape. Our results suggest that closed-canopy planted Pinus spp. cover types are not detrimental to M. gallopavo silvestris when well distributed with fields and mature hardwood drains.
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259. **A survey of CRP land in Minnesota: I. Legume and grass persistence.**
Jewett, J. G.; Sheaffer, C. C.; Moon, R. D.; Martin, N. P.; Barnes, D. K.; Breitbach, D. D.; and Jordan, N. R.
Journal of Production Agriculture 9(4): 528-534. (Oct. 1996-Dec. 1996)
NAL Call #: S539.5.J68
Descriptors: land policy/ governmental programs and projects/ permanent grasslands/ legumes/ grasses/ soil fertility/ phosphorus/ potassium/ soil pH/ Conservation Reserve Program/ Minnesota/ persistence/ regional surveys/ economics of land development, land reform and utilization/ plant ecology/ soil fertility, fertilizers, and manures
Abstract: This article provides an analysis of the federal Conservation Reserve Program (CRP), which had goals including reduced soil erosion and increased wildlife habitat, funded diversion of land from annual crops into permanent vegetation. The survival of grasses and legumes planted in CRP fields was not known. Our objectives were to assess the persistence and coverage of grasses and legumes in 6- to 8-yr-old CRP fields and to determine changes in soil pH, P, and K levels.
This citation is from AGRICOLA.

260. **Survival and nesting habitat use by Sichuan and ring-necked pheasants released in Ohio.**
Shipley, K. L. and Scott, D. P.
Ohio Journal of Science 106(3): 78-85. (2006)
NAL Call #: 410 Oh3; ISSN: 00300950
Descriptors: ring-necked pheasant/ Sichuan pheasants/ Conservation Reserve Program/ CRP/ nesting habitat
Abstract: Ring-necked pheasant (Phasianus colcbicus) populations in the Midwestern United States have declined drastically since World War II. Population numbers in Ohio have leveled off since the establishment of the Conservation Reserve Program (CRP); however, a return to historically abundant ring-necked pheasant populations is unlikely with current land-use practices. Studies by the Michigan Department of Natural Resources (DNR) of released Sichuan pheasants (P. c. strauchi), a subspecies of the ring-necked pheasant, suggested that Sichuans may nest in woody cover, a trait that could reduce agriculture-related nest losses common to ring-necked pheasants and potentially increase pheasant populations. We released over 2,000 Sichuan pheasants (962 females, 1,116 males) and 208 ring-necked pheasants (24 females, 84 males) in central Ohio, United States, in early April 1993-96. Survival and habitat use before, during, and after the nesting season were evaluated for a sample of hens from each subspecies through the use of radio-telemetry. Survival rates (range = 0.05-0.15) and apparent nest success (38% and 50% for Sichuan and ring-necked nests, respectively) were not different between the subspecies. The largest source of mortality for both subspecies was predation (71.84% and 65.88%, for Sichuan and ring-necked hens, respectively). Most nests, 85% of Sichuan and 81% of ring-necked, were located in upland herbaceous, upland shrub/ scrub, and hay macro-habitat types. Nests of both subspecies were within 16 m of an edge, surrounded by few woody stems (median = 0.25/m^2 and dense herbaceous cover (1,450 and 1,130 stems/m^2, Sichuan and ring-necked nests, respectively). Sichuan hens selected a higher proportion of forbs (37.5% and 15.0%, Sichuan and ring-necked, respectively) and ring-necked hens selected a higher proportion of grass (17.5% and 37.5%, Sichuan and ring-necked, respectively) within 1.0 m^2 of the nest ($P \leq 0.010$). Population survey indices suggested that a self-sustaining Sichuan pheasant population was not established.
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261. **Temporal patterns of bird abundance in cornfield edges during the breeding season.**
Best, L. B.
American Midland Naturalist 146(1): 94-104. (2001)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: abundance/ avifauna/ breeding season/ field margin/ temporal variation/ Iowa
Abstract: Bird abundance in cornfield edges in Iowa was documented from mid-April through early August 1992. During this period the barren, sparsely vegetated fields are transformed into fields with dense plant cover; the availability of food resources (corn and arthropods) also changes. Temporal patterns of bird abundance in cornfield edges differed greatly among species - Some were present in cornfield edges throughout most, if not all, of the study period (e.g., American robin and eastern kingbird), whereas others restricted their use to brief periods. Some were more abundant early in the season (e.g., killdeer and horned lark); others were more abundant later (e.g., black-capped chickadee and indigo bunting). Much of the seasonal change in bird abundance in cornfield edges was attributed to the habitat affinities of the various species and to seasonal shifts in available food resources. Birds that feed on the ground or in low herbaceous vegetation became less abundant later in the season, whereas species that characteristically feed in shrubs or the lower canopy of trees became more numerous. The availability of waste corn on the soil surface, the phenology of the developing crop and the life history stages of major corn insect pests all contribute to the temporal dynamics of bird abundance in cornfields. Also, seasonal patterns of bird abundance in cornfields influence avian risk of exposure to agricultural pesticides. Effective management and conservation of avian communities associated with cornfields require understanding temporal patterns of bird abundance and their implications.
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262. **Tillage differentially affects the capture rate of pitfall traps for three species of carabid beetles.**
Hatten, Timothy D.; Bosque Perez, Nilsa A.; Johnson Maynard, Jodi; and Eigenbrode, Sanford D.
Entomologia Experimentalis et Applicata 124(2): 177-187. (2007); ISSN: 0013-8703
Descriptors: commercial activities/ techniques/ ecological techniques/ reproduction/ sex differences/ man-made habitat/ abiotic factors/ physical factors/ land zones/ Poecilus lucublandus/ Poecilus scitulus/ Pterostichus melanarius: farming and agriculture/ tillage effect on pitfall trap capture rate/ sampling/ pitfall trapping/ capture rate/ effect of tillage/ gender and microclimate/ behavioral sex differences/ pitfall trap capture rate/ cultivated land habitat/ pitfall trap capture rate/ climate and weather/ microclimate/ pitfall trap capture rate relationships/ Humidity/ ground level/ effect on pitfall trap cature rate/ temperature/ Idaho/ Palouse region/ Insecta, Coleoptera, Adephaga, Caraboidea, Carabidae/ arthropods/ beetles/ insects/ invertebrates
Abstract: The influence of tillage, gender, and microclimate on capture rates of pitfall traps for the beetles Poecilus scitulus LeConte, Poecilus lucublandus (Say), and Pterostichus melanarius Illiger (Coleoptera: Carabidae) were assessed in mark-release-recapture experiments in spring pea and spring wheat. Experiments were conducted during June, July, and August of 2003 in the Palouse region of northern Idaho, USA. Rates of capture in pitfall traps for the three carabid species were differentially affected by crop-tillage systems. Capture rates for P. scitulus and R. lucublandus were higher in no-till (NT) than in conventional tillage (CT) peas, whereas capture rates for R scitulus and Pt. melanarius were higher in CT than in NT wheat. Ground-level temperatures and relative humidity (r.h.) differed little among tillage systems. Nevertheless, capture rates were generally positively correlated with ground-level temperature and negatively correlated with r.h., with correlations more often significant in NT than in CT systems. The response of the thermophilic Poecilus spp. to temperature provides a possible mechanistic explanation for capture rate patterns in legumes during June, but not in other months for peas or any month in wheat during the experiments. Movement impedance due to residue could explain lower capture rates of R. scitulus and Pt. melanarius

in NT than in CT spring wheat. These results suggest that researchers using pitfall trapping for carabid populations should take into account potential capture biases their treatments can introduce.
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263. **Use of Conservation Reserve Program fields by greater sage-grouse and other shrubsteppe associated wildlife in Washington.**
Schroeder, M. A. and Vander Haegen, W. M.
Olympia, WA: Washington Department of Fish and Wildlife, 2006. 39 p.
Notes: Published by the Wildlife Program, Science Division, Washington Department of Fish and Wildlife.
http://wdfw.wa.gov/wlm/research/papers/shrub/use_of_crp_fields.pdf
Descriptors: Centrocercus urophasianus/ greater sage grouse/ Conservation Reserve Program/ CRP/ shrubsteppe/ wildlife/ Washington
Abstract: This report examines the use of CRP fields by wildlife in Washington, focusing on the shrubsteppe and grassland species most associated with the historical shrubsteppe habitat. Our focus also is on birds, because this group has received the most research attention in the recent past and includes numerous species of regional and national conservation concern. Our objective was to provide information that might be used to examine the potential of the CRP to aid in the conservation of these species.

264. **Use of no-till winter wheat by nesting ducks in North Dakota.**
Duebbert, H. F. and Kantrud, H. A.
Journal of Soil and Water Conservation 42(1): 50-53. (1987)
NAL Call #: 56.8 J822 ; ISSN: 0022-4561
Descriptors: no-tillage/ Aves/ North Dakota/ nesting/ birds/ habitats
Abstract: Nests of 5 duck species were found: blue-winged teal Anas discors, northern pintail A. acuta, mallard A. platyrhynchos, gadwall A. strepera, and northern shoveler A. clypeata. Average number of nest found was 8/100 ha in 1984 and 6/100 ha in 1985. Nest success for all species averaged 26% in 1984 and 29% in 1985. Predation by mammals was the principal cause of nest destruction. No egg or hen mortality could be attributed to pesticide use. Only 6 of 151 nests (4%) were abandoned during the 2 years. Nests of 7 other ground-nesting bird species were also found. The trend toward increased planting of no-till winter wheat in the prairie pothole region should benefit production of ducks and other ground-nesting birds. -from Authors
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265. **Use of winter food plots by nongame wildlife species.**
Donalty, S.; Henke, S. E.; and Kerr, C. L.
Wildlife Society Bulletin 31(3): 774-778. (2003)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: food plots/ Lagomorphs/ Lepus californicus/ Odocoileus virginianus/ rodents/ Sylvilagus floridanus/ Texas/ white-tailed deer/ exclusion experiment/ food consumption/ habitat management/ habitat use/ wildlife management/ winter/ United States/ Avena sativa/ Lepus californicus/ Odocoileus virginianus/ Sylvilagus floridanus
Abstract: Food plots typically are suggested as a management practice to benefit game species because use by nongame species is considered negligible. We tested this assumption and determined nongame species' use of winter food plots on 6 ranches in southern Texas. We equally divided a total of 144 1-m^3 sites among the ranches and located them randomly within newly planted winter oat (Avena sativa) food plots during December 1996. We built 24 1- m^3 exclosures per food plot to exclude white-tailed deer (Odocoileus virginianus; large-mesh fencing), deer and lagomorphs (medium-mesh fencing), all animals (small-mesh fencing), and no animals (i.e., no exclosures as control plots), respectively. We observed white-tailed deer in each food plot. We observed eastern cottontail rabbits (Sylvilagus floridanus) and black-tailed jackrabbits (Lepus californicus) within the large-mesh fencing exclosures and control plots. We observed 5 species of rodents within each exclosure type except the small-mesh fencing exclosures. We observed no animal or animal signs within the small-mesh fencing exclosures. After 4 months of growth, dry-matter biomass of winter oats differed between exclosure types. The small-mesh exclosures had the greatest biomass (356.9±5.7 g; $\bar{x}$±SE), followed by the medium- and large-mesh exclosures (219.8±13.2 g and 191.7±4.3 g, respectively), and no exclosures (62.3±6.2 g). Using the biomass of oats from the small-mesh exclosures as the potential plant growth, we determined that 46.7%, 9.6%, and 43.7% of the oats consumed were eaten by rodents, lagomorphs, and deer, respectively. Therefore, we attributed the majority of winter food plot consumption to nongame wildlife.
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266. **Using Conservation Reserve Program maps derived from satellite imagery to characterize landscape structure.**
Egbert, S. L.; Park, S.; Price, K. P.; Lee, R. Y.; Wu, J. P.; and Nellis, A. D.
Computers and Electronics in Agriculture 37(1-3): 141-156. (Dec. 2002)
NAL Call #: S494.5.D3C652; ISSN: 0168-1699
Descriptors: remote sensing/ Conservation Reserve Program/ landscape metrics/ wildlife habitat/ Great Plains/ agriculture/ patch size/ Accuracy/ land/ GIS/ Geographic Information systems
Abstract: The Conservation Reserve Program (CRP) instituted one of the largest and most rapid land use/land cover conversions in US history. Approximately 14.8 million ha (36.5 million acres) of cropland were converted to grassland, woodland, and other conservation uses between 1986 and 1995. As policy makers continue to evaluate the future of the program and as scientists examine its effects, it is critical that the impact of CRP on landscape structure be considered because of its potential influence on wildlife populations. Utilizing multi- seasonal Landsat thematic mapper imagery in an unsupervised classification technique, we produced highly accurate maps of cropland and grassland for 1987 and 1992 for Finney County, Kansas. Post-classification differencing identified regions of cropland that had been converted to CRP. We then used the Finney County CRP map to examine changes in landscape structure caused by the introduction of CRP. Using the FRAGSTATS spatial pattern analysis program, we calculated the number of patches, mean patch size, patch density, edge density, mean shape index, nearest neighbor distance, and an interspersion/juxtaposition index.

In addition, we calculated total grassland area and percent of area in grassland for the pre- and post-CRP enrollment years. We found that the total grassland area and the percent area in grassland in Finney County increased due to CRP and that mean grassland patch size also increased. The total number of grassland patches decreased, however, due to coalescence of smaller grassland patches. Patch density, edge density, mean shape index, nearest neighbor distance, and the interspersion/juxtaposition index all showed relatively small changes. These small changes appear to reflect geographic differences in CRP effects within the county-large aggregating patches in the northeast were offset by a number of isolated patches of CRP in other areas. The implication of these findings for wildlife managers is that, for species that require large areas of grassland habitat, especially habitat that is contiguous, CRP in Finney County represents a substantial increase in potential habitat. This holds for species at all levels of management interest. ranging from economically valuable species to species that are rare. threatened, and endangered. These findings emphasize the importance of CRP for wildlife conservation and should further inform ongoing debate concerning the importance of the CRP.
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267. **Using regional wildlife surveys to assess the CRP: Scale and data-quality issues.**
Giudice, J. H. and Haroldson, K. J.
Journal of Field Ornithology 78(2): 140-151. (2007)
NAL Call #: 413.8 B534; ISSN: 02738570.
Notes: doi: 10.1111/j.1557-9263.2007.00097.x.
Descriptors: Conservation Reserve Program/ land use/ Minnesota/ Phasianus colchicus/ ring-necked pheasant
Abstract: Evidence that the Conservation Reserve Program (CRP) has resulted in large-scale increases in populations of grassland birds is limited. Detecting large-scale CRP effects is difficult because agricultural landscapes are complex, dynamic systems where many concurrent changes are occurring across space and time, and CRP is only one of many factors influencing wildlife populations. Trying to isolate and quantify the contribution of CRP to large-scale population changes under these conditions is extremely difficult and tenuous. Data-quality issues affecting many large-scale monitoring programs exacerbate the problem. We use a case study of land-use and pheasant-monitoring data in Minnesota from 1974-1997 to illustrate these problems. In our example, roadside counts of Ring-necked Pheasants (Phasianus colchicus) were correlated positively with percent of CRP grasslands within 1.6 km of survey routes, but the predicted change in mean pheasant counts (pre-CRP vs. CRP) was negative in three of five regions despite the addition of up to 8% CRP grasslands. We also documented concurrent losses (1.8%-6.1% per year) of alternative reproductive habitats that apparently counteracted the positive association between pheasant counts and CRP abundance. These results illustrate the need for a more comprehensive evaluation of Farm Bill effects on wildlife, including commodity provisions that lead to conversion of pasture, hayland, and small grains to row crops. © 2007 Association of Field Ornithologists.
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268. **Valuation of agriculture's multi-site environmental impacts: An application to pheasant hunting.**
Hansen, L.; Feather, P.; and Shank, D.
Agricultural and Resource Economics Review 28(2): 199-207. (1999)
NAL Call #: HD1773.A2N6; ISSN: 1068-2805
Descriptors: land diversion/ environmental impact/ hunting/ consumer surplus/ economic evaluation/ valuation/ pheasants/ United States/ Phasianidae/ Galliformes/ birds/ vertebrates/ Chordata/ animals
Abstract: Pheasant hunting benefits of the US Conservation Reserve Program (CRP) were estimated using a multi-site demand model, a national survey on recreation (1991), and environmental data processed through a geographic information system. Results indicate that pheasant hunting benefits of the CRP were approximately $80 million/year in 1991, in states where the CRP appears most critical to pheasant populations. It is argued that, not only is the resulting evaluation of the CRP's environmental impacts more accurately assessed than through the use of the generalized, supply-demand equilibrium models of previous work, but, more importantly, the environmental benefits of programme acreage can be compared across field locations allowing subtle changes in policy to be assessed and the design and operation of a programme to be optimized.
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269. **The value of buffer habitats for birds in agricultural landscapes.**
Best, L. B.
In: A comprehensive review of Farm Bill contributions to wildlife conservation, 1985-2000/ Heard, L. P; Hohman, W. L.; Halloum, D. J.; and Wildlife Habitat Management Institute (U.S.); Series: Technical Report USDA/NRCS/WHMI.
Madison, MS: USDA, NRCS, Wildlife Habitat Management Institute, 2000; pp. 75-94.
NAL Call #: aS604.6 C66 2000
Descriptors: wildlife habitats/ conservation buffers/ agricultural land

270. **Value of the Conservation Reserve Program to birds in the Texas southern high plains.**
Berthelsen, P. S.
Lubbock, TX: Texas Tech University, 1989.
Notes: M.S. Thesis
Descriptors: Conservation Reserve Program/ State conservation programs/ Texas
Abstract: Examined what habitat type would provide the greatest potential benefit of the CRP to avian wildlife species in the Texas southern high plains.

271. **Variation in spatial distribution and diurnal activity cycles of ground beetles (Coleoptera: Carabidae) encountered in experimental settings for study of sustainability issues.**
Ellsbury, M. M.; French, B. W.; Noble, C.; Head, G.; Fuller, B. W.; and Pikul, J. L.
American Entomologist 51(4): 219-223. (2005)
NAL Call #: QL461.A52; ISSN: 1046-2821.
http://www.entsoc.org/pubs/periodicals/ae/AE-2005/Winter/Ellsbury-et-al.pdf
Descriptors: commercial activities/ behavior/ activity patterns/ circadian activity/ ecology/ man-made habitat/

land zones/ Carabidae: farming and agriculture/ agricultural practices/ diurnal activity/ activity cycle variation/ crop residue/ community structure/ cultivated land habitat/ crop field habitat/ United States/ Insecta, Coleoptera, Adephaga, Caraboidea/ arthropods/ beetles/ insects/ invertebrates
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272. **Vegetation characteristics in seasonal-disked fields and at bobwhite brood locations.**
Carver, A. Vince; Burger, Loren W.; Palmer, William E; and Brennan, Leonard A.
Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies 55: 436-444. (2001)
NAL Call #: SK1.S6; ISSN: 0276-7929
Descriptors: commercial activities/ conservation measures/ man-made habitat/ land zones/ Colinus virginianus: farming and agriculture/ habitat management/ fallow field management for brood habitat improvement/ cultivated land habitat/ Fallow field/ Florida/ Leon County/ Tall timbers Research Station/ Aves, Galliformes, Phasianidae/ birds/ chordates/ vertebrates
Abstract: Disking fallow fields is a management practice commonly used to promote early successional habitats for northern bobwhite (Colinus virginianus) broods. However, effects on habitat value for bobwhite broods from different seasonal timing of disking is poorly understood. We compared vegetation composition and structure among fall-disked fields (N=24), spring-disked fields (N=26) and bobwhite brood locations determined by telemetry (N=22 broods). Both disking treatments produced more bare ground and visual obstruction than brood locations. In a joining cluster analysis based on vegetation structure, neither spring-disked nor fall-disked fields were grouped with broods. Ground coverage in disked fields tended to be dominated by a few species, but plant community composition differed between fall-and spring-disked fields. Spring disking promoted agronomic weed species such as Senna obtusifolia and Crotalaria spectibilis which have little food value to quail. Fall disking promoted important food plants for bobwhite, including Ambrosia artemisiifolia and Rubus spp. Fall-disked fields and broods were grouped serparately from most spring-disked fields in a joining cluster analysis based on vegetation composition. On our study site, use of annually disked fields by broods (N=22) was low (<5% of locations) relative to use of open canopy pine (Pinus spp.) forests (88% of locations). We recommend fall-disking over spring-disking to promote important food plants for bobwhite. However, neither of the disking treatment provided habitat used by broods on our study area.
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273. **Vegetation management practices on Conservation Reserve Program fields to improve northern bobwhite habitat quality.**
Greenfield, K. C.; Burger, L. W.; Chamberlain, M. J.; and Kurzejeski, E. W.
Wildlife Society Bulletin 30(2): 527-538. (Summer 2002)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: agriculture/ CRP/ Colinus Virginianus/ Conservation Reserve Program/northern bobwhite/ RUSLE/ Revised Universal Soil Loss Equation/ Missouri/ wildlife
Abstract: Since 1985, an annual average of more than 14 million ha of very erodible cropland has been removed from production and enrolled in perennial grass practices under the Conservation Reserve Program (CRP). The rate of changes in plant communities on CRP fields can be modified (intentionally or accidentally) by disturbance-management regimes. Throughout the Midwest and Southeast, habitat quality for early successional and grassland species may decline as CRP grasslands age, but premeditated disturbance regimes may enhance and maintain habitat quality for these species. However, concerns regarding perceived conflicts between wildlife habitat and soil erosion objectives of the CRP persist among United States Department of Agriculture (USDA) and Natural Resources Conservation Service (NRCS) personnel. Therefore, we evaluated effects of strip- discing on vegetation structure and composition and soil erosion in tall fescue (Festuca arundiacea) and orchard grass (Dactylis glomerata) CRP fields in Missouri. We interpreted vegetation response in the context of habitat quality for a socially and economically important species, the northern bobwhite quail (Colinus virginianus). Fall discing generally increased percentage bare ground and plant diversity and decreased percentage litter cover and litter depth. However, plant community response and duration of effects differed between fescue and orchard grass fields. Gains in habitat quality in fescue fields were minimal and short-lived, whereas enhancements in orchard grass fields were substantial and longer-lived. Overall, fall discing enhanced bobwhite habitat quality, but responses diminished by the second growing season post-treatment, especially in CRP fields planted to fescue. Soil-loss potential, as estimated by the Revised Universal Soil Loss Equation (RUSLE), was well within USDA tolerable limits for all treatments. Our findings indicated that discing intensity on CRP fields could be increased by 2-3 times without compromising soil erosion provisions of CRP. Therefore, we suggest that strip-discing on a 2- to 3-year rotation should be a permissible and encouraged practice to maintain early succession plant communities on CRP fields in the Midwest and Southeast.
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274. **Vegetation structure and avian species composition in diverted farmland: Evaluation of vegetation structure on CRP lands in northern Missouri/Avian species in diverted farmland.**
Kurzejeski, E. W.
In: Missouri Department of Conservation Annual Report, 1996. 62 p.
Notes: Final Report; Project Number: MO W-013-R-50/Jobs 1&2/Study 1; Unpublished Wildlife Report; 0085-3496 (ISSN).
Descriptors: cultivated farmland/ conservation programs/ vegetation/ birds/ abundance/ reproduction/ grassland/ sampling/ nests and nesting/ population density/ species diversity/ statistics/ Missouri/ Knox County/ Macon County/ Linn County
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275. **Vegetative and invertebrate community characteristics of Conservation Reserve Program fields relative to gamebirds in western Kansas.**
Doxon, E. D. and Carroll, J. P.
American Midland Naturalist 158(2): 243-259. (2007)
NAL Call #: 410 M58; ISSN: 00030031.
Notes: doi: 10.1674/0003-0031(2007)158[243:VAICCO]2.0.CO;2.
Descriptors: invertebrates/ Conservation Reserve Program/ birds/ chicks/ Kansas
Abstract: We examined vegetation and invertebrate characteristics, including insect biomass, insect-prey, six Families and seven Orders in four varieties of Conservation Reserve Program (CP10, improved CP10 CP2 and CP25) and wheat fields in western Kansas during Jun. and Jul., 2004 and 2005 relative to gamebird chick ecology. CP10 fields had less bare ground and forbs compared to the other Conservation Practices and CP25 fields had lost much of their original forb component by the end of the study. Although there was little forb component, CP10 fields had high invertebrate biomass. However, CP10 fields demonstrated sizeable declines in the estimated effect size of examined invertebrate characteristics between sampling periods unlike the other mixes. Unharvested wheat (Triticum aestivum), CP10 and improved CP10 fields had the greatest number of insect-prey. Overall, most fields had adequate insect-prey availability suggesting that in terms of insect availability for gamebird chicks, these fields provide excellent brood feeding opportunities, therefore accessibility and other issues might be more important in determining habitat "quality" for gamebird chicks.
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276. **Waterfowl density on agricultural fields managed to retain water in winter.**
Twedt, D. J. and Nelms, C. O.
Wildlife Society Bulletin 27(4): 924-930. (2000)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: abundance/ agricultural fields/ mallard/ Mississippi Alluvial Valley/ moist-soil/ northern shoveler/ private lands/ rice/ soybean/ waterfowl/ winter-flooding/ agricultural land/ flood/ population density/ water management/ waterfowl/ United States/ Anas platyrhynchos/ Spatula clypeata
Abstract: Managed water on private and public land provides habitat for wintering waterfowl in the Mississippi Valley, where flood control projects have reduced the area of natural flooding. We compared waterfowl densities on rice, soybean, and moist-soil fields under cooperative agreements to retain water from 1 November through 28 February in Arkansas and Mississippi and assessed temporal changes in waterfowl density during winter in 1991-1992 and 1992-1993. Fields flooded earlier in Arkansas, but retained water later in Mississippi. Over winter, waterfowl densities decreased in Arkansas and increased in Mississippi. Densities of waterfowl, including mallard (Anas platyrhynchos), the most abundant species observed, were greatest on moist-soil fields. However, soybean fields had the greatest densities of northern shoveler (Spatula clypeata).
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277. **Waterfowl responses to the Conservation Reserve Program in the Northern Great Plains.**
Reynolds, R. E.
In: A comprehensive review of Farm Bill contributions to wildlife conservation, 1985-2000/ Heard, L. P.; Hohman, W. L.; Halloum, D. J.; and Wildlife Habitat Management Institute (U.S.); Series: Technical Report USDA/NRCS/WHMI.
Madison, MS: USDA, NRCS, Wildlife Habitat Management Institute, 2000; pp. 35-43.
NAL Call #: aS604.6 C66 2000
Descriptors: Conservation Reserve Program/ wetlands/ waterfowl/ wildlife habitats/ wildlife management

278. **Waterfowl use of restored wetlands in CRP in southeastern Wisconsin.**
Halvorsen, Harvey H.
Passenger Pigeon 66(3): 211-221. (2004); ISSN: 0031-2703
Descriptors: conservation measures/ ecology/ habitat/ land zones/ Aves: habitat management/ wetland restoration/ utilization by waterfowl relationship/ habitat utilization/ restored wetlands/ influences/ semiaquatic habitat/ restored wetlands/ habitat utilization by waterfowl/ Wisconsin/ restored wetland utilization by waterfowl/ Aves/ birds/ chordates/ vertebrates
Abstract: In 1992, we surveyed 147 restored wet-lands to determine waterfowl use in South-eastern Wisconsin. Of these, 106 (72%) were between 1 to 4 years old and provided brood-rearing water: Average size of all restorations was 1.6 acres. Emergent wet-land vegetation averaged 39% cover on all wetlands and 49.3% cover on wet-lands with broods. Wetlands were restored by either breaking sub-surface drain tiles, installing water control structures on tile lines, plugging surface drainage ditches, scraping topsoil sediment out of shallow basins, building small earthen dikes, or a combination of these techniques. In this survey, we observed 43 duck broods; brood size averaged 6.3 ducklings. The top 3 species, in decreasing order of abundance, were Mallard (Anas platyrhynchos), Wood Duck (Aix sponsa), and Blue-winged Teal (Anas discors). Duck brood use of the restored wetlands was likely influenced by the proximity of secure nest cover; by the ratio of emergent wet-land plant cover; open water; and the size, shape, and number of the restored wet-lands. CRP containing 80+ acres in grasscombined with four or more restored wet-lands was highly attractive to breeding waterfowl.The Conservation Reserve Program (CRP) provided the impetus for landowners to enroll their active croplands into quality wildlife habitat. The partnering of slate and federal agencies with private landowners contributed to successful development of grassland and wetland habitats for wildlife on former croplands.
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279. **Why haven't pheasant populations in western Kansas increased with CRP?**
Rodgers, Randy D.
Wildlife Society Bulletin 27(3): 654-665. (1999)
NAL Call #: SK357.A1W5; ISSN: 0091-7648.
Notes: Project Number: KS FW-009-P; KS W-039-R.
Descriptors: Galliformes/ Phasianidae/ Phasianus colchicus/ birds/ conservation programs/ Conservation Reserve Program/ ecosystems/ grasslands/ habitat management/ management/ status/ wildlife/ wildlife-habitat

relationships/ phasianus colchicus/ population density/ land management/ federal programs/ Kansas/ natural Resources/ land development, land reform, and utilization (macroeconomics)/ population loss/ food crops/ habitat management for wildlife/ changes detrimental to wildlife/ cultivated farmland/ surveys/ summer/ burning/ pesticides/ habitat changes/ food supply/ private land/ winter/ common pheasant/ ecological requirements/ habitat change/ agriculture/ loss of habitat/ population dynamics/ reserve/ biocide/ vegetation
Abstract: Ring-necked pheasant (Phasianus colchicus) populations in western Kansas declined an average of 65% from 1966-75 to 1986-95, particularly in the 1980s. Although 686,000 ha of Conservation Reserve Program (CRP) grasslands have been added to the western Kansas landscape since 1985, pheasant populations have not recovered. Summer observations suggested that CRP was used proportionally more by pheasant broods than indicated by its relative availability. Overwinter pheasant use of CRP (a habitat gained) averaged just 37% of that in weedy wheat stubble (a habitat being lost). Widespread deterioration of abundant wheat stubble habitats, largely from increased herbicide use, represents an overwhelming habitat loss in western Kansas for which CRP could not compensate. In addition, anticipated pheasant benefits from CRP were not fully realized due to inadequate plant diversity, poor stand maintenance, and large field size. The habitat value of established CRP can be enhanced by strip-disking fireguards around the margins of fields to facilitate occasional controlled burns, stimulate growth of broad-leaved annuals, and increase edge. Interseeding perennial legumes and other forbs into recently burned grass stands also can be effective. Interspersion of grass-legume strips on intensively farmed croplands through the continuous signup of CRP offers great potential to improve pheasant habitat.
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280. **Wildlife and federal cropland retirement programs.**
Berner, A. H.
In: When Conservation Reserve Program contracts expire: The policy options; Ankeny, IA: Soil and Water Conservation Society, 1994.
Descriptors: Conservation Reserve Program/ United States/ cropland/ conservation practices/ conservation programs
Abstract: Reviewed studies of wildlife responses to cropland retirement programs from 1956 to 1984 and discussed the future of cropland retirement programs.

281. **Wildlife and vegetative response to diverted agricultural land in Gratiot County, Michigan.**
Campa, H.; Winterstein, S. R.; Minnis, R. B.; and Pearks, A. J.
In: Michigan Department of Natural Resources: Annual Report, 1995. 50 p.
Notes: Project Number: MI W-127-R.
Descriptors: birds/ blackbirds and cowbirds/ changes detrimental to wildlife/ conservation programs/ cultivated farmland/ cutting/ grassland/ land use/ modeling/ pheasant, ring necked/ productivity/ vegetation/ abundance/ cover/ habitat management/ history/ statistics/ Michigan/ Gratiot County
Abstract: Project is composed of two separate studies. For the first study, vegetation characteristics of Conservation Reserve Program (CRP) fields and the differences in avian relative abundance, diversity, and productivity between CRP and agricultural fields were evaluated. For the second study, effects of various methods of mowing on vegetation characteristics and avian populations were examined, and information was gathered to evaluate habitat suitability index (HSI) models of selected avian species. Both studies provide management recommendations for a diversity of wildlife species on CRP fields.
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282. **Wildlife benefits of the Conservation Reserve Program: A national perspective.**
Allen, A. W.
Land and Water 38: 23-25. (1994)
NAL Call #: HD101.L36
Descriptors: Conservation Reserve Program/ United States/ wildlife habitat/ environmental policy/ watersheds
Abstract: Provided a synopsis of the wildlife benefits of CRP and discussed how the pattern of CRP land distribution within a watershed would influence wildlife.

283. **Wildlife benefits of the Conservation Reserve Program in Ohio.**
Swanson, D. A.; Scott, D. P.; and Risley, D. L.
Journal of Soil and Water Conservation 54(1): 390-394. (1999)
NAL Call #: 56.8 J822 ; ISSN: 0022-4561
Descriptors: wildlife management/ agricultural land/ habitat utilization/ nests/ Ohio/ Aves/ Conservation Reserve Program/ birds/ conservation/ United States
Abstract: Federal agriculture programs significantly impact a variety of wildlife species. Grassland birds, in particular, should benefit from establishment of permanent vegetative cover through conservation initiatives like the Conservation Reserve Program (CRP). Evaluation of current conservation programs is needed to help shape future initiatives and ensure the long-term continuation of beneficial programs. The vegetative and physical characteristics of CRP fields in Ohio were quantified, the timing and extent of disturbances during the nesting season noted, avian use of these habitats measured, and indices of avian use related to field characteristics. It was found that more than half of the sampled fields were disturbed, primarily by mowing, during the nesting season (May to July). These same fields, however, were used by 43 avian species. Use of CRP fields by several grassland-dependent species was related to the amount of grassland habitat provided by the field and/or adjacent grasslands. Age of permanent cover and field size were not related, however, to total species richness. Eliminating disturbance of vegetative cover during the nesting season could significantly add to the wildlife value of these habitats. Policy options that include establishment of larger fields or grassland cover near existing grasslands should positively benefit the widest array of grassland birds.
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284. **Wildlife habitat criteria in relation to future use of CRP lands.**
Allen, A. W.
Proceedings, Great Plains Agricultural Council: 41-88. (1993)
NAL Call #: 282.9 G7992; ISSN: 0434-5835.
Notes: Meeting held June 2-4, 1993, Rapid City, South Dakota. Includes references.
Descriptors: wildlife/ habitats/ land diversion/ selection criteria/ federal programs/ United States/ Conservation Reserve Program
This citation is from AGRICOLA.

285. **Wildlife management on Conservation Reserve Program land: The farmer's view.**
Miller, E. J. and Bromley, P. T.
Journal of Soil and Water Conservation 44(5): 438-440. ill. (Sept. 1989-Oct. 1989)
NAL Call #: 56.8 J822 ; ISSN: 0022-4561 [JSWCA3]
Descriptors: wildlife management/ soil conservation/ natural resources/ farmers' attitudes
This citation is from AGRICOLA.

286. **Wildlife management on Virginia Conservation Reserve Program land: The farmer's view.**
Miller, E. J.
Blacksburg, VA: Virginia Polytechnic Institute and State University, 1989.
Notes: M.S. Thesis
Descriptors: Conservation Reserve Program/ State conservation programs/ Virginia
Abstract: Surveyed land owners/farmers to ascertain their views on the CRP and its implementation.

287. **Wildlife on Conservation Reserve Program lands and native shrubsteppe in Washington.**
Vander Haegen, W. M.; Schroeder, M. A.; Germaine, S. S.; West, S. D.; and Gitzen, R. A.
Olympia, WA: Washington Department of Fish and Wildlife, 2004. 51 p.
Notes: 2004 Progress Report.
http://wdfw.wa.gov/wlm/research/papers/shrub/conservation_reserve_program.pdf
Descriptors: Conservation Reserve Program/ CRP/ habitat restoration/ wildlife/ shrubsteppe/ grassland/ Columbia River Basin/ Washington
Abstract: The Conservation Reserve Program (CRP) is currently the only large-scale effort to restore habitat that may be used by grassland and shrubsteppe wildlife in the Columbia River Basin. Administered by the US Department of Agriculture, this voluntary program pays farmers to take agricultural lands out of production to achieve conservation objectives including reducing soil erosion and providing wildlife habitat. In Washington, over 1 million acres (405,000 ha) of converted farmland has been planted to non-native grasses and to native grasses, forbs and shrubs under the CRP. In 2003 we began a study to evaluate the potential role of CRP in the long-term conservation of obligate grassland and shrubsteppe wildlife in the Columbia River Basin. We established 48 study sites in CRP fields of varying age and landscape contexts and in extant shrubsteppe communities. In 2004, we repeated surveys of birds, herptiles, and small mammals and we examined reproductive parameters of selected bird species. In addition, we characterized the vegetation on all sites and we added two new components to the study: a survey of the mosses and lichens that make up the biological soil crusts and pellet surveys to document use by lagomorphs, deer, and prairie grouse. Plans for 2005 include continued bird and small mammal surveys, pellet sampling, and sampling of the remaining sites for biological soil crusts.

288. **Wildlife response to the Conservation Reserve Program in Minnesota.**
Mueller, JM.; Haroldson, KJ.; Berner, AH; and Kimmel, RO
Summaries of Wildlife Research Findings 1999: 27-30. (2000).
Notes: Minnesota Department of Natural Resources, Division of Fish and Wildlife, Wildlife Populations and Research Unit.
Descriptors: Mammalia/ Aves/ mammals/ birds/ extensive agriculture/ prairies/ Conservation Reserve Program/ wildlife response
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289. **Wildlife responses to the Conservation Reserve Program and other land-use changes in Minnesota.**
Guidice, John H.; Haroldson, Kurt J.; Mueller, Jane M.; Kimmel, R. O.; and Berner, A. H.
Minnesota Department of Natural Resources Summaries of Wildlife Research Findings 2001: 47-68. (2002)
Descriptors: conservation measures/ ecology/ community structure/ population dynamics/ terrestrial habitat/ man-made habitat/ land zones/ Lepus townsendi/ Odocoileus virginianus/ Perdix perdix/ Phasianus colchicus/ Sylvilagus floridanus: habitat management/ national parks and reserves/ relative abundance/ population density/ distribution within habitat/ grasslands/ cultivated land habitat/ Minnesota/ grassland species/ Conservation Reserve Program/ land use changes/ Aves, Galliformes, Phasianidae/ birds/ chordates/ Lagomorphs/ mammals/ ungulates/ vertebrates
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290. **Wildlife responses to the Conservation Reserve Program in the Southeast.**
Burger, W.
In: A comprehensive review of Farm Bill contributions to wildlife conservation, 1985-2000/ Heard, L. P; Hohman, W. L.; Halloum, D. J.; and Wildlife Habitat Management Institute (U.S.); Series: Technical Report USDA-NRCS-WHMI.
Madison, MS: USDA, NRCS, Wildlife Habitat Management Institute, 2000; pp. 55-73.
NAL Call #: aS604.6 C66 2000
Descriptors: Conservation Reserve Program/ wildlife habitats/ wildlife management/ United States, southeastern region

291. **Will conversion of Conservation Reserve Program (CRP) lands to pasture be detrimental for grassland birds in Kansas?**
Klute, David S.; Robel, Robert J.; and Kemp, Kenneth E.
American Midland Naturalist 137(2): 206-212. (1997)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: Ammodramus savannarum/ Bartramia longicauda/ Molothrus ater/ Spiza americana/ Sturnella magna/ agricultural practices/ behavior/ birds/ conservation/ Conservation Reserve Program/ ecosystems/ farmland/ grasslands/ habitat use/ land use/ management/ nest

parasitism/ nests-nesting/ pastures/ productivity/ public relations/ status/ wildlife/ federal programs/ wild birds/ nature conservation/ natural resources/ agricultural economics (general)/ land development, land reform, and utilization (macroeconomics)/ dickcissel/ grasshopper sparrow/ meadowlark/ brown headed cowbird/ upland sandpiper/ Kansas/ Riley County
Abstract: Most Conservation Reserve Program contracts expire in 1997 and approximately 70 per cent of CRP fields in Kansas may be converted into pastures. The authors compared bird use of CRP fields to their use of pastures. Total avian abundance was greater in pastures than on CRP fields. Data on five species using these habitats are provided.
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292. **Winter avian community and sparrow response to field border width.**
Conover, Ross R.; Burger, L. Wes; and Linder, Eric T.
Journal of Wildlife Management 71(6): 1917-1923. (2007)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: conservation measures/ ecology/ man-made habitat/ land zones/ Aves: habitat management/ field border width/ effect on winter community structure/ community structure/ winter community structure/ field border width effects/ cultivated land habitat/ field border width effects on winter community structure/ Mississippi/ Sunflower County/ Aves/ birds/ chordates/ vertebrates
Abstract: Transformations of agricultural practices in the southeastern United States have drastically reduced preexisting quantities of strip-cover habitat along field margins. The National Conservation Buffer Initiative has promoted the establishment of herbaceous field borders to restore wildlife benefits once provided by such habitat. We evaluated effects of native warm-season grass field border establishment and width on winter bird response. Narrow (approx. 8-m) field borders represented a marginal improvement to non-bordered margins that were cropped ditch to ditch, whereas wide (approx. 30-m) borders significantly enhanced total avian conservation value, abundance, species richness, and sparrow abundance compared to non- or narrow borders. Furthermore, presence of wide borders altered bird use of row-crop fields. We observed increased sparrow (Emberizidae) abundances in agricultural fields adjacent to wide borders, which likely resulted from enhanced waste grain foraging opportunities. Given these benefits to wintering farmland birds, we advocate the integration of herbaceous field border habitat in agricultural landscapes, particularly borders of enhanced width.
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293. **Winter bird use of Conservation Reserve Program fields harvested for biomass.**
Murray, Les D. and Best, Louis B.
Journal of the Iowa Academy of Science 113(1-2): 45-48. (2006)
NAL Call #: Q11.J68; ISSN: 0896-8381
Descriptors: conservation/ ecology/ man-made habitat/ land zones/ Aves: conservation measures/ Conservation Reserve Program fields/ habitat utilization/ winter habitat use/ cultivated land habitat/ Iowa/ Appanose/ Lucas/ Monroe and Wayne counties/ Aves, Galliformes, Phasianidae/ birds/ chordates/ vertebrates
Abstract: As Conservation Reserve Program (CRP) contracts expire, many fields may be returned to agricultural production. Growing switchgrass (Panicum virgatum) as a biomass fuel is an alternative to returning fields to rowcrops. CRP fields provide winter cover for birds, but the harvest of biomass Would remove most of the cover and affect bird use of the fields. We estimated winter bird abundances in nonharvested, total-harvested, and partially (strip) harvested switchgrass fields in southern Iowa. Song sparrows (Melospiza melodia) were observed only in strip-harvested fields and ring-necked pheasants (Phasianus colchicus) were observed only in nonharvested fields and uncut areas of strip-harvested fields. American tree sparrows (Spizella arborea) were observed in all three treatments, but abundances were not significantly different among treatments. Tree sparrows, however, were observed more often in uncut strips of strip-harvested fields than in cut strips, with 87% of observations in strip-harvested fields in uncut strips. Abundances in strip-harvested fields were in general higher than abundances in rowcrop and CRP plantings in other studies. Strip-harvested switchgrass fields may be more beneficial in winter than total-harvested fields, rowcrop, or idle CRP fields for some bird species.
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Grazing Lands

294. **Above ground invertebrate responses to land management differences in a central Kansas grassland.**
Jonas, J. L.; Whiles, M. R.; and Charlton, R. E.
Environmental Entomology 31(6): 1142-1152. (2002)
NAL Call #: QL461.E532; ISSN: 0046225X
Descriptors: biological assessment/ Coleoptera/ Indicator species/ Orthoptera/ bioindicator/ biomonitoring/ community response/ community structure/ invertebrate/ land management/ community structure/ macroinvertebrate/ United States/ Andropogon gerardii/ Bromus inermis/ Coleoptera/ Orthoptera
Abstract: This article describes macroinvertebrate communities in a central Kansas grassland that were examined to assess their responses to differences in land management and explore their viability for biological assessment of grasslands. Canopy (drop-trap) and ground-dwelling (pitfall traps) communities were quantitatively sampled from June-September 1998 and 1999. The responses of the whole arthropod community and two focal groups, Coleopteran families and Orthopteran species, to three land use types (brome fields, old fields, and native prairies) were examined. Vegetation analyses reflected clear differences among land use types. Bromus inermis Leyss, an exotic grass, and Andropogon gerardii Vitman, a native grass, dominated brome fields and native prairie sites, respectively. Old fields were composed of a mixture of native and exotic plant species. Coleopteran family richness and diversity were significantly greater in native prairies than brome fields ($P < 0.05$), whereas orthopteran species richness and diversity peaked in brome fields. Diversity and richness of all arthropod groups examined were significantly, positively correlated with plant species

diversity and richness in drop-trap samples (P < 0.05). Coleopteran family diversity and richness in pitfall samples were positively correlated with abundance of native plants, but orthopteran species diversity and richness were negatively correlated with native plant abundance. Coleopteran and orthopteran responses to land use appeared linked to differences in management practices. Whereas coleopterans appeared most influenced by plant community composition, orthopterans showed sensitivity to mechanical disturbance associated with haying on native prairie. Plant and arthropod group diversities were not consistently correlated, demonstrating that arthropod groups can reflect differences in a landscape that may not be apparent from examining plant communities alone.
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295. **Abundance and diversity of small mammals in exotic and reseeded native grasslands at Oakwood Lakes State Park.**
Gardner, Dawn M.; Jensen, Kent C.; Higgins, Kenneth F.; Hansen, Nicole K.; and Huehl, Abbigayil A.
Proceedings of the South Dakota Academy of Science 84: 109-117. (2005)
NAL Call #: 500 So82; ISSN: 0096-378X
Descriptors: conservation measures/ ecology/ community structure/ terrestrial habitat/ land zones/ Mammalia: habitat management/ small taxa/ exotic grasslands/ reseeded grasslands/ relative abundance/ native grasslands/ species diversity/ South Dakota/ Brookings County/ Oakwood Lakes Game Production Area/ Mammalia/ chordates/ mammals/ vertebrates
Abstract: Relative abundance and diversity of small mammal populations in exotic and reseeded native grassland plots were evaluated during the fall of 2004 at West Oakwood Lakes Game Production Area, Brookings County, South Dakota. Exotic grassland plots were defined as areas dominated by smooth brome (Bromus inermis) and Kentucky bluegrass (Poa pratensis). Big bluestem (Andropogon gerardii), Indiangrass (Sorghastrum nutans), and switchgrass (Panicum virgatum) dominated plots defined as reseeded native grassland. A total of 36 small mammals representing six species were captured over 727 operable trap nights in four grassland plots using Museum Special snap traps from 25 September to 1 October 2004. Shrew species (Blarina and Sorex spp.) comprised 57% and 73% of the total small mammal captures in the exotic and reseeded native plots respectively. Based on relative abundance there was significantly greater small mammal abundance in the exotic plots than in the reseeded native plots (x^2 = 35.04, p < 0.0001). Northern short-tailed shrew (Blarina brevicauda) (x^2 = 11.36, p = 0.0008) relative abundance was significantly greater in the reseeded native plots than in the exotic plots, whereas relative abundance of all other species, except the western harvest mouse (Reithrodontomys megalotis), were significantly greater in the exotic plots than in the reseeded native plots. Alpha diversity was significantly greater in the exotic plots than in the reseeded native plots (x^2 = 22.21, p = 0.035). However, Shannon-Wiener Index richness and evenness values were similar in the exotic and reseeded native plots. Our data indicates a higher relative abundance of small mammals and greater within habitat diversity in exotic grasslands than in reseeded native grasslands.
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296. **Adaptive management of prairie grouse: How do we get there?**
Aldridge, C. L.; Boyce, M. S.; and Baydack, R. K.
Wildlife Society Bulletin 32(1): 92-103. (2004)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: adaptive management/ Alberta/ Centrocercus urophasianus/ conservation plans/ grazing/ greater sage-grouse/ habitat/ Manitoba/ policy planning/ prairie sharp-tailed grouse/ Tympanuchus phasianellus/ gamebird/ grassland/ habitat conservation/ prairie/ species conservation/ wildlife management/ Canada/ Manitoba/ North America/ Centrocercus urophasianus/ Tympanuchus phasianellus
Abstract: Managing prairie grouse has been largely a reactive process without any "true" management experiments being implemented, thereby limiting our ability to learn from management and enhance conservation efforts for declining prairie grouse populations. In a few cases where the potential existed for a passive or active adaptive approach, monitoring was insufficient to detect effects of changes in management practices. Similar problems appear to occur at planning stages in attempts to implement adaptive management for prairie grouse populations, preventing proper consideration of sound adaptive experiments that advance learning. Successful adaptive management begins with stakeholder gatherings following a policy planning process, which includes many steps, beginning with goal identification and understanding of uncertainties and culminating in model simulations to understand potential management policies. By following this process, the opportunity to implement successful management experiments can be enhanced. We discuss the successes and failures of prairie grouse management using 2 case studies, 1 for prairie sharp-tailed grouse (Tympanuchus phasianellus) in Manitoba and 1 for greater sage-grouse (Centrocercus urophasianus) in southern Alberta. We describe ways in which active adaptive management could improve our understanding of prairie grouse population declines and outline a policy planning process that, if followed, will allow adaptive management to be successfully implemented, enhancing prairie grouse management and conservation.
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297. **Agricultural and recreational impacts of the Conservation Reserve Program in rural North Dakota, USA.**
Bangsund, D. A.; Hodur, N. M.; and Larry Leistritz, F.
Journal of Environmental Management 71(4): 293-303. (2004)
NAL Call #: HC75.E5J6; ISSN: 03014797.
Notes: doi: 10.1016/j.jenvman.2003.12.017.
Descriptors: economic impacts/ farmland retirement/ rural economies/ Conservation Reserve Program/ North Dakota
Abstract: The Conservation Reserve Program (CRP), created in 1985, provides conservation benefits and agricultural supply control through voluntary, long-term retirement of crop land. While the effects of the CRP on the agricultural sector are well understood, the implications of its conservation benefits for rural economies remain largely undocumented. To quantify the effects on rural economies, this study addressed the net economic effects of decreased agricultural activity and increased recreational activity associated with the CRP in six rural areas of North Dakota from 1996 to 2000. Based on the level of economic activity

that would have occurred in the absence of the program, net revenues from CRP land if returned to agricultural production in the six study areas were estimated at $50.2 million annually or $37 per acre of land currently enrolled in the CRP. Recreational (hunting) revenues as a result of the CRP in the study areas were estimated at $12.8 million annually or $9.45 per CRP-acre. The net economic effect of the CRP (lost agricultural revenues and gains in recreational expenditures) indicated that several areas of the state are not as economically burdened by the CRP as previous research has suggested. In addition, the net economic effects of the program would appear more favourable if revenues from all CRP-based recreation were included. The degree that recreational revenues offset agricultural losses might be further enhanced by enterprises that capitalize on the economic opportunities associated with expanded recreational activities on CRP lands.
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298. **Allocating forage among wild and domestic ungulates: A new approach.**
Johnson, B. K.; Ager, A.; Crim, S. A.; Wisdom, M. J.; Findholt, S. L.; and Sheehy, D.
In: Proceedings of a symposium on sustaining rangeland ecosystems.Eastern Oregon State College, La Grande, Oregon. Edge, W. D. and Olsen-Edge, S. L. (eds.); Vol. Special Report 953.
Corvallis, Ore.: Oregon State University Extension Service; pp. 166-169; 1996.
NAL Call #: 100 Or3M no.953
Descriptors: resource allocation/ stocking rate/ computer software/ simulation models/ geographical information systems/ grazing/ wild animals/ grasslands/ rangelands/ range management/ models/ grazing behavior
Abstract: The allocation of rangeland forage between domestic and wild ungulates is discussed and none of the methods tried are considered satisfactory. The difficulty of combining static and dynamic environmental factors on a seasonal basis to quantify and predict the distribution of ungulates and vegetation is described. A case study is presented using computer-aided spatial analysis models and linear programming formulation to allocate forage among elk (Cervus elaphus), mule deer (Odocoileus hemionus) and cattle. The results were displayed on 3-dimensional computer-generated images to show where forage was removed by each animal species on a monthly basis.
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299. **Altered rangeland ecosystems in the interior Columbia Basin.**
Bunting C. S. C.; Kingery, J. L.; Hemstrom, M. A.; Schroeder, M. A.; Gravenmier, R. A.; and Hann, W. J.
Portland, OR: Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture; General Technical Report-PNW 553, 2002. 67 p.
Notes: 08874840 (ISBN).
http://www.fs.fed.us/pnw/pubs/gtr553/
Descriptors: altered rangelands/ Columbia sharp-tailed grouse/ greater sage grouse/ potential vegetation types/ rangeland ecosystems/ restoration/ environmental disturbance/ habitat restoration/ human activity/ land management/ rangeland/ United States/ Animalia/ cellular organisms/ Centrocercus urophasianus/ Phasianidae/ Salvia/ Tympanuchus phasianellus
Abstract: A workshop was held to address specific questions related to altered rangeland ecosystems within the interior Columbia Basin. Focus was primarily on public lands administered by the Forest Service and Bureau of Land Management. Altered ecosystems were considered to be those where human-induced or natural disturbances are of sufficient magnitude to affect ecosystem processes, causing long-term loss or displacement of native community types and loss of productivity, making it difficult or impossible to restore these ecosystems to historical conditions. Seventeen rangeland potential vegetation types (PVT) were indentified by the Interior Columbia Basin Ecosystem Management Project and briefly described. Reasons that rangeland ecosystems are altered include presence of invasive species, uncharacteristic grazing effects, climatic change, change in fire regime, and other factors related to human presence. However, primary causes of alteration and restoration potential differ among PVTs. Some altered rangeland ecosystems may be restored by stabilizing ecosystem processes, restoring native plant communities, reducing the spread of invasive species, or conserving existing biota. In some altered conditions, these options have a relatively high probability of success over the short term with low to moderate cost at the site scale. However, in other altered areas, restoration options are expensive, have a low probability of success, and require long timeframes. Restoration of rangeland PVTs is also necessary for the survival of some animal species whose populations are in decline such as the Columbian sharp-tailed grouse and greater sage grouse.
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300. **An annotated bibliography on the interaction of range management (livestock grazing, brush management and prescribed burning) or nonmanagement with wildlife habitat and wildlife.**
Kozicky, Edward L.; Fulbright, Timothy E.; and Texas Fisheries and Wildlife Division, Wildlife Section
Austin, Tex.: Texas Parks and Wildlife Dept., 1991. 293 p.
Notes: Meeting abstract.
NAL Call #: SF85.K69 1991
Descriptors: fires-burns/ grazing/ habitat alterations/ habitat management/ range management/ wildlife/ wildlife management/ range ecology/ wildlife habitat improvement/ natural resources
© NISC

301. **Ant biodiversity in semiarid landscape mosaics: The consequences of grazing vs. natural heterogeneity.**
Bestelmeyer, Brandon T. and Wiens, John A.
Ecological Applications 11(4): 1123-1140. (2001)
NAL Call #: QH540.E23; ISSN: 1051-0761
Descriptors: commercial activities/ conservation measures/ land and freshwater zones/ Formicidae: farming and agriculture/ grazing/ habitat management/ community structure/ arid rangelands/ Colorado/ New Mexico/ terrestrial habitat/ Weld County, Colorado/ Dona Ana County, New Mexico/ Socorro County, New Mexico/ vegetation structure/ Formicidae/ Formicoidea, Aculeata, Apocrita, Hymenoptera, Insecta/ arthropods/ hymenopterans/ insects/ invertebrates

Abstract: The conservation of biodiversity in landscape mosaics requires an understanding of the impacts of human land use within mosaic elements and an evaluation of the biological uniqueness of different elements. We address these issues by examining patterns of ant diversity in three semiarid rangeland landscapes used predominantly for grazing. These landscapes lie along a regional gradient from shortgrass steppe through a transitional zone to desert grassland, along which climate and ant species composition vary. Within each landscape, we compared the effects of grazing and natural variation in soils and vegetation on ant diversity and community composition. Grazing had little effect on ant richness, diversity, or composition at the transitional zone or the desert grassland site, but ungrazed areas at the shortgrass steppe site had a higher overall richness and favored the abundance of some species. Some samples of saltbush (Atriplex canescens) shrubland were similar to ungrazed samples in richness and species composition. In both the transitional zone and the desert grassland, creosotebush (Larrea tridentata)-dominated habitats harbored comparatively species-rich and distinct ant communities. In addition, mesquite (Prosopis glandulosa) coppice dunes at the desert grassland site favored the abundance of several species that were rare across the site. Canonical correspondence analysis revealed that variation in soil strength and texture best explained community variation at the shortgrass steppe site, whereas soil texture and associated differences in shrub density best explained differences in composition at the transitional and desert grassland sites. The characterization of habitats based upon vegetation classification did not adequately reflect environmental variation that was important to ants in shortgrass steppe, but reflected important soil textural variation in the transitional and desert grassland sites. These results suggest that ant conservation in these semiarid rangelands should emphasize patterns of variation in soil properties. The results add to a growing consensus that a variety of variables determined by the responses of several focal taxa may be needed to characterize biodiversity patterns.
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302. **Aplomado falcons and grazing: Invoking history to plan restoration.**
Truett, Joe C.
Southwestern Naturalist 47(3): 379-400. (2002)
NAL Call #: 409.6 So8 ; ISSN: 0038-4909
Descriptors: Cynomys ludovicianus/ Sciuridae/ Rodentia/ Falco femoralis septentrionalis/ Falconiformes/ Falconidae/ wildlife management/ grazing/ grazing management/ prey biomass/ Arizona/ farming and agriculture/ food supply/ grasslands/ ecosystems/ New Mexico/ stocking-transplanting/ techniques/ Southeast/ Southwest/ wildlife-human relationships/ commercial enterprises/ conservation/ wildlife management/ disturbances/ land zones/ nutrition/ Aplomado falcon/ black-tailed prairie dog/ extermination-endanger/ habitat management/ brood-egg/ agriculture/ prairie/ historic/ food/ ecological requirements/ northern Aplomado falcon/ black-tailed prairie dog
Abstract: The federally endangered northern aplomado falcon (Falco femoralis septentrionalis) disappeared as a breeder from its historic nesting range in the southwestern United States in the early to middle 1900s. Since 1995, a small breeding population has been restored to former range in South Texas grasslands, and interest has escalated in restoring the bird to northern Chihuahuan Desert grasslands in southeastern Arizona and southwestern New Mexico. In these latter areas, intensive livestock grazing and associated shrub (brush) encroachment have been theorized to have contributed importantly to the bird's demise, and thus grazing management has been identified as an important restoration issue. A review of the bird's abundance in the context of the grazing history of these areas suggests it was common when grazing, both by livestock and black-tailed prairie dogs (Cynomys ludovicianus), was intense and widespread (1880s-1920s) in the bird's habitat. It declined in abundance and disappeared coincident with declines in livestock abundance and the extirpation of prairie dogs (1930s-1940s). Most locations where observers historically encountered the bird had little brush at the time of its demise. In the Chihuahuan Desert grasslands of Arizona, New Mexico, and West Texas where the bird occurred historically, the avian prey base is presently an order of magnitude or more lower than that in higher-rainfall habitats of the bird in eastern Mexico and South Texas. The avian prey base is similarly depauperate where 2 small populations of aplomado falcon exist in Mexico's northern Chihuahuan Desert, and the bird's reproductive success there is lower than that in eastern Mexico. The historic extirpation of prairie dogs caused a reduction in the prey biomass available to diurnally feeding raptors such as the aplomado falcon. Efforts to restore the falcon to Chihuahuan Desert grasslands in the United States ideally should include monitoring the responses of released birds to levels of grazing, to shrub abundance, to prey abundance, and to black-tailed prairie dog colonies should any exist in release areas.
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303. **Application of the fire-grazing interaction to restore a shifting mosaic on tallgrass prairie.**
Fuhlendorf, S. D. and Engle, D. M.
Journal of Applied Ecology 41(4): 604-614. (2004)
NAL Call #: 410 J828; ISSN: 0021-8901
Descriptors: Bos bison/ Bovidae/ Artiodactyla/ conservation/ terrestrial ecology/ ecosystem management/ fire-grazing interaction
Abstract: 1. Management of rangelands has long operated under the paradigm of minimizing spatially discrete disturbances, often under the objective of reducing inherent heterogeneity within managed ecosystems. Management of grazing animals has focused on uniform distribution of disturbance, so that no areas are heavily disturbed or undisturbed (i.e. management to the 'middle'). 2. A model of the fire-grazing interaction argues that grazing and fire interact through a series of positive and negative feedbacks to cause a shifting mosaic of vegetation pattern across the landscape. This interaction was important in the evolution of species in the North American Great Plains grasslands. This approach has the potential to serve as an ecological-based model for management of grasslands with a long evolutionary history of grazing. 3. We compared a heterogeneity-based approach, in which fire is applied to discrete patches, with typical homogeneity-based land management in the North American Great Plains, to determine if patch burning followed by focal grazing creates a shifting mosaic pattern of vegetation structure and composition. 4. Our data suggest that spatially discrete fires promote focal grazing, where grazing animals devote 75%

of grazing time within the one-third of the area that has been burned within the past year. These focal disturbances cause local changes in the plant community and increase patch-level heterogeneity across landscapes. As the focal disturbance is shifted to other patches over time, successional processes lead to changes in local plant communities and the patchwork landscape can be described as a shifting mosaic. 5. A patch-dynamic approach can be accomplished in the tallgrass prairie through applying spatially discrete fires and allowing animals free access to a diversity of landscape elements that vary in time since focal disturbance. This increases heterogeneity across the landscape, a variable that has been shown to be critical to some wildlife species as well as the structure and function of grassland ecosystems. 6. Synthesis and applications. Our study demonstrates that the fire-grazing model may be useful for generating heterogeneity in grassland management. Discrete fires are applied to patches, and patchy grazing by herbivores promotes a shifting vegetation mosaic across the landscape. Furthermore, application of the model has the potential of increasing the area of rangelands under management for conservation purposes, because livestock production is maintained at a level similar to traditional management. So, by managing transient focal patches that move through the landscape, heterogeneity has the potential to be a central paradigm for managing landscapes for multiple objectives, such as biodiversity and agricultural productivity.
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304. **Are prescribed fires endangering the endangered Silphium borer moth (Papaipema silphii)?**
Andrew, Carrie and Leach, Mark K.
Ecological Restoration 24(4): 231-235. (2006);
ISSN: 1522-4740
Descriptors: conservation measures/ ecology/ population dynamics/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Papaipema silphii: habitat management/ prescribed burning/ endangered status/ population density/ prescribed burning effects/ prairie/ grassland/ prairie habitat/ fire/ Wisconsin/ Insecta, Lepidoptera, Glossata, Heteroneura, Noctuoidea, Noctuidae/ arthropods/ insects/ invertebrates/ Lepidopterans
Abstract: The silphium borer moth (Papaipema silphii), a rare endemic insect in midwestern prairies, completes one life cycle per year and has a short dispersal distance. The moth eggs are presumably laid in the duff near host Silphium plants. Silphium species distributions are primarily restricted to fragmented prairie patches, commonly in upland habitats that can burn more intensely than lowland patches. Thus, these moths must cope with existence in a fire-prone environment. Currently, there is controversy regarding how prescribed fire affects the sustainability of prairie invertebrate populations. We counted larval densities of silphium borer moths within thirty-four 0.1-ha plots in three isolated southern Wisconsin prairies with different burn patterns. The median density of larvae was significantly lower in the rotationally burned prairie than in one of the prairies that has been repeatedly burned edge-to-edge. Larval densities did not differ significantly between recently burned and recently unburned plots. These findings suggest that prescribed fires are not endangering the silphium borer moth, regardless of burn method, at least at these three sites. However, more studies at more locations are needed. We still recommend burning only two-thirds of isolated prairies every year.
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305. **Assemblages of breeding birds as indicators of grassland condition.**
Browder, S. F.; Johnson, D. H.; and Ball, I. J.
Ecological Indicators 2(3): 257-270. (2002);
ISSN: 1470160X.
Notes: doi: 10.1016/S1470-160X(02)00060-2.
Descriptors: grassland birds/ North Dakota/ northern Great Plains/ point counts/ Prairie Pothole Region/ aerial photography/ biodiversity/ environmental impact/ vegetation/ wetlands/ breeding birds/ ecology/ avifauna/ bioindicator/ breeding population/ grassland/ habitat type/ index of biotic integrity/ United States
Abstract: We developed a measure of biological integrity for grasslands (GI) based on the most influential habitat types in the Prairie Pothole Region of North Dakota. GI is based on proportions of habitat types and the relationships of these habitat types to breeding birds. Habitat types were identified by digital aerial photography, verified on the ground, and quantified using GIS, We then developed an index to GI based on the presence or abundance of breeding bird species. Species abundance data were obtained from 3 min roadside point counts at 889 points in 44, 4050 ha study plots over a 2-year period. Using a modified North American Breeding Bird Survey protocol, species were recorded in each of four quadrants at each point. Fifty species selected for analysis included all grassland species that occurred in at least 15 quadrants and all other bird species that occurred in at least 1 % of quadrants. We constructed preliminary models using data from each of the 2 years, then tested their predictive ability by cross-validation with data from the other year. These cross-validation tests indicated that the index consistently predicted grassland integrity. The final four models (presence and abundance models at 200 and 400 m scales) included only those species that were statistically significant ($P \leq 0.05$) in all preliminary models. Finally, we interpreted the components of the indices by examining associations between individual species and habitat types. Logistic regression identified 386 statistically significant relationships between species and habitat types at 200 and 400m scales. This method, though labor-intensive, successfully uses the presence of grassland-dependent species and absence of species associated with woody vegetation or cropland to provide an index to grassland integrity. Once regional associations of species with habitat types have been identified, such indices can be applied relatively inexpensively to monitor grassland integrity over large geographic areas. Indices like the ones presented here could be applied widely using bird abundance data that are currently being collected across the United States and southern Canada through the North American Breeding Bird Survey.
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306. **Assessing grassland restoration success: Relative roles of seed additions and native ungulate activities.**
Martin, Leanne M. and Wilsey, Brian J.
Journal of Applied Ecology 43(6): 1098-1109. (2006)
NAL Call #: 410 J828; ISSN: 0021-8901
Descriptors: Artiodactyla/ Bovidae/ Cervidae/ Bos bison/ Cervus elaphus/ Bison bison/ Cervus canadensis/ habitat use/ grasslands/ ecosystems/ grassland restoration/ wildlife-habitat relationships/ Iowa/ Jasper County, Walnut Creek watershed/ land zones/ native ungulate activity/ seed/ seed addition/ seedling emergence/ tallgrass prairie restoration/ diversity/ grazing/ net primary productivity/ tallgrass prairie/ bison/ wapiti/ habitat management/ vegetation/ ethology/ food/ experiment/ fence/ productivity
Abstract: 1. Grassland restorations often lack rare forb and grass species that are found in intact grasslands. The possible reasons for low diversity include seed limitation, microsite limitation and a combination of both. Native ungulates may create microsites for seedling establishment in tallgrass prairie restorations by grazing dominant species or through trampling activities, but this has never been tested in developing prairies. 2. We experimentally tested for seed and microsite limitation in the largest tallgrass prairie restoration in the USA by adding rare forb and grass seeds in two trials inside and outside native ungulate exclosures. We measured seedling emergence because this stage is crucial in recruiting species into a community. We also measured light, water and standing crop biomass to test whether resource availability could help to explain seedling emergence rates. 3. Ungulates increased light availability for each sampling time and also increased above-ground net primary productivity (ANPP) during summer. 4. Seedling emergence of rare prairie forbs and grasses was consistently greater when we added seeds. 5. Seedling emergence was conditionally greater with a combination of seed additions and grazing, but grazing alone was unable to increase emergence. 6. When ungulates increased seedling enhancement, the mechanism was partially associated with increased water and light availability. 7. Exotic and cosmopolitan weed seedling emergence was not affected by grazing. 8. Synthesis and applications. These results suggest that tallgrass prairie restorations are primarily seed limited and that grazing alone may not be able to increase seedling emergence of rare species without the addition of seeds. Therefore, adding seeds to grassland restorations may increase seedling emergence of rare species, and mimicking effects of grazing may increase emergence when seeds are added.
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307. **Assessment of grassland ecosystem conditions in the southwestern United States: Wildlife and fish.**
Finch, Deborah M.
Provo, UT: Rocky Mountain Research Station, Forest Service, U.S. Department of Agriculture; General Technical Report-RMRS 135, 2005. 168 p.
Notes: Volume 2.
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Pisces: habitat management/ ecology/ freshwater habitat/ United States, southwest/ Pisces/ chordates/ fish/ vertebrates
Abstract: This report is volume 2 of a two-volume ecological assessment of grassland ecosystems in the Southwestern United States. Broad-scale assessments are syntheses of current scientific knowledge, including a description of uncertainties and assumptions, to provide a characterization and comprehensive description of ecological, social, and economic components within an assessment area. Volume 1 of this assessment focused on the ecology, types, conditions, and management practices of Southwestern grasslands. Volume 2 (this volume) describes wildlife and fish species, their habitat requirements, and species-specific management concerns, in Southwestern grasslands. This assessment is regional in scale and pertains primarily to lands administered by the Southwestern Region of the USDA Forest Service (Arizona, New Mexico, western Texas, and western Oklahoma). A primary purpose of volume 1 is to provide information to employees of the National Forest System for managing grassland ecosystems and landscapes, both at the Forest Plan level for Plan amendments and revisions, and at the project level to place site-specific activities within the larger framework. This volume should also be useful to State, municipal, and other Federal agencies, and to private landowners that manage grasslands in the Southwestern United States.
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308. **Assessment of native species and ungulate grazing in the southwest: Terrestrial wildlife.**
Zwartjes, P. W.; Cartron, J. L. E.; Stoleson, P. L. L.; Haussamen, W. C.; and Crane, T. E.
Provo, UT: Rocky Mountain Research Station, Forest Service, U.S. Department of Agriculture; General Technical Report-RMRS 142, 2005. 78 p.
Notes: 02775786 (ISSN).
Descriptors: Arizona/ grazing effects/ New Mexico/ range management/ terrestrial wildlife/ ungulate grazing/ wildlife management
Abstract: Range managers in the Southwestern States are increasingly being required to develop management strategies that take into consideration the conservation of wildlife populations. However, information on many aspects of the fundamental biology and impacts of grazing on individual species is still lacking in the scientific and government literature. This report documents a project designed to assemble this information for terrestrial wildlife in Arizona and New Mexico that have the potential to be negatively impacted by grazing or range management practices. To achieve this, a two-stage panel process was developed that employed a variety of wildlife experts to create a list of potentially vulnerable species and to develop an informational database. Panelists first reviewed and assessed all terrestrial vertebrates in the region to develop an initial list. In the second stage, the panelists refined the list, reviewed published information drafted into individual species accounts, and then augmented these accounts with information from their own experience and observations. The resulting database contains accounts for 305 species and subspecies of amphibians, reptiles, birds and mammals, including a computer database that allows managers to search and query the species accounts based on geographic distribution as well as shared ecological and life history characteristics.
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309. **Associations of grassland birds with landscape factors in southern Wisconsin.**
Ribic, C. A. and Sample, D. W.
American Midland Naturalist 146(1): 105-121. (2001)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: avifauna/ density/ grassland/ habitat type/ United States/ Ammodramus savannarum/ Dolichonyx oryzivorus/ Passerculus sandwichensis/ Sturnella magna
Abstract: We investigated the association of grassland birds with field- and landscape-level habitat variables in south-central Wisconsin during 1985-1987. Landscape-level variables were measured and digitized at 200, 400 and 800 m from the perimeter of 38 200 m × 100 m strip transects. A mixture of field and landscape variables was associated with the density of savannah sparrow (Passerculus sandwichensis) and grasshopper sparrow (Ammodramus savannarum). Only landscape variables were associated with the density of bobolink (Dolichonyx oryzivorus), eastern meadowlark (Sturnella magna) and all birds that were grassland species of management concern. Field size was not an important predictor of bird density. Cover-type diversity of the surrounding area was commonly selected in the models for three species and all birds that were grassland species of management concern. Higher bird densities in the transects were associated with landscapes where the cover types were less diverse. Landscapes with low cover type diversity were dominated by grassland, pasture and hay. Field habitat, mean patch size of cover types and distance to woody vegetation were the next most common predictors of avian density. The density of some grassland birds increased as nonlinear woody features such as woodlots and shrub carrs decreased in patch size, decreased in total amount in the landscape and increased in distance from a transect. However, density of other species was positively associated with linear woody features such as the total amount and nearness of hedgerows. The composition of the surrounding landscape, at least out to 800 m, is important in grassland bird management.
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310. **Assuring the future of prairie grouse: Dogmas, demagogues, and getting outside the box.**
Applegate, R. D.; Williams, C. K.; and Manes, R. R.
Wildlife Society Bulletin 32(1): 104-111. (2004)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: dogma/ planning/ policy/ prairie grouse/ research/ Tympanuchus spp./ gamebird/ grassland/ policy development/ prairie/ species conservation/ wildlife management/ North America/ Tympanuchus
Abstract: We discuss the necessity of a paradigm shift among managers toward dealing with the recovery and management of prairie grouse (Tympanuchus spp). To assure the future of these species, we will need to test dogmatic assumptions about grouse and their management and challenge the demagogues who insist on perpetuating untested "principles." Tolerance for descriptive and qualitative studies is needed. Additionally, managers will need to remove themselves from the box and embrace landowners, theoretical biologists, economists, human-dimensions researchers, marketing and advertising specialists, and many other professionals outside the normal sphere of wildlife management. There is crucial need for a willingness to devise, test, and apply innovative ideas that are not normally considered in the management of grouse species, especially applying management to large areas within ecosystems. A comprehensive plan is needed to guide rangewide prairie grouse management. Planned management systems are needed to provide operational guidance in implementing species plans.
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311. **Attitudes of Vermont dairy farmers regarding adoption of management practices for grassland songbirds.**
Troy, A. B.; Strong, A. M.; Bosworth, S. C.; Donovan, T. M.; Buckley, N. J.; and Wilson, M. L.
Wildlife Society Bulletin 33(2): 528-538. (2005)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: agricultural management practices/ attitudinal surveys/ Champlain Valley/ dairy farms/ forage crops/ grassland songbirds/ hayfields/ agricultural management/ dairy farming/ environmental management/ farmers attitude/ management practices/ songbirds/ Vermont/ Aves/ Passeri
Abstract: In the northeastern United States, most populations of grassland songbirds occur on private lands. However, little information exists about the attitudes of farmers toward habitat management for this guild. To address this information gap, we surveyed 131 dairy farmers in Vermont's Champlain Valley to assess current hayfield management practices and farmers' willingness to adopt more "bird-friendly" practices. Our results showed a clear trend toward earlier and more frequent hayfield cuts. Farmers indicated they have little flexibility to alter the timing of their cuts on most of their land. However, many farmers (49%) indicated a willingness to adopt alternative management practices on at least a small portion of their land. Combined with the fact that many farmers characterized parts of their land as "wasteland," or economically unproductive land, this result suggests that some leeway exists for increasing songbird habitat quality on at least portions of dairy farms. Although significant differences existed in the amount of land for which farmers were willing to adopt alternative management based on herd size, acreage, and experience, the directionality of these relationships could not be established except tentatively for herd size, in which case it appeared that farmers with smaller herds were more likely to dedicate a greater percentage of their land to alternative management. The results of this study likely have relevance to dairy farms throughout the northern-tier dairy states. Given the increasing trend for agricultural land to be converted into housing, we recommend that extension and education efforts target farmers with large hayfield acreages, encouraging the maintenance of high-quality habitat for grassland songbirds.
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312. **Avian community responses to fire, grazing, and drought in the tallgrass prairie.**
Zimmerman, John L.
In: Ecology and conservation of Great Plains vertebrates/ Knopf, Fritz L. and Samson, Fred B.; Series: Ecological Studies 125.
New York: Springer-Verlag, 1997; pp. 167-180.

Notes: ISBN 0387948023; ISSN 0070-8356.
NAL Call #: QH540.E288 v.125
Descriptors: conservation/ drought/ fire/ forest fragment/ grazing/ Great Plains/ tallgrass prairie/ terrestrial ecology
© Thomson Reuters Scientific

313. **Avian community structure among restored riparian habitats in northwestern Mississippi.**
Smiley, Peter C.; Maul, Jonathan D.; and Cooper, Charles M.
Agriculture, Ecosystems and Environment 122(2): 149-156. (2007)
NAL Call #: S601.A34; ISSN: 0167-8809
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Aves: habitat management/ restored riparian habitat/ community structure/ riparian habitat/ community structure in restored habitat/ Mississippi/ Yazoo River watershed/ community structure among restored riparian habitat/ Aves/ birds/ chordates/ vertebrates
Abstract: Riparian zones and agricultural fields adjacent to incised streams in northwestern Mississippi are impacted by gully erosion initiated by runoff flowing over unstable streambanks. Currently, installation of erosion control structures (drop pipes) at the riparian zone-agricultural field interface halts gully erosion and simultaneously establishes one of four riparian habitat types. Avian communities were compared among four types of restored habitats and among four seasonal periods in northwestern Mississippi from June 1994 to May 1996. Fifty-seven species were observed among riparian habitats, of which 49% were neotropical migrants. Habitat type and season significantly affected species richness, abundance, and diversity. Species richness, abundance, and diversity increased as habitat area, pool volume, and vertical structure of woody vegetation increased among riparian habitat types. Additionally, species richness, abundance, and diversity increased during spring and fall. The influence of habitat type on avian species richness, abundance, and diversity did not differ among seasons. Present drop pipe installation practices focus on erosion control without consideration of habitat creation. Installation practices can be altered to more effectively incorporate habitat creation to provide the greatest ecological benefits for avian communities within impacted riparian zones. Published by Elsevier B.V.
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314. **Avian nest success in relation to past grazing regimes in a montane riparian system.**
Ammon, Elisabeth and Stacey, Peter B.
Condor 99(1): 7-13. (1997)
NAL Call #: QL671.C6; ISSN: 0010-5422
Descriptors: livestock grazing regime/ montane riparian system/ nest predation rates/ nest success/ terrestrial ecology/ vegetation composition/ vegetation structure
Abstract: One possible link between livestock grazing and bird population declines is variation in nest predation rates. To explore this possibility we documented vegetational differences in a montane riparian community subdivided by a fence, one side of which traditionally has been summer-grazed, and the other side rested from grazing for 30 years. We found that ground vegetation was more abundant, willows (Salix spp.) less abundant, and vertical vegetational diversity was lower on the grazed relative to the rested side. Predation rates on real nests were higher on the grazed side compared to the rested side. Artificial nests were placed (1) in mixed conifer vegetation to mimic the most common nest types currently present in the riparian zone, (2) in streamside willows that differed in abundance across the fence, and (3) in old-willow remnants distant from the stream, which were equally abundant on both sides of the fence. All artificial above-ground nests, and ground nests in the old-willow experiment, suffered greater predation rates on the grazed compared to the rested side. Thus, livestock grazing may not only affect availability of nesting substrates for riparian birds by reducing streamside vegetation, but could influence bird populations by facilitating nest predation, possibly by increasing detectability of nests or through changes in predator assemblage.
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315. **Avian reproductive success in restored grasslands: Measuring the success of a restoration effort.**
Dunning, John B.; Wee, Bryan; and Houston, Alexandra.
In: 87th Annual Meeting of the Ecological Society of America and the 14th Annual International Conference of the Society for Ecological Restoration, Tucson, Arizona, USA; August 04-09, 2002.; Vol. 87.; pp. 344; 2002.
Descriptors: reproduction/ terrestrial ecology: ecology, environmental sciences/ wildlife management: conservation/ avian reproductive success/ breeding success/ grassland restoration effort success
© Thomson Reuters Scientific

316. **Avian response to landscape change in fragmented southen Great Plains grasslands.**
Coppedge, Bryan R.; Engle, David M.; Masters, Ronald E.; and Gregory, Mark S.
Ecological Applications 11(1): 47-59. (2001)
NAL Call #: QH540.E23 ; ISSN: 1051-0761
Descriptors: bird communities/ neotropical migrant species/ conservation/ aerial photography/ Juniperus spp/ plains/ prairies/ agricultural conservation programs
Abstract: We examined the dynamics of avian communities associated with fragmented grasslands in Oklahoma USA, using long-term (1965-1995) raw (stop-level) data from the Breeding Bird Survey (BBS). Aerial photography was used to document changes in land cover type and landscape pattern as affected by woody plant (mostly Juniperus virginiana L.) encroachment and concurrent cropland conversions to agricultural grassland under the Conservation Reserve Program (CRP). Rank trend analysis identified species with significant population trends, and canonical correspondence analysis (CCA) was used to identify important environmental gradients froma group of descriptive habitat variables that included land cover type composition and indices of vegetation cover, landscape pattern, and grassland patch structure. Avian community structure shifted along gradients of increasing woody plant cover and indicators of continuing landscape fragmentation. Open-habitat generalists, woodland, and successional scrub species generally increased, whereas many grassland species decreased. In some instances, neotropical migrants responded positively to increasing woody vegetation. Some grassland birds also showed a positive response to increases in agricultural grassland, but only in areas of severe juniper encroachment. Most grassland species exhibited consistent declines related to the influx of woody vegetation and associated landscape

changes. Woody plant encroachment into southern Great Plains grasslands already fragmented by agricultural activity represents a conservation management dilemma. Although woody vegetation in remnant native prairies may provide habitat for some declining neotropical migrants that require shrubby areas, grassland structure and suitability is compromised for many declining grassland-endemic birds. Cropland conversion to agricultural grassland does appear to provide suitable for some grassland species. However, this benefit appears to be limited to areas where woody plant invasion into grasslands is relatively advanced, and may have only a temporary effect, as most CRP areas are likely to return to agricultural production in the near future. Changes are needed in grassland management practices to restrict woody plant encroachment and fragmentation; otherwise, continued declines in grassland bird populations can be expected.
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317. **Avian response to warm-season grass use in pasture and hayfield management.**
Giuliano, W. M. and Daves, S. E.
Biological Conservation 106(1): 1-9. (2002)
NAL Call #: S900.B5; ISSN: 00063207.
Notes: doi: 10.1016/S0006-3207(01)00126-4.
Descriptors: abundance/ birds/ disturbance/ grassland/ reproduction/ agricultural management/ avifauna/ conservation management/ pasture/ plant community/ reproduction/ United States/ Ammodramus/ Ammodramus savannarum/ Andropogon/ Andropogon gerardii/ Aves/ Dactylis/ Dactylis glomerata/ Galliformes/ Melospiza melodia/ Panicum/ Panicum virgatum/ Passeridae/ Poaceae/ Pooecetes/ Spizella/ Spizella passerina/ Spizella pusilla
Abstract: Populations of most avian species associated with grasslands have declined in North America over the last few decades. These declines may be related, in part, to changes in species composition and management of pastures and hayfields. The incorporation of native, warm-season grasses into pasture and hayfield management has been suggested as a means of providing suitable habitat for birds in agricultural areas. To examine this, we compared avian abundance, richness, and reproductive success in warm- [i.e. switchgrass (Panicum virgatum) and big bluestem (Andropogon gerardii)] and cool-season grass [i.e. orchardgrass (Dactylis glomerata)] fields on private farms in southwest Pennsylvania. Point counts, nest monitoring, and vegetation sampling were conducted on nine pairs (warm- and cool-season grass) of fields in 1996, and 12 pairs of fields in 1997. Compared with cool-season grass fields, warm-season grass fields supported a greater abundance and richness of birds, including several declining species [e.g. song sparrows (Melospiza melodia), field sparrows (Spizella pusilla), chipping sparrows (Spizella passerina), grasshopper sparrows (Ammodramus savannarum), and vesper sparrows (Pooccetes gramineus)]. Additionally, due to lower nest destruction and depredation rates, birds in warm-season grass fields had greater nest success and fledge rates. The positive response of birds to the use of warm-season grasses in pastures and hayfields appears to be due to the increased availability of undisturbed cover. Thus, the establishment of warm-season grasses in pastures and hayfields should be an avian conservation and management priority. Convincing farmers to use warm-season grasses in their fields should not be difficult, as several state and federal programs fund their establishment, and the use of these grasses increases forage production and farm income.
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318. **Avian responses to late-season grazing in a shrub-willow floodplain.**
Stanley, Thomas R. and Knopf, Fritz L.
Conservation Biology 16(1): 225-231. (2002)
NAL Call #: QH75.A1C5 ; ISSN: 0888-8892
Descriptors: late season grazing: avian response/ shrub willow floodplain: habitat
Abstract: Riparian vegetation in western North America provides important habitat for breeding birds and valuable forage for grazing livestock. Whereas a number of studies have documented the response of riparian vegetation to the removal of cattle, few have experimentally evaluated specific grazing systems. We evaluated the responses of vegetation and breeding birds to two cycles of late-season (August-September) grazing followed by 34 months of rest on the Arapaho National Wildlife Refuge, Colorado. We used a before-and-after control-impact (BACI) design, with two control (ungrazed) and two treatment (grazed) pastures composing the experimental units. Vegetation characteristics and bird densities were quantified on sample plots prior to and following two cycles of the treatment. We found no statistical differences in vegetation change and few differences in bird-density change among pastures. Inspection of means for pastures, however, suggests that changes in shrub vigor and spatial pattern differed among ungrazed and grazed pastures and that changes in population density for three of the nine bird species and three guilds studied differed among pastures. Our results suggest that habitat for grazing-sensitive birds may be restored while still allowing late-season grazing, although the rate at which species are recovered will be slower than if all cattle are removed.
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319. **Avian use of recently evolved riparian habitat on the lower Snake River, Washington.**
Rocklage, A. M. and Ratti, J. T.
Northwest Science 74(4): 286-293. (2000)
NAL Call #: 470 N81; ISSN: 0029344X
Descriptors: avifauna/ habitat management/ habitat use/ riparian zone/ United States
Abstract: Since 1975 the U. S. Army Corps of Engineers has managed and irrigated 440 ha along the lower Snake River in Washington as mitigation for four dams constructed 1962-1975. We investigated avian use of irrigated Habitat Management Units (HMUs), compared to non-irrigated sites and streams that entered the fiver. We conducted bird surveys at 25 sites in summer and fall 1997 and in spring 1998. We compared avian abundance, species richness, and species diversity among habitats and seasons. We detected an average of 169 birds and 33 species at HMUs, 120 birds and 28 species at non-irrigated sites, and 63 birds and 23 species along streams in all three seasons. We detected an average of 29 species/site in summer, 31 in fall, and 22 in spring. Species diversity, as measured by the Shannon-Wiener function, was higher in summer, indicating that large flocks of a few species were common in fall and spring. These data demonstrated that the lower Snake River is an important stopover site for migrating

birds. We detected an average of 30 more bird species than a study conducted on the same area in 1974. The increase in species richness is attributed to the development of HMUs and to natural succession of palustrine vegetation since dam construction. Future potential changes in reservoir levels, such as breaching of dams, will undoubtedly affect bird communities along the lower Snake River in all seasons. However, our data demonstrated that habitat perturbations can be partially mitigated by habitat enhancement and management.
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320. **Benefit of permanent non-fire refugia for Lepidoptera conservation in fire-managed sites.**
Swengel, Ann B. and Swengel, Scott R.
Journal of Insect Conservation 11(3): 263-279. (2007)
NAL Call #: QL362.J68 ; ISSN: 1366-638X
Descriptors: conservation measures/ terrestrial habitat/ land zones/ Lepidoptera: habitat management/ Permanent non fire refugium management in fire managed sites/ grassland/ prairie habitat/ Wisconsin/ Insecta/ arthropods/ insects/ invertebrates/ Lepidopterans
Abstract: From the early 1990s through 2005, we conducted butterfly transect surveys annually at the same sites in three regions of Wisconsin. We compared specialist butterfly population indices at three sites where a permanent non-fire refugium (a unit kept unburned through cycles of rotational fire elsewhere in the site) was established during this study to indices at comparison sites (which had consistent management throughout this study) in the same region. At Crex Meadows (12,180 ha), all significant changes in specialist numbers skewed toward relatively higher abundance in the refugium (14 ha, last burned in 1988) during the later period (1998-2005) versus 10 comparison subsites (fire-managed in both periods) than expected from observations in the earlier period (1991-97). The same pattern occurred in the refugium (4 ha) at Bauer-Brockway (125 ha), after the rest of that unit (9 ha) had its first management fire. Population trends were positive in these refugia, while the comparison sites usually had less favorable trends, or otherwise had similar trends. At Muralt Bluff (25 ha), regal fritillaries (Speyeria idalia) were more concentrated in the refugium (3 ha, last burned in 1991) during the earlier period but were more abundant in both periods in the refugium than the other units there (fire-managed in both periods). In the earlier period at Muralt Bluff, this species significantly declined, the opposite trend of comparison sites (which always had never-burned refugia), but significantly increased in the later period, similar to comparison sites. The refugium did not benefit Ottoe skipper (Hesperia ottoe), which declined significantly in the earlier period and was not recorded in the later period. Formerly burned units began functioning as refugia only >6-8 years after last fire and continued to increase in benefit for years after that. In fire-managed and fire-prone sites, we recommend the creation of permanent non-fire refugia for Lepidoptera conservation, placed where the most specialists will benefit and managed unintensively (e.g. mowing) if needed.
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321. **Benefits of Farm Bill grassland conservation practices to wildlife.**
Haufler, Jonathan B. and Ganguli, Amy C.
In: Fish and Wildlife Response to Farm Bill Conservation Practices; Bethesda, MD: The Wildlife Society, 2007.
ftp://ftp-fc.sc.egov.usda.gov/NHQ/nri/ceap/fwfb5.pdf
Descriptors: Farm Bill/ conservation practices/ Farm Bill/ terrestrial habitat/ wildlife species/ wildlife management
Abstract: This publication provides details on conservation practices applied to rangelands with prescribed grazing, prescribe d burning, range planting, and restoration of declining habitats showing some of the greatest benefits to wildlife. Prescribed grazing has been shown to produce both positive and negative responses by wildlife. Prescribed burning has also been shown to have both positive and negative effects, but benefits generally outweigh detriments of this practice. Range planting and restoration of declining habitats have been shown to benefit wildlife, but determining appropriate comparisons can be problematic. Grassland ecosystems have been found to need greater heterogeneity and better representation of historical ecosystem diversity, challenges that make comparisons to “native” ecosystem conditions complex. Additional practices including fencing, brush management, tree planting and shelterbelts, and pest management can all be used to improve wildlife habitat, although each can also cause problems for wildlife in certain situations. Bird responses to practices have received the greatest attention, with generally inadequate information available for most other taxa. Even for birds, considerable information is lacking including effects of practices on many species, effects of surrounding landscape factors on wildlife responses, and responses in reproductive rates or survival rates to various practices. Yet, rangeland practices offer some of the greatest potential for conservation benefits to wildlife. Grassland ecosystems and wildlife are considered among the most at risk, and rangeland practices can be used to maintain, enhance, and restore needed plant communities and habitat conditions.

322. **Benefits of protective fencing to plant and rodent communities of the western Mojave Desert, California.**
Brooks, Matthew L.
Environmental Management 19(1): 65-74. (1995)
NAL Call #: HC79.E5E5 ; ISSN: 0364-152X
Descriptors: alien grass/ annual plant biomass/ community diversity/ desert ecosystem/ desert tortoise research natural area/ forb biomass/ human disturbance/ Kern County/ livestock grazing/ Merriami's kangaroo rat/ method/ protective effect
Abstract: Human disturbance in the western Mojave Desert takes many forms. The most pervasive are livestock grazing and off-highway vehicle use. Over the past few decades several areas within this region have been fenced to preclude human disturbance. These areas provide opportunities to study the impact of human activities in a desert ecosystem. This paper documents the response of plant and small mammal populations to fencing constructed between 1978 and 1979 at the Desert Tortoise Research Natural Area, Kern County, California. Aboveground live annual plant biomass was generally greater inside than outside the fenced plots during April 1990, 1991, and 1992. The alien grass Schismus barbatus was a notable exception, producing more biomass in the unprotected area. Forb biomass was greater than that of alien annual grasses inside the fence during all three years of the study.

Outside the fence, forb biomass was significantly higher than that of alien grasses only during spring 1992. Percent cover of perennial shrubs was higher inside the fence than outside, while no significant trend was detected in density. There was also more seed biomass inside the fence; this may have contributed to the greater diversity and density of Merriam's kangaroo rats (Dipodomys merriami), long-tailed pocket mice (Chaetodipus formosus), and southern grasshopper mice (Onychomys torridus) in the protected area. These results show that protection from human disturbance has many benefits, including greater overall community biomass and diversity. The significance and generality of these results can be further tested by studying other exclosures of varying age and configurations in different desert regions of the southwestern United States.
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323. **Benefits of rotational grazing and dense nesting cover for island-nesting waterfowl in southern Quebec.**
Lapointe, S.; Giroux, J. F.; Belanger, L.; and Filion, B.
Agriculture, Ecosystems and Environment 78(3): 261-272. (2000)
NAL Call #: S601.A34; ISSN: 0167-8809
Descriptors: grazing/ nests/ agricultural practices/ wildlife management/ environment management/ nature conservation/ aquatic birds/ breeding sites/ islands/ population density/ population structure/ dominant species/ habitat improvement/ vegetation cover/ herbivores/ agriculture/ man-induced effects/ Anatidae/ Anas strepera/ Anas acuta/ Canada, Quebec/ Canada, St. Lawrence R./ Canada/ ducks/ cattle grazing/ rotational grazing/ dense nesting cover/ northern pintail/ gadwall
Abstract: Intensification of agricultural practices is an important factor responsible for the decline of duck populations throughout North America. More than 200 islands covering a total of 5000 ha are found in the St. Lawrence River between Montreal and Trois-Rivieres in southern Quebec. The value of these islands as duck nesting habitat, however, is often limited by cattle grazing. The effects of two types of habitat improvements, rotational grazing and establishment of dense nesting cover (DNC), on island-nesting waterfowl was studied from 1992 to 1994. Four treatments were compared: idle fields with no vegetation improvement but exclusion of cattle, improved pastures with seeding of forage plants for cattle, DNC fields with improved cover for ducks and exclusion of cattle and unimproved pastures used after the duck nesting season. Before habitat improvements, grazing by cattle reduced dry mass of green vegetation by 53% relative to ungrazed plots. No difference was found in the biomass of live (green) and dead (residual) vegetation among the islands' sections before treatments. Nest density and the number of expected nests based on the area covered by each habitat were also similar among sections before treatment. Gadwall (Anas strepera L.), mallard (Anas platyrhynchos L.), and pintail (Anas acuta L.) were the most abundant species nesting on the islands and this was not affected by treatments. Two years after habitat improvements, the number of duck nests increased. Idle fields and 2-year old DNC had greater visual obstruction, more residual vegetation and more litter. Densities of 2.8 and 7.0 nests ha^{-1} with 69 and 82% Mayfield nest success were recorded in the idle and DNC fields, respectively. Nest success was low in improved pasture where a large proportion of nests were trampled (33%) or depredated (28%). Fencing permitted growth of emergent vegetation which enabled over-water nesting by ducks. These results indicate that with appropriate management, coexistence of cattle and nesting waterfowl is possible on islands of the St. Lawrence River.
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324. **Big game-livestock relationships study: Vegetal change in the absence of livestock grazing on deer winter range in Red Butte and Emigration Canyons, Utah.**
Austin, D. D. and Urness, P. J. Utah State Dept. Natural Resources, 1985. 18 p.
Descriptors: cover/ deer, mule/ grazing/ history/ interspecies relationships/ oak/ vegetation/ wildlife-habitat relationships/ wildlife-livestock relationships/ Utah/ Red Butte Canyon/ Emigration Canyon/ Wasatch Mountains
Abstract: Objective was to determine change, if any, in the vegetation of Emigration Canyon resulting from withdrawal of livestock grazing in contrast to Red Butte Canyon that has been ungrazed since 1905.
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325. **Big sagebrush: A sea fragmented into lakes, ponds, and puddles.**
Welch, B. L.
Provo, UT: Rocky Mountain Research Station, Forest Service, U.S. Department of Agriculture; General Technical Report-RMRS 144, 2005. 218 p.
Notes: 02775786 (ISSN).
Descriptors: Artemisia tridentata/ canopy cover relationships/ distribution/ fire interval/ nutritive value
Abstract: Pioneers traveling along the Oregon Trail from western Nebraska, through Wyoming and southern Idaho and into eastern Oregon, referred to their travel as an 800 mile journey through a sea of sagebrush, mainly big sagebrush (Artemisia tridentata). Today approximately 50 percent of the sagebrush sea has given way to agriculture, cities and towns, and other human developments. What remains is further fragmented by range management practices, creeping expansion of woodlands, alien weed species, and the historic view that big sagebrush is a worthless plant. Two ideas are promoted in this report: (1) big sagebrush is a nursing mother to a host of organisms that range from microscopic fungi to large mammals, and (2) many range management practices applied to big sagebrush ecosystems are not science based.
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326. **Biodiversity across a rural land-use gradient.**
Maestas, J. D.; Knight, R. L.; and Gilgert, W. C.
Conservation Biology 17(5): 1425-1434. (2003)
NAL Call #: QH75.A1C5 ; ISSN: 08888892
Descriptors: biodiversity/ domestic species/ ecological impact/ land use change/ native species/ ranching/ urban development/ Canis familiaris/ Canis latrans/ Felis catus
Abstract: Private lands in the American West are undergoing a land-use conversion from agriculture to exurban development, although little is known about the ecological consequences of this change. Some nongovernmental organizations are working with ranchers to keep their lands out of development and in ranching, ostensibly because they believe biodiversity is better protected on ranches than on exurban developments. However, there are several assumptions underlying this

approach that have not been tested. To better inform conservation efforts, we compared avian, mesopredator, and plant communities across the gradient of intensifying human uses from nature reserves to cattle ranches to exurban developments. We conducted surveys at randomly selected points on each type of land use in one Colorado watershed between May and August of 2000 and 2001. Seven bird species, characterized as human commensals or tree nesters, reached higher densities (all p < 0.02) on exurban developments than on either ranches or reserves. Six bird species, characterized as ground and shrub nesters, reached greater densities (all p < 0.015) on ranches, reserves, or both of these types of land use than on exurban developments. Domestic dogs (Canis familiaris) and house cats (Felis catus) were encountered almost exclusively on exurban developments, whereas coyotes (Canis latrans) were detected more frequently (p = 0.047) on ranchlands than exurban developments. Ranches had plant communities with higher native species richness and lower non-native species richness and cover than did the other types of land use (all p < 0.10). Our results support the notion that ranches are important for protecting biodiversity and suggest that future conservation efforts may require less reliance on reserves and a greater focus on private lands.
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327. **Biodiversity attributes of different sward structures in grazed grassland.**
McIntyre, S.
Ecological Management and Restoration 6(1): 71-73. (2005); ISSN: 1442-7001
Descriptors: biodiversity/ grass sward/ grasslands/ grazing/ habitats/ nature conservation/ plant ecology/ wild animals/ wildlife conservation/ invertebrates/ vertebrates
Abstract: This paper discusses the effects of grazed grassland structure on plant biodiversity, and vertebrate and invertebrate habitats. It is concluded that the presence of all structural types is optimum for the conservation of biodiversity, although the extent of tall patches is likely to be limiting to biodiversity conservation, owing to the large number of species preferring tall grassland structure and the tendency for these habitats to be eliminated by grazing.
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328. **Biogeographic and conservation implications of late quaternary pygmy rabbits (Brachylagus idahoensis) in eastern Washington.**
Lyman, R. L.
Western North American Naturalist 64(1): 1-6. (2004)
NAL Call #: QH1.G7; ISSN: 15270904
Descriptors: agriculture/ biogeography/ Brachylagus idahoensis/ conservation/ grazing/ pygmy rabbit/ Washington/ Bos taurus/ Oryctolagus cuniculus/ Vertebrata
Abstract: Five implications of a biogeographic model of pygmy rabbits (Brachylagus idahoensis) in eastern Washington proposed in 1991 are confirmed by 11 new late-Quaternary records. Pygmy rabbits from eastern Oregon colonized eastern Washington during the late Pleistocene and occupied their largest range during the middle and late Holocene. Disjunction of the eastern Washington population from that in eastern Oregon occurred during at least the late Holocene. Nineteenth-century cattle grazing and 20th-century agricultural practices reduced habitat preferred by pygmy rabbits. Conservation of the small remaining population of pygmy rabbits will necessitate altered land use practices.
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329. **Bird and small mammal populations in a grazed and ungrazed riparian habitat in Idaho.**
Medin, D. E. and Clary, W. P.
Ogden, Utah: US Department of Agriculture, Forest Service, Intermountain Research Station; Research Paper INT-425, 1990. 10 p.
Notes: ISSN 0886-7380.
NAL Call #: A99.9 F764U
Descriptors: wildlife/ birds/ mammals/ habitats/ rangelands/ riparian buffers/ grazing/ Idaho
This citation is from AGRICOLA.

330. **Bird responses to harvesting switchgrass fields for biomass.**
Best, Louis B. and Murray, Les D.
Transactions of the North American Wildlife and Natural Resource Conference 69: 229-235. (2004)
NAL Call #: 412.9 N814; ISSN: 0078-1355
Descriptors: commercial activities/ conservation measures/ reproduction/ ecology/ community structure/ man-made habitat/ land zones/ Aves: farming and agriculture/ biomass/ harvest/ switchgrass/ nesting success/ habitat management/ reproductive productivity/ relative abundance/ cultivated land habitat/ Iowa/ Southern Iowa Drift Plain/ Aves/ birds/ chordates/ vertebrates
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331. **Birds as grazing indicator species in southeastern Arizona.**
Bock, C. E. and Webb, B.
Journal of Wildlife Management 48(3): 1045-1049. (1984)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Eremophila alpestris/ Aimophila cassinii/ Chondestes grammacus/ Ammodramus savannarum/ grassland/ density/ habitat/ environmental condition
© Thomson Reuters Scientific

332. **Birds of southwestern grasslands: Status, conservation, and management.**
Merola-Zwartjes, M.
In: Assessment of grassland ecosystem conditions in the southwestern United States: Wildlife and fish - Volume 2, Gen. Tech. Rep. RMRS-GTR-135: Vol. 2/ Finch, Deborah M., editor; Fort Collins, CO: U.S. Forest Service, 2004. 71-140.
Notes: ISSN: 0277-5786.
Descriptors: grasslands/ ecological assessment/ United States, southwestern region/ ecosystem conditions/ wildlife/ fish/ birds/ mammals/ Arizona/ New Mexico/ grassland avifauna/ desert grasslands/ grassland bird species
Abstract: In the Southwestern United States, the grassland avifauna is collectively composed of a mixture of species found primarily in desert grasslands, shortgrass steppe, wet meadows, and alpine tundra (as used here, desert grasslands incorporate both arid grasslands and desert shrub grasslands). Of these habitats, desert grasslands and shortgrass steppe are the most extensive and support the greatest number of grassland bird species. Desert grasslands are patchily distributed across the southern

halves of New Mexico and Arizona, and shortgrass steppe is a component of the Great Plains system that in the Southwest region extends across the eastern half of New Mexico into the panhandles of Texas and Oklahoma. Alpine tundra and particularly wet meadows are limited in geographic extent and support relatively few species of grassland birds in this region (see chapter 2 for detailed maps of the distribution of grassland types). Though their geographic extent may vary, all of these grassland systems provide habitat for distinctive grassland bird species in the Southwest and are therefore worthy of management concern.
This citation is from Treesearch.

333. **Bobwhite habitat use under short duration and deferred-rotation grazing.**
Wilkins, R. N. and Swank, W. G.
Journal of Range Management 45(6): 549-553. (1992)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume45/Number6/azu_jrm_v45_n6_549_553_m.pdf
Descriptors: Colinus virginianus/ habitats/ grazing/ semiarid zones/ rangelands/ wildlife management/ population density/ Texas
Abstract: A study was conducted in the South Texas Plains to contrast the short-term impacts of short duration grazing (SDG) and deferred-rotation grazing (DG) systems on habitats for northern bobwhites (Colinus virginianus). Foliar cover, species richness, and structural attributes of the vegetation were compared at radio-location sites (quail-used) and sites along random transects (available) within and between the 2 grazing systems. Quail-used sites were characterized by increased species richness, forb cover, and bare ground and decreased plant height and litter accumulations. Principal components analysis revealed that available sites on the SDG during the fall and winter were scored higher along a habitat gradient which had greater species richness and forb cover combined with diminished litter accumulations. This habitat gradient explained 41% of the variation in the ground layer variables. In addition, mark-recapture studies suggested positive population responses on the SDG during the first year following its initiation. Short-term improvements in bobwhite habitats may be realized by initiating SDG on some semiarid rangelands.
This citation is from AGRICOLA.

334. **The Botteri's sparrow and exotic Arizona grasslands: An ecological trap or habitat regained?**
Jones, Z. F. and Bock, C. E.
Condor 107(4): 731-741. (2005)
NAL Call #: QL671.C6; ISSN: 00105422
Descriptors: Botteri's sparrow/ ecological trap/ exotic grasses/ habitat quality/ habitat structure/ livestock grazing/ reproductive success/ Aimophila botterii/ Aves/ Eragrostis/ Passeridae/ Poaceae/ Sacaton/ Sporobolus wrightii
Abstract: The Botteri's Sparrow (Aimophila botterii) is a bird of tall grasslands that temporarily disappeared from Arizona following heavy livestock grazing in the 1890s. Its return was noted first in sacaton (Sporobolus wrightii), an uncommon native floodplain tallgrass often >2 m in height, and subsequently in stands of exotic lovegrasses (Eragrostis spp.) spreading into adjacent uplands that otherwise supported shorter native grasslands. We examined whether the exotic grasslands provided suitable breeding habitat for Botteri's Sparrows, compared to native grasslands. We counted birds for three years on 18 plots, monitored 314 nests on 323 home ranges, banded 583 birds, and measured vegetation on plots and home ranges, and at nests and fledgling locations. Abundance and site fidelity were positively associated with grass height and cover, being greatest in sacaton, intermediate in exotics, and lowest in native upland grasslands. The three habitats did not differ in young fledged per capita. Vegetation cover on Botteri's Sparrow home ranges did not differ from the surrounding available habitat, but locations of flightless recently fledged young included taller and more dense vegetation than either nest sites or random locations, especially in sparsely vegetated native grasslands. These results suggest that fledglings required substantial cover to avoid predation while they completed development. Far from being an ecological trap, the exotic lovegrasses apparently are providing essential cover for the Botteri's Sparrow in Arizona, perhaps allowing it to regain an abundance similar to what existed regionally prior to overgrazing of the late 19th Century. © The Cooper Ornithological Society 2005.
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335. **Breeding biology of Henslow's sparrows on reclaimed coal mine grasslands in Kentucky.**
Monroe, M. S. and Ritchison, G.
Journal of Field Ornithology 76(2): 143-149. (2005)
NAL Call #: 413.8 B534; ISSN: 02738570
Descriptors: Ammodramus henslowii/ breeding/ Henslow's sparrow/ nesting/ reclaimed surface mine/ vegetation
Abstract: Populations of Henslow's Sparrows (Ammodramus henslowii) are declining, and loss of habitat is a likely factor. Coal mine reclamation has created grassland habitat in Kentucky and elsewhere, and information is needed concerning the use of these areas by Henslow's Sparrows. We compared the behavior and ecology of populations on reclaimed sites and non-mined sites in west-central Kentucky during the 2000 and 2001 breeding seasons. Territories were smaller on the reclaimed sites than unmined sites, perhaps due to differences in habitat quality. Insect sweeps revealed more prey biomass on reclaimed sites than unmined sites. Twenty-eight of 48 nests (58%) fledged at least one young, and nesting success was similar on reclaimed and unmined sites. Mean clutch size was 3.75, with no difference between reclaimed and unmined sites. Similarly, the mean number of fledglings per nest was similar on reclaimed and unmined sites. Multivariate analysis revealed differences in the characteristics of vegetation on reclaimed areas and unmined areas. Reclaimed areas had more grass cover and greater vegetation density, probably due to differences in management history (i.e., mowing or burning) and species composition. Our results indicate that the nesting success of Henslow's Sparrows on reclaimed surface mines in Kentucky is comparable to that on unmined areas. As such, the thousand of hectares of reclaimed surface mines in Kentucky and elsewhere could play an important role in stabilizing populations of Henslow's Sparrows.
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336. **Breeding bird abundance and habitat on two livestock grazing regimes in North Dakota.**
Buskness, Natoma A.; Murphy, Robert K.; Higgins, Kenneth F.; and Jenks, Jonathan
South Dakota Academy of Science: Proceedings 80 (2001)
NAL Call #: 500 SO82; ISSN: 0096-378X
Descriptors: birds/ breeding/ wildlife habitat/ prairies/ North Dakota
Abstract: To help sustain prairie wildlife habitat on privately owned lands in North Dakota, prescribed rotational grazing (RG) systems have been implemented as part of the Prairie Pothole Joint Venture (PPJV) of the North American Waterfowl Management Plan. However, impacts of these systems on nongame breeding birds are unmeasured. During 1996 and 1997 we assessed the relative abundance, species richness, and habitat of breeding birds especially passerines on five PPJV-prescribed RG pastures in central and northwestern North Dakota. Each RG pasture was paired with a nearby traditional, continuous-grazed (CG) pasture for comparison. Using 5-minute point counts on 100-m radius plot to survey breeding birds, we recorded 30 species in 1996 and 29 species in 1997. We detected no differences in relative abundance or species richness between grazing regimes in 1996 (P = 0.29 and 0.58), but relative abundance and species richness were greater on RG pastures than on CG pastures in 1997 (P = 0.08 and 0.04), a relatively dry year. A group of five species (savannah sparrow [Passerculus sandwichensis], grasshopper sparrow [Ammodramus savannarum], western meadowlark [Sturnella neglecta], bobolink [Dolichonyx oryzivorus], Baird's sparrow [Ammodramus bairdii]) considered sensitive to heavy grazing in previous studies had a higher collective mean abundance on RG than on CG in 1997 ($\bar{x}$ = 4.29 and 2.75 breeding pairs/point count, P = 0.03). Litter depth also was greater on RG than on CG in 1997 ($\bar{x}$ = 2.4 and 1.4 cm, P = 0.04). PPJV grazing systems help conserve native prairie by improving its economic viability without diminishing habitat values for grassland passerines, and in dry years may enhance breeding bird habitat compared to that on traditional grazing systems especially for grazing-sensitive species such as bobolink and Baird's sparrow.
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337. **Breeding bird communities of Midwestern prairie fragments: The effects of prescribed burning and habitat area.**
Herkert, J. R.
Natural Areas Journal 14: 128-135. (1994)
NAL Call #: QH76.N37
Descriptors: wildlife habitat/ breeding birds/ agricultural practices/ fire
Abstract: Compared the effects of habitat area and prescribed burning on breeding bird communities using Midwestern prairie fragments.

338. **Breeding bird community responses to a small shrubland-to-prairie restoration.**
Lerczak, Thomas V.
Transactions of the Illinois State Academy of Science 97(2): 135-140. (2004)
NAL Call #: 500 IL6; ISSN: 0019-2252
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Aves: habitat management/ community structure/ breeding community/ grasslands/ tallgrass prairie/ shrubland conditions/ Illinois/ Mason County/ shrubland restoration/ birds/ chordates/ vertebrates
Abstract: Fifteen-minute point counts were used to sample bird communities within and adjacent to a 6-ha site at the 169-ha Revis Hill Prairie Nature Preserve, in Mason County, central Illinois. In 1994 and 1995, the study site was dominated by shrublands (primarily Maclura pomifera, Crataegus spp., Cornus spp., and Gleditsia triacanthos) surrounded by second-growth woodland. Counts were repeated in 2001 and 2002 after 3 ha of shrubland had been restored to tallgrass prairie (dominated by Andropogon gerardi, Sorghastrum nutans, and Solidago canadensis). For all years, 43 bird species were recorded and categorized as grassland (5), shrubland (12), or woodland (26) species. The Brown-headed Cowbird (Molothrus ater) was the most numerous species. An Index of Similarity comparing bird communities among all years ranged from 0.70 to 0.80, indicating a consistent similarity among pre- and post-restoration bird communities, both of which were dominated by birds characterized as woodland and shrubland species. Birds detected by sight alone indicated few species, other than the American Goldfinch (Carduelis tristis) and Common Yellowthroat (Geothlypis trichas), actually seemed to use the prairie restoration. Because true grassland birds tend to require large blocks of habitat, this small prairie restoration provides inadequate grassland breeding habitat. Resource managers should consider such effects during the planning phases of small restoration projects, especially if their goals are to serve more than botanical interests.
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339. **Breeding bird response to cattle grazing of a cottonwood bottomland.**
Sedgwick, J. A. and Knopf, F. L.
Journal of Wildlife Management 51(1): 230-237. (1987)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: breeding/ birds/ cattle/ grazing/ cottonwood/ fences
Abstract: We studied avian habitat relationships and the impact of grazing on breeding densities of selected migratory birds in a plains cottonwood (Populus sargentii) bottomland in northeastern Colorado. Five 16-ha plots served as controls and 5 were fenced and fall-grazed October-November 1982-84 following a season of pre-treatment study in the spring of 1982. We focused our analysis on bird species directly dependent on the grass-herb-shrub layer of vegetation for foraging, nesting, or both. The guild included house wren (Troglodytes aedon), brown thrasher (Toxostoma rufun), American robin (Turdus migratorius), common yellowthroat (Geothlypis trichas), yellow-breasted chat (Icteria virens), and rufous-sided towhee (Pipilo erythropthalmus). Moderate, late-fall grazing had no detectable impact on calculated densities of any of the 6 species, implying that proper seasonal grazing of a cottonwood floodplain is, at least initially (3 years), compatible with migratory bird use of a site for breeding. Habitat associations suggested that common yellowthroats and yellow-breasted chats were most unique and most likely to respond negatively to higher levels of grazing. We suggest that these latter 2 species are appropriate ecological indicators of the quality of ground-shrub vegetation as breeding bird habitats in lowland floodplains of the Great Plains.
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340. **Breeding bird response to varying amounts of basal area retention in riparian buffers.**
Hanowski, J.; Danz, N.; Lind, J.; and Niemi, G.
Journal of Wildlife Management 69(2): 689-698. (2005)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2005)069 [0689:BBRTVA]2.0.CO;2.
Descriptors: birds/ breeding/ buffers/ forest/ harvest/ Minnesota/ riparian/ streams/ avifauna/ basal area/ buffer zone/ conservation management/ ecological impact/ riparian forest/ timber harvesting/ Minnesota/ Aves
Abstract: We examined response of breeding bird communities to forest harvest that removed varying amounts of tree basal area from riparian buffers on a 2- to 4-m-wide stream in northern Minnesota, USA. We compared bird species and communities in 30-m-wide riparian buffers along the stream. Buffers were established within plots in which upland forests were clear-cut (basal area 2 m^2/ha) according to standard local forest management practice. Buffers had 4 treatments (3 plots/treatment): (1) no harvest (riparian control); (2) reduction of basal area to an average of 7-10 m^2/ha; (3) reduction of basal area to an average of 2 m^2/ha (defined as a clear-cut); and (4) control (no harvest in either riparian buffer or adjacent upland). Bird surveys were conducted 1 year prior to harvest and for 4 years after harvest.Results revealed a significant response of the bird community to varying amounts of tree basal area retention in the riparian area. Univariate (analysis of variance) and multivariate (principal response curves [PRC]) analyses showed that in the first year after harvest, bird community composition in the riparian buffers changed in all 3 treatments relative to the control plots, and continued to diverge over time. More species and individuals, primarily those species associated with edge or early-successional habitats, colonized the harvested riparian buffers after treatment. In contrast, the number of birds and species that inhabit interior forests declined in the riparian buffers. Results suggest that any amount of harvest in riparian buffers next to clear-cut upland forest will affect breeding bird communities along small headwater streams. Because individual bird species are differentially affected by riparian forest harvest, management should consider the desired future condition of the forest and choose a harvest prescription to benefit the desired avifauna community.
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341. **Brown-headed cowbird behavior and movements in relation to livestock grazing.**
Goguen, Christopher B. and Mathews, Nancy E.
Ecological Applications 11(5): 1533-1544. (2001)
NAL Call #: QH540.E23; ISSN: 1051-0761
Descriptors: commercial activities/ nutrition/ feeding behavior/ reproduction/ reproductive behavior/ associations/ parasites diseases and disorders/ land and freshwater zones/ Passeriformes: farming and agriculture/ conservation measures/ nest parasitism/ Molothrus ater/ brood parasites/ livestock grazing/ conservation/ New Mexico/ Colfax County/ Passeriformes/ Aves/ birds/ chordates/ vertebrates
Abstract: The Brown-headed Cowbird (Molothrus ater) is a widespread brood parasite which often engages in a commensalistic feeding relationship with domestic livestock. We studied the behavior of female cowbirds breeding in pinyon-juniper woodlands in New Mexico, USA, on two adjacent sites, one an active cattle ranch, and the other a site that was not grazed by domestic livestock throughout the songbird breeding season. In 1994, we conducted morning and afternoon surveys of cowbird abundance in pinyon-juniper and prairie habitats; from 1995 to 1997 we used radio telemetry to monitor daily and seasonal movement and behavioral patterns of female cowbirds. Our objectives were to measure how closely cowbird feeding behavior was linked to livestock grazing, and how the presence or absence of active livestock grazing within a female's breeding range influenced diurnal patterns of behavior. During morning surveys, we detected cowbirds primarily in pinyon-juniper habitat, but in similar numbers in the ungrazed and actively grazed woodlands. In the afternoon, we detected cowbirds feeding almost exclusively in actively grazed prairies but found that they deserted those sites when cattle were removed in early July. Radio telemetry confirmed that individual females were commuting daily between these habitats. Females (n = 30) were generally located in pinyon-juniper habitats from 0500 to ≃1200, presumably breeding. Females that bred within actively grazed pinyon-juniper habitat often fed on the ground with livestock on their morning ranges, while those breeding in ungrazed habitat did not. In total, 98% of cowbird feeding observations occurred with livestock. Although most females commuted <3 km between breeding and feeding ranges, some individuals with breeding ranges located toward the center of the ungrazed property averaged 7.7 km. When cattle were rotated out of the main feeding pasture in early July, females immediately extended their commutes by ≃1.2 km to access remaining actively grazed pastures. Overall home range sizes were large (160-4344 ha) and tended to increase with distance between the females' breeding range and active livestock grazing. This increase was reflected mainly by differences in feeding range sizes rather than breeding range sizes. The observed link between cowbird behavior and the distribution of livestock suggests that in regions where livestock grazing is the dominant land use, manipulations of livestock grazing patterns may provide an effective tool to manage cowbird parasitism.
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342. **Burning and grazing effects on bobwhite foods in the southeastern coastal plain.**
Lewis, C. E. and Harshbarger, T. J.
Wildlife Society Bulletin 14(4): 455-459. (1986)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Pinus palustris/ Pinus elliottii/ Colinus virginianus/ prescribed burning/ habitat destruction/ wildlife management/ grazing/ Georgia
This citation is from AGRICOLA.

343. **Butterfly responses to habitat edges in the highly fragmented prairies of central Iowa.**
Ries, L. and Debinski, D. M.
Journal of Animal Ecology 70(5): 840-852. (Sept. 2001)
NAL Call #: 410 J828
Descriptors: edge permeability/ habitat fragmentation/ lepidoptera/ tracking study
Abstract: 1. The behaviour of two butterfly species, a habitat specialist (Speyeria idalia) and a habitat generalist (Danaus plexippus), was tracked at four prairie edges to determine the extent to which edges act as a barrier to emigration. The four edge types studied were crop, road, field and treeline. The edges differed in structure ranging from high-contrast (treeline) to low-contrast (field). 2. S. idalia, the habitat specialist, responded strongly to all

edges, even those with low structural contrast. However, S. idalia's response was strongly affected by conspecific density at crop and field edges; individuals were less likely to exit from high density plots. S. idalia responded to edges both by turning to avoid crossing them, and returning to the plot if they had crossed. 3. D. plexippus responded strongly only to treeline edges. Wind direction and time of year were important factors influencing behaviour at edges for this species. Conspecific density was not a significant factor affecting their behaviour. D. plexippus responded to edges by not crossing them, but rarely returned once they had crossed. 4. In highly fragmented landscapes, such as the one in which this study occurred, butterflies which show little or no response to edges may exhibit high emigration rates because of the high probability of encountering an edge in small habitat patches. Butterflies may respond strongly to even subtle habitat boundaries, but those responses may be modified by the edge structure, local environment or other conditions. Therefore, modifying edge structure may be a way to influence emigration rates, making it a useful tool for conservation.
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344. **Butterfly responses to prairie restoration through fire and grazing.**
Vogel, J. A.; Debinski, D. M.; Koford, R. R.; and Miller, J. R.
Biological Conservation 140(1-2): 78-90. (2007)
NAL Call #: S900.B5; ISSN: 00063207.
Notes: doi: 10.1016/j.biocon.2007.07.027.
Descriptors: burning/ butterflies/ grazing/ Insect conservation/ restoration/ tallgrass prairie
Abstract: The development of land for modern agriculture has resulted in losses of native prairie habitat. The small, isolated patches of prairie habitat that remain are threatened by fire suppression, overgrazing, and invasion by non-native species. We evaluated the effects of three restoration practices (grazing only, burning only, and burning and grazing) on the vegetation characteristics and butterfly communities of remnant prairies. Total butterfly abundance was highest on prairies that were managed with burning and grazing and lowest on those that were only burned. Butterfly species richness did not differ among any of the restoration practices. Butterfly species diversity was highest on sites that were only burned. Responses of individual butterfly species to restoration practices were highly variable. In the best predictive regression model, total butterfly abundance was negatively associated with the percent cover of bare ground and positively associated with the percent cover of forbs. Canonical correspondence analysis revealed that sites with burned only and grazed only practices could be separated based on their butterfly community composition. Butterfly communities in each of the three restoration practices are equally species rich but different practices yield compositionally different butterfly communities. Because of this variation in butterfly species responses to different restoration practices, there is no single practice that will benefit all species or even all species within habitat-specialist or habitat-generalist habitat guilds.
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345. **Can livestock be used as a tool to enhance wildlife habitat?**
Severson, Kieth E.
Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture; General Technical Report-RM 194, 1990.
123 p.
Notes: 43rd Annual Meeting of the Society for Range Management, Reno, Nev., February 13, 1990.
NAL Call #: aSD11.A42 no. 194
Descriptors: livestock/ Cervus elaphus/ Antilocapra americana/ Odocoileus hemionus/ forage/ grazing/ Cervus elaphus nelsoni/ Centrocercus urophasianus
This citation is from AGRICOLA.

346. **A case study of changing land use practices in the Northern Great Plains, U.S.A.: An uncertain future for waterbird conservation.**
Higgins, K. F.; Naugle, D. E.; and Forman, K. J.
Waterbirds 25(SPECIAL PUBL.2): 42-50. (2002)
NAL Call #: QL671; ISSN: 07386028
Descriptors: agriculture/ cropland/ grassland/ land use/ nesting cover/ South Dakota/ wetlands/ agriculture/ grassland/ habitat conservation/ land use change/ waterfowl/ wetland/ United States
Abstract: Wetland and grassland habitats of the northern Great Plains are a primary breeding ground for waterbirds in North America. Native mixed grass prairies that were historically used for cattle grazing have met with changing social and economic pressures that put the remaining 40% of this resource at high risk of tillage. In this paper, we describe the current state of our waning rural societies, characterize impacts of land use change on waterbird habitats, and discuss conservation actions to benefit waterbirds. Recent population statistics indicate that a record number of farmers facing low commodity prices are selling their farms and moving to urban centers for employment. Other farmers are shifting from diversified agriculture to monoculture grain farming to take advantage of farm programs that provide incentives to bring marginal land into production. Additional data indicate that concurrent changes in crop types have decreased quality of farmland wildlife habitat while bigger and faster farm equipment and genetically modified crops continue to make farming marginal land less risky. Legislators and administrators should be advised that waterbird habitat loss continues to expand westward. The last chance to sustain the unique grassland-wetland character of the northern Great Plains is to accelerate grassland conservation with short-and long-term stewardship programs and incentives to family ranchers. This philosophy is of vital importance because it also protects wetland habitats that otherwise are vulnerable to drainage when native prairie is converted to cropland. Lastly, and perhaps most importantly, this would conserve our prairie heritage for future generations while preserving the private property rights of landowners.
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347. **Cattle and sheep grazing effects on soil organisms, fertility and compaction in a smooth-stalked meadowgrass-dominant white clover sward.**
Murphy, W. M.; Mena Barreto, A. D.; Silman, J. P.; and Dindal, D. L.
Grass and Forage Science 50(3): 191-194. (1995)
NAL Call #: 60.19 B773; ISSN: 0142-5242
Descriptors: Poa pratensis/ Trifolium repens/ cattle/ sheep/ rotational grazing/ pastures/ range management/ forbs/ soil fertility/ soil compaction/ free-living nematodes/ Rotifera/ earthworms/ nitrogen/ potassium/ phosphorus/ topping/ Vermont
This citation is from AGRICOLA.

348. **Cattle grazing and avian communities of the St. Lawrence River islands.**
Belanger, L. and Picard, M.
Journal of Range Management 52(4): 332-338. (1999)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume52/Number4/azu_jrm_v52_n4_332_338_m.pdf
Descriptors: Phragmites australis/ cows/ islands/ prairies/ grazing intensity/ wild birds/ range management/ wildlife management/ Phalaris arundinacea/ Passeriformes/ canopy/ habitats/ species diversity/ waterfowl/ nesting/ Quebec
Abstract: Three hundred islands are found along the St. Lawrence River in Quebec. Among these islands, over 5,000 ha are used for agricultural purposes and 32% of this total is devoted to communal pasture, a traditional practice in this part of the river. In 1993 and 1994, we compared the avian communities of 500 ha natural spring flooded prairie islands subjected to different degrees of grazing pressure. Three islands were divided into 12 sectors, in which 108 sample plots of 0.5 ha were selected. Results show that the degree of visual obstruction by herbaceous vegetation and the percentage of shrub cover were higher on ungrazed and on moderately grazed prairie (< 1 cow/ha/year) as compared with intensively grazed prairie (> 1 cow/ha/year). More than 1,650 observations of passerines were made and 13 species were identified. The Swamp Sparrow (Melospiza georgiana), Savannah Sparrow (Passerculus sandwichensis), Red-winged Blackbird (Agelais phoeniceus), and Bobolink (Dolichonyx oryzivorus) were the 4 most abundant species, accounting for over 80% of all birds counted. Ungrazed and moderately grazed prairie contained 6 times more birds than intensively grazed prairie (10.4 birds/ha and 11.7 birds/ha vs 1.6 birds/ha). We also recorded 167 and 113 dabbling duck (anatinae) nests in 1993 and 1994 respectively. Moderately grazed and ungrazed prairies had a nest density nearly 10 times higher than that of intensively grazed prairie (0.50 +/- 0.01 and 0.30 +/- 0.01 nest/ha vs 0.05 +/- 0.01 nest/ha). Our study shows that grazing pressure on prairies of the studied islands largely determined the type of bird species present. However, prairie subjected to excessive grazing pressure is not suitable for waterfowl nesting. Various recommendations are provided for integrated management of wildlife and agriculture on the St. Lawrence River communal pasture islands.
This citation is from AGRICOLA.

349. **Cattle grazing and management of dusky seaside sparrow habitat.**
Holder, Gregory L.; Johnson, Mark K.; and Baker, James L.
Wildlife Society Bulletin 8(2): 105-109. (1980)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Fringillidae/ Passeriformes/ Ammodramus maritimus nigrescens/ dusky seaside sparrow/ seaside sparrow/ fires-burns/ grazing/ habitat alterations/ cattle/ sparrow habitat/ endangered species/ St. John's River basin/ Florida/ natural resources/ animal science: animal nutrition/ plant ecology/ Florida
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350. **Cattle grazing and sharp-tailed grouse nesting success.**
Kirby, D. R. and Grosz, K. L.
Rangelands 17(4): 124-126. (1995)
NAL Call #: SF85.A1R32; ISSN: 0190-0528
Descriptors: Phasianidae/ nesting/ rangelands/ nests/ rotational grazing/ cattle/ grazing/ North Dakota
This citation is from AGRICOLA.

351. **Cattle management to enhance wildlife habitat in south Texas.**
Ortega, S. J. Alfonso and Bryant, Fred C.
Wildlife Management Bulletin of the Caesar Kleberg Wildlife Research Institute 6: 1-11. (2005)
Descriptors: commercial activities/ conservation measures/ land zones/ North America/ comprehensive zoology: farming and agriculture/ cattle management strategies/ rangeland habitat management applications/ habitat management/ terrestrial habitat/ rangeland habitat/ Texas/ cattle management strategies applications/ rangelands/ Phasianidae/ Galliformes/ Aves/ birds/ chordates/ mammals/ ungulates/ vertebrates
Abstract: For cattle ranching operations in South Texas, wildlife recreation can be a very important source of income for those who choose to diversify. In many cases, income from wildlife such as hunting leases is higher than the income obtained from cattle. Range, cattle, and wildlife management practices need to be adjusted to achieve rangeland sustainability, fulfill the requirements of multiple animal species, and optimize economic output. Under the climatic conditions of South Texas, specific strategies to adjust cattle stocking rates at the first signs of drought are required if valuable range plants and wildlife productivity are to be maintained. We discuss strategies of cattle grazing, including rates of use, grazing systems, stocking rate adjustments based on range condition, calculation of correct stocking rate, and guidelines to adjust livestock numbers based on spring and fall moisture availability. In South Texas, all wildlife species are important to consider in the context of total ranch management. We offer these guidelines to those who are interested in fostering compatible cattle and wildlife operations while protecting the integrity of rangeland, watershed, habitat, and soil resources. We use South Texas as a model to encourage the development of similar strategies and prescriptions for other arid and semiarid regions to help preserve rangeland habitat integrity and optimize biological and economic output.
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352. **Cattle trampling of simulated ground nests in rotationally grazed pastures.**
Paine, L.; Undersander, D. J.; Sample, D. W.; Bartelt, G. A.; and Schatteman, T. A.
Journal of Range Management 49(4): 294-300. (1996)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume49/Number4/azu_jrm_v49_n4_294_300_m.pdf
Descriptors: cattle/ pheasants/ rotational grazing/ wild birds/ stocking rate/ grazing intensity/ Wisconsin
Abstract: For many grassland songbird species, pastures represent some of the best available breeding habitat in the Upper Midwest. Increasing interest in intensive rotational grazing (IRG) among midwestern livestock farmers may result in an expansion of pasture hectares in the region. We evaluated the effects of several cattle stocking densities on ground nest survival in rotationally grazed cool-season pastures in southwestern Wisconsin. Ground nests were simulated with clutches of 3 unwashed pheasant eggs. We tested 3 rotational grazing systems: a 1-day dairy rotation stocked at 60 head ha-1; a 4-day beef rotation at 15 head ha-1; and a traditional, non-intensive 7-day rotation at 8 head ha-1. Paddock size (1.2 ha) and nest density (15 nests paddock($^{-1}$)) were held constant. The simulated nests were observed 4 times day(-1) to document trampling patterns during the herds' diurnal grazing and rumination cycles. Trampling damaged a mean of 75% (+/- 3.1%) of the nests for all 3 treatments during 8 consecutive replications. While the 7-day treatment exhibited a pattern of greater nest trampling during cattle grazing periods than during rumination periods, this pattern was less evident in the 4-day treatment and absent in the 1-day treatment. Increasing vegetation height-density and percent vegetation cover were associated with reduced nest trampling rates, but pasture forage production and removal were not associated with nest damage.
This citation is from AGRICOLA.

353. **Cattle trampling of simulated ground nests under short duration and continuous grazing.**
Koerth, B. H.; Webb, W. M.; Bryant, F. C.; and Guthery, F. S.
Journal of Range Management 36(3): 385-386. (1983)
NAL Call #: 60.18 J82; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume36/Number3/azu_jrm_v36_n3_385_386_m.pdf
Descriptors: birds/ bird communities/ grazing lands/ nest success/ nest survival rate
Abstract: Trampling by cattle on simulated ground nests [of birds] were compared between continuous (CONT) grazing at 8.0 ha/steer and short duration grazing (SDG) at 5.3 ha/steer. Trampling losses were similar under CONT grazing (15%) and SDG (9%) at a nest density of 1/ha. Percentage trampling loss did not increase at higher nest densities under either grazing regime. Nest survival curves indicated a loss rate of 2.21%/wk under CONT grazing and 2.09%/wk under SDG. SDG with cattle will probably not increase trampling loss of ground nests over CONT grazing.
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354. **Changes in abundance and diversity of microarthropods associated with fescue prairie grazing regimes.**
Clapperton, M. Jill; Kanashiro, Derrick A.; and Behan Pelletier, Valerie M.
Pedobiologia 46(5): 496-511. (2002)
NAL Call #: 56.8 P343; ISSN: 0031-4056
Descriptors: field experiment: experimental method/ livestock grazing: plant community structure, soil health, soil quality/ Orthic Black Chernozemic: Udic Haploboroll/ disturbance severity/ fescue prairie grazing regimes/ grassland productivity/ grazing recovery exclosure/ heavy grazing regime/ light grazing regime/ soil bulk density/ soil depth/ soil moisture/ soil temperature
Abstract: Livestock grazing influences plant community structure, soil quality and health, and is likely to also affect the populations and diversity of soil biota. In our study, we determined the abundance and family level diversity of soil mites under very heavy and light grazing regimes, and a very heavy grazing exclosure, and asked whether there were differences in abundance of mite taxa that reflected the severity of disturbance. The field experiment we sampled was established in 1949 on a Rough Fescue Prairie with Orthic Black Chernozemic (Udic Haploboroll) soils near Stavely Alberta Canada. Soil cores were taken from the light (L)(1.2 AUM (animal unit month) ha-1) and very heavy (VH) (4.8 AUM ha-1) grazing regimes and the grazing recovery exclosure (Ex) in the very heavy grazing site in June and October 1999. The results showed that the soil temperature, moisture and bulk density varied between the grazing regimes, soil depth and the sampling times. Collembola were not abundant at any of the sites compared with Acari. Among Acari, prostigmatid mites were significantly more abundant in VH site and all the grazing treatments at both depths and sampling times. Oribatida, and to a lesser extent Mesostigmata, were more closely associated with reduced and undisturbed habitats than the Prostigmata, and there was a positive relationship between increased grassland productivity and the abundance and diversity of soil microarthropods. Our results suggest that Acari are sensitive to soil disturbance.
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355. **Changes in land cover and breeding bird populations with restoration of riparian habitats in east-central Iowa.**
Benson, Thomas J.; Dinsmore, James J.; and Hohman, William L.
Journal of the Iowa Academy of Science 113(1-2): 10-16. (2006)
NAL Call #: Q11.J68; ISSN: 0896-8381
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Aves: habitat management/ riparian habitat restoration/ grassland and wetland population changes/ population dynamics/ riparian habitat restoration effects/ semiaquatic habitat/ wetlands habitat/ population changes/ grassland/ riparian habitat/ Iowa/ Benton/ Iowa County/ Tama County/ Aves/ birds/ chordates/ vertebrates
Abstract: Conversion of Midwestern riparian areas for agricultural production has greatly altered their function and suitability for birds and other wildlife. Recently, however, restoration of riparian functions has been a major focus of land management agencies in the Midwest. We used historic land-use data to describe land-cover changes since European settlement and the subsequent effects of habitat

restoration efforts on the landscape along a section of the Iowa River in east-central Iowa. We then used bird-density data collected in a subset of the study area in 2001 and 2002 to estimate changes in breeding bird populations of the entire study area resulting from these habitat restoration efforts. Before settlement, the (>24,000 ha) Iowa River Corridor was dominated by herbaceous vegetation (72%), with wooded areas accounting for less than one-third of the area. Between the mid-1800s and 1992, agricultural conversion decreased the amount of herbaceous cover by >75%, and the cover of woody vegetation increased by >25%. After the 1993 flood, establishment of USDA conservation easements increased the amount of herbaceous cover in the corridor by >135% (>5,000 ha). Populations of most grassland and wetland bird species in the corridor (13 of 17) increased with habitat restoration, although some species associated with open habitats, such as those that often breed in rowcrop fields, decreased. We estimated that these restored habitats provide habitat for >12,000 additional birds of grassland- or wet land-dependent species in the Iowa River Corridor, 5,000 of which are members of eight species that are of moderate or high conservation priority. An understanding of presettlement land cover, the extent of land-cover alteration, and the effects of habitat restoration on the landscape and breeding bird populations provides a useful guide for both evaluating the efficacy of past restoration and for guiding future conservation and restoration efforts
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356. **Changes in spider Araneae assemblages in relation to succession and grazing management.**
Gibson, C. W. D.; Hambler, C.; and Brown, V. K.
Journal of Applied Ecology 29(1): 132-142. (1992)
NAL Call #: 410 J828; ISSN: 0021-8901
Descriptors: Linyphiidae/ sheep grazing/ invertebrates/ plant species composition arable land/ grassland/ disturbed land/ species accumulation
Abstract: Spiders were sampled, by suction (D-vac) and direct counts of their webs, in a controlled sheep grazing experiment on calcareous ex-arable land and in old calcareous grassland. Results from 1985-89 are presented. Heavily grazed assemblages were dominated by a group of Linyphiidae, also characteristic of disturbed land. Large web-spinners were most sensitive to grazing, preferring ungrazed controls because of their dependence of rigid plant structures. DCA ordination of D-vac data suggested that only heavy grazing (in spring and autumn) produced a distinct asemblage. Three other grazed treatments produced impoverished versions of ungrazed control assemblages. The dominant successional trend was a gradual accumulation of species, especially in ungrazed controls. This process was incomplete by 1989: old grasslands contained many species, including some characteristics of calcareous grassland, which had failed to colonize the ex-arable field 7 years after abandonment. Most features of the assemblages could be explained by the effects of grazing on plant architecture, in contrast to other invertebrates studied in the same system, which were more strongly affected by plant species composition.
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357. **Changes in the distribution and status of sage-grouse in Utah.**
Beck, Jeffrey L.; Mitchell, Dean L.; and Maxfield, Brian D.
Western North American Naturalist 63(2): 203-214. (2003)
NAL Call #: QH1.G7; ISSN: 1527-0904
Descriptors: Centrocercus minimus/ Centrocercus spp./ Centrocercus urophasianus/ Galliformes/ terrestrial ecology/ habitat degradation/ habitat fragmentation/ habitat loss/ sagebrush habitats/ habitat management/ sagebrush rangeland enhancement requirement/ ecosystems/ Utah/ conservation/ wildlife management/ land zones
Abstract: Sage-grouse (Centrocercus spp.) were abundant in all of Utah's 29 counties at the time of European settlement wherever sagebrush (Artemisia spp.) occurred. Greater Sage-Grouse (C. urophasianus) inhabited areas north and west of the Colorado River, and Gunnison Sage-Grouse (C. minimus) occupied suitable habitat south and east of the Colorado River. The largest Greater Sage-Grouse populations in Utah are currently restricted to suitable habitats in Box Elder, Garfield, Rich, Uintah, and Wayne Counties. A remnant breeding population of Gunnison Sage-Grouse occurs in eastern San Juan County. We stratified Greater Sage-Grouse populations (1971-2000) by counties where the 1996 to 2000 moving average for estimated spring breeding populations was > 500 (GT500) or < 500 (LT500). Males per lek declined in all populations from 1971 to 2000; however, there were consistently more males observed on GT500 than on LT500 leks. Juveniles per adult hen (including yearling hens) Greater Sage-Grouse in the 1973-2000 fall harvest in Box Elder, Rich, and Wayne Counties did not differ from 2.25, a ratio suggesting sustainable or increasing sage-grouse populations. Declines are attributed to loss, fragmentation, and degradation of sagebrush habitat. Sage-grouse conservation ultimately depends on management and enhancement of remaining sagebrush rangelands in Utah.
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358. **Changing habitat associations of a thermally constrained species, the silver-spotted skipper butterfly, in response to climate warming.**
Davies, Zoe G.; Wilson, Robert J.; Coles, Sophie; and Thomas, Chris D.
Journal of Animal Ecology 75(1): 247-256. (2006)
NAL Call #: 410 J828; ISSN: 0021-8790
Descriptors: behavior/ biogeography: population studies/ terrestrial ecology: ecology, environmental sciences/ climatology: environmental sciences/ wildlife management: conservation/ reproduction/ climate warming
Abstract: 1.The impact of climate change on the distribution, abundance, phenology and ecophysiology of species is already well documented, whereas the influence of climate change on habitat choice and utilization has received little attention. Here we report the changing habitat associations of a thermally constrained grassland butterfly, Hesperia comma, over 20 years.2. Between 1982 and 2001-2, the optimum percentage of bare ground within habitat used for egg-laying shifted from 41% to 21%.3. Egg-laying rates are temperature-dependent and females actively adjust microhabitat usage in response to temperature variations; relatively warmer host plants are

chosen or oviposition at low ambient temperatures, and cooler host plants at high ambient temperatures.4. Climate warming has increased the availability of thermally suitable habitat for H. comma at the cool, northern edge of the species' distribution, therefore increasing: (a) egg-laying rate and potentially the realized rate of population increase; (b) effective area of habitat patches as more microhabitats within a given vegetation fragment are now suitable for egg-laying; (c) buffering of populations against environmental variation as eggs are laid within a wider range of microhabitats; and (d) the number of habitat patches in the landscape that are currently available for colonization (including the use of more northerly facing aspects; Thomas et al., Nature, 2001, 411, 577-581). Conservationists often assume the habitat requirements of a species to be constant, and manage habitats to maintain these conditions. For many species, these requirements are likely to change in response to climate warming, and care must be taken not to manage habitats based on outdated prescriptions.
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359. **Characteristics of nest sites of northern bobwhites in western Oklahoma.**
Townsend, D. E.; Masters, R. E.; Lochmiller, R. L.; Leslie D.M.; Demaso, S. J.; and Peoples, A. D.
Journal of Range Management 54(3): 260-264. (2001)
NAL Call #: 60.18 J82; ISSN: 0022409X
Descriptors: bobwhite/ Colinus virginianus/ Gallinaceous/ habitat/ quail/ upland game/ gamebird/ habitat structure/ nest site/ vegetation structure/ United States
Abstract: Previous authors have described nesting habitat of the northern bobwhite (Colinus virginianus) throughout its range, but few have compared structural or compositional differences of vegetation between nest sites and random non-use sites, and successful and non-successful nests. From 1996-1998, we compared cover and structure of 85 plant species from 80 nest sites of northern bobwhite in western Oklahoma. Nest sites were consistently associated with greater structural complexity than what was available at random. Bobwhites selected nest sites with a greater coverage of grass (ca. 50%) and woody (ca. 20-30%) vegetation with a relatively low percentage of bare ground, presumably because these attributes maximize their chance for successful reproduction by providing protection against weather and predators. Successful nests were more concealed during 1996 and 1997 (12.37 and 10.74% visibility, respectively) than non-successful nest sites (21.6 and 27.65% visibility), but levels of concealment did not differ during 1998. We found no significant differences in vegetation composition or structure between successful and non-successful nest sites.
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360. **Characteristics of ungulate behavior and mortality associated with wire fences.**
Harrington, J. L. and Conover, M. R.
Wildlife Society Bulletin 34(5): 1295-1305. (2006)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2006)34 [1295:COUBAM]2.0.CO;2.
Descriptors: Antilocapra americana/ Cervus elaphus/ elk/ habitat fragmentation/ highways/ human-wildlife conflicts/ mortality/ mule deer/ Odocoileus hemionus/ pronghorn/ wire fences
Abstract: We studied the characteristics of pronghorn (Antilocapra americana), mule deer (Odocoileus hemionus), and elk (Cervus elaphus) mortalities associated with wire fences along roads in Colorado and Utah, USA, from June 2004 to June 2005. We estimated an average annual mortality occurrence of 0.25 mortalities/km for the wire fences studied (0.08 mule deer mortalities/km, 0.11 pronghorn mortalities/km, and 0.06 elk mortalities/km) or 0.5 mortalities/km of road. The highest wire fence-mortality rates in our study area occurred during August, which coincided with weaning of fawns. Mule deer and pronghorn jumped fences in >81% of observed crossings. Mortalities were largely caused by animals getting caught between the top 2 wires. Mule deer experienced higher fence-mortality rates than elk or pronghorn because they crossed fences more frequently ($P < 0.001$) and spent more time in road right-of-ways ($P < 0.001$) than the other species. Juveniles were 8 times more likely to die in fences than adults. Woven-wire fences topped with a single strand of barbed wire were more lethal to ungulates than woven wire with 2 strands of barbed wire above it or 4-strand barbed-wire fences ($P < 0.01$). There was a direct relationship between the frequency of fence mortalities and ungulate abundance ($r^2 = 0.83$). Traffic volumes were inversely related to fence-mortality frequencies ($r^2 = 0.50$) and ungulate densities along the right-of-way ($r^2 = 0.50$).
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361. **Communities of small mammals in six grass-dominated habitats of southeastern Oklahoma.**
Clark, B. K.; Clark, B. S.; Homerding, T. R.; and Munsterman, W. E.
American Midland Naturalist 139(2): 262-268. (Apr. 1998)
NAL Call #: 410 M58
Descriptors: prairies/ pasture/ species diversity/ community composition/ Oklahoma/ Mammalia
Abstract: During autumn 1991, we sampled small mammals in sixgrass-dominated habitats including upland ungrazed native prairie,upland improved pastures, upland mowed native prairie, uplandroadside fencerows, lowland ungrazed native prairie and lowlandungrazed native prairie with forbs and shrubs in southeastern Oklahoma. Eleven species of small mammals were represented in 405 captures. Species diversity (H') was high in upland (1.57) and lowland (1.47) ungrazed prairie and least for upland fencerows(0.86). Evenness (J') exhibited a similar pattern and was high in upland (0.88) and lowland (0.82) ungrazed prairie and least for lowland ungrazed prairie with forbs and shrubs (0.53). Community overlap (R_o) varied from 1.00 (upland improved pastures and upland roadside fencerows) to 0.57 (upland improved pastures and upland ungrazed prairie). Abundance of small mammals was greatest in fencerows, largely due to the prevalence of hispid cotton rats(Sigmodon hispidus). Different land-use practices elicited both positive and negative species-specific responses. Current human activity in some locations may produce habitat mosaics that result in an overall greater abundance and diversity of small mammals.
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362. **Comparative productivity of American ducks and mallards nesting in agricultural landscape of southern Quebec.**
Maisonneuve, C.; McNicoll, R.; and Desrosiers, A.
Waterbirds 23(3): 378-387. (2000)
NAL Call #: QL671; ISSN: 07386028
Descriptors: Anas platyrhynchos/ Anas rubripes/ black duck/ chronology/ clutch size/ hen survival/ mallard/ nesting success/ agricultural land/ clutch size/ habitat structure/ nesting success/ survival/ waterfowl/ Canada/ Anas platyrhynchos/ Anas rubripes
Abstract: We monitored radio-marked female American Black Ducks (Anas rubripes) and Mallards (A. platyrhynchos) in agricultural landscapes of southern Quebec in 1994-1996 to characterize nesting habitat, and to compare nesting success and female survival rates. In early spring, when nesting cover is almost non-existent in agricultural fields, both species avoid fields for nesting. These habitats are rather used later in cases of renesting. Both species selected recent wood cuts and edge-transition habitats (abandoned farmland, hedgerows and riparian areas) as nesting habitat. Median nest initiation date, clutch size, and nest success rates did not differ between the two species. Especially high Black Duck nesting success (100%) in peatlands underlines the importance of these habitats. When peatland nests are excluded to provide a better indication of what prevails in typical agricultural landscapes, nesting effort of female Mallards is almost twice that of Black Ducks. Survival rates of females were similar for both species, both during laying and post-laying periods. Received 20 October 1999, accepted 20 May 2000.
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363. **Comparing pocket gopher (Thomomys bottae) density in alfalfa stands to assess management and conservation goals in northern California.**
Smallwood, K. Shawn; Geng, Shu; and Zhang, Minghua
Agriculture, Ecosystems and Environment 87(1): 93-109. (2001)
NAL Call #: S601.A34; ISSN: 0167-8809
Descriptors: commercial activities/ ecology/ population dynamics/ man-made habitat/ abiotic factors/ land and freshwater zones/ Thomomys bottae (Geomyidae): farming and agriculture/ farming practices/ conservation measures/ density and distribution/ population density/ alfalfa crop habitats/ distribution within habitat/ cultivated land habitat/ alfalfa fields/ abiotic factors/ California/ Yolo County/ Geomyidae/ Rodentia, Mammalia/ chordates/ mammals/ vertebrates
Abstract: Pocket gophers (Thomomys bottae) affect alfalfa (Medicago sativa L.) production in Yolo County, California, as well as the distribution of special status, rare species that either prey on gophers or use their burrows as habitat. Farming practices, as well as attributes of the landscape and of alfalfa fields, were compared to 134 estimates of gopher density among 35 alfalfa stands scattered throughout the County during 1992-1994. Gophers in alfalfa fields averaged only one-fourth the average density among published reports, and the range from low to high density was much smaller in alfalfa fields. Gopher density was greater at the field edge, especially during the first 2 years of stand production. Preference for the edge decreased by the third year of alfalfa production as gophers used the available space in the field interior. A stepwise multiple regression model could explain 73% of the variation in the 134 estimates of gopher density. This variation was explained by years since sowing of the alfalfa (standardized slope coefficient, 0.52), annual frequency of flood irrigation (0.43), habitat area as a percentage of the landscape within a 500m buffer around the field (0.31), season of the year (0.25), field size (0.20) and percentage of sand within the top soil layer (0.16). This model can be used to predict the distribution of special status species that depend on gophers, and can be used to guide conservation efforts by increasing the spatial extent of non-cultivated gopher habitat on suitable areas intervening alfalfa fields. Non-cultivated gopher habitat is currently rare in the valley portion of Yolo County. Gopher control failed to influence density to the magnitude sought by the alfalfa growers, and cessation of control would benefit both production and conservation goals in some alfalfa growing regions.
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364. **A comparison of restored native grasslands and exotic grass pastures as wintering habitat for declining grassland bird species in the southeastern United States.**
Mcmellen, A. B. and Schweitzer, S. H.
In: XX International Grassland Congress: Offered Papers. Wageningen, Netherlands: Wageningen Academic Publishers, 2005.
Notes: Meeting Information: 20th International Grassland Congress, Dublin, Ireland; June 26 -July 01, 2005; 9076998817 (ISBN).
Descriptors: terrestrial ecology: ecology, environmental sciences/ wildlife management: conservation/ wintering habitat/ restored native grassland/ exotic grass pasture
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365. **Compatibility of prescribed burning with the conservation of insects in small, isolated prairie reserves.**
Panzer, Ron
Conservation Biology 16(5): 1296-1307. (2002)
NAL Call #: QH75.A1C5; ISSN: 0888-8892
Descriptors: conservation/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ land and freshwater zones/ Insecta: conservation/ biodiversity preservation/ prescribed burning compatibility/ population dynamics/ grassland/ small isolated prairie reserves/ fire/ prescribed burning/ prairie reserves/ Indiana/ Wisconsin/ Illinois/ Indiana/ Newton County/ Green and Kenosha Counties/ prairie reserve burning/ Insecta/ arthropods/ insects/ invertebrates
© Thomson Reuters Scientific

366. **Concurrent effects of fire regime, grazing and bison wallowing on tallgrass prairie vegetation.**
Trager, Matthew D.; Wilson, Gail W. T.; and Hartnett, David C.
American Midland Naturalist 152(2): 237-247. (2004)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: Bovidae/ Artiodactyla/ Bos bison/ Bison bison/ terrestrial ecology/ fire regime/ grazing/ interacting disturbances/ tallgrass prairie/ vegetation patterns/ wallowing/ habits-behavior/ intraspecies relationships/ fires-burns/ foods-feeding/ grasslands/ ecosystems/ habitat management/ wildlife-habitat relationships/ Kansas/ Konza Prairie Biological Station/ environmental factors/ behavior/ conservation/ wildlife management/ habitat use/ land zones/

nutrition/ bison/ prairie/ food/ vegetation/ change in vegetation
Abstract: We examined the effects of fire regime and bison activity oil the plant communities of active bison wallows and the surrounding grazing lawns at Konza Prairie Biological Station in northeastern Kansas, USA. In both mid-june and late july the grazed sites had higher species richness and more vegetation cover than the wallow edges regardless of fire regime. The percent cover of most dominant perennial species was significantly higher on grazing lawns than in wallows. Annual species and exotic species had significantly higher cover in wallows than in grazing lawns and in annually burned sites compared to those burned at a 4-y interval. Overall, treatment effects on community structure and individual species abundance were stronger in the June. However, in July there was significantly more bare ground wallows around sites burned at a 4-y, interval, suggesting increased wallowing activity at these sites. This finding suggests a strong effect of fire regime on seasonal bison activity, which further indicates the importance of multiple interacting disturbances for generating local- and landscape-level vegetation patterns in tall grass prairie.
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367. **Conservation of biodiversity in managed rangelands, with special emphasis on the ecological effects of large grazing ungulates, domestic and wild.**
Duncan, Patrick and Jarman, Peter J.
International Grassland Congress: Proceedings 17(3): 2077-2084. (1993); ISSN: 0074-6185
Descriptors: ungulates/ Ungulata/ Bos taurus/ conservation/ damage/ grazing/ ecosystems/ mammals/ rangeland/ species diversity/ cattle/ prairie/ diversity
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368. **Conservation of grassland birds in North America: Understanding ecological processes in different regions.**
Askins, Robert A.; Chavez-Ramirez, Felipe; Dale, Brenda C.; Haas, Carola A.; Herkert, James R.; Knopf, Fritz L.; and Vickery, Peter D.
Auk 124: 1-46. (2007)
NAL Call #: 413.8 AU4 ; ISSN: 0004-8038
Descriptors: birds/ grasslands/ habitat requirements/ prairies/ Bison bison/ Castor canadensis/ beavers/ longleaf pine/ Pinus palustris/ whooping crane/ Pinus palustris/ Pinus spp.
Abstract: Many species of birds that depend on grassland or savanna habitats have shown substantial overall population declines in North America. To understand the causes of these declines, we examined the habitat requirements of birds in six types of grassland in different regions of the continent. Open habitats were originally maintained by ecological drivers (continual and pervasive ecological processes) such as drought, grazing, and fire in tallgrass prairie, mixed-grass prairie, shortgrass prairie, desert grassland, and longleaf pine savanna. By contrast, grasslands were created by occasional disturbances (e.g., fires or beaver [Castor canadensis] activity) in much of northeastern North America. The relative importance of particular drivers or disturbances differed among regions. Keystone mammal species-grazers such as prairie-dogs (Cynomys spp.) and bison (Bison bison) in western prairies, and dam-building beavers in eastern deciduous forests- played a crucial, and frequently unappreciated, role in maintaining many grassland systems. Although fire was important in preventing invasion of woody plants in the tallgrass and moist mixed prairies, grazing played a more important role in maintaining the typical grassland vegetation of shortgrass prairies and desert grasslands. Heavy grazing by prairie-dogs or bison created a low "grazing lawn" that is the preferred habitat for many grassland bird species that are restricted to the shortgrass prairie and desert grasslands. Ultimately, many species of grassland birds are vulnerable because people destroyed their breeding, migratory, and wintering habitat, either directly by converting it to farmland and building lots, or indirectly by modifying grazing patterns, suppressing fires, or interfering with other ecological processes that originally sustained open grassland. Understanding the ecological processes that originally maintained grassland systems is critically important for efforts to improve, restore, or create habitat for grassland birds and other grassland organisms. Consequently, preservation of large areas of natural or seminatural grassland, where these processes can be studied and core populations of grassland birds can flourish, should be a high priority. However, some grassland birds now primarily depend on artificial habitats that are managed to maximize production of livestock, timber, or other products. With a sound understanding of the habitat requirements of grassland birds and the processes that originally shaped their habitats, it should be possible to manage populations sustainably on "working land" such as cattle ranches, farms, and pine plantations. Proper management of private land will be critical for preserving adequate breeding, migratory, and winter habitat for grassland and savanna species.
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369. **Conservation of grassland leafhoppers: A brief review.**
Biedermann, Robert; Achtziger, Roland; Nicke, Herbert; and Stewart, Alan J. A.
Journal of Insect Conservation 9(4): 229-243. (2005)
NAL Call #: QL362.J68 ; ISSN: 1366-638X
Descriptors: climatology: environmental sciences/ terrestrial ecology: ecology, environmental sciences/ wildlife management: conservation/ climate/ conservation/ population density/ habitat change/ ecology
Abstract: The leafhoppers, planthoppers and their allies (collectively known as the Auchenorrhyncha) are presented as a group of insects that are highly appropriate for studying grassland ecology and conservation, evaluating the conservation status of sites and monitoring environmental and habitat change. Semi-natural grasslands typically support dense populations and a wide range of species with diverse ecological strategies. Their numerical dominance in many grasslands means that they have considerable functional significance, both as herbivores and as prey for higher trophic levels. Population and assemblage studies are supported by good ecological knowledge about most species and modern identification keys. Hitherto, most studies have focused on the composition and structure of assemblages and how they are affected by conservation management. However, grasslands support many rare species with small and fragmented populations which deserve conservation attention in their own right, and recent work has started to reflect this. The effects of management on the composition

and structure of grassland leafhopper populations and assemblages are described and an assessment is given of the main threats facing individual species and overall diversity. There is a need to synthesise the scattered literature on grassland leafhoppers, to provide a model for how the composition and structure of populations and assemblages respond to major environmental and anthropogenic gradients across large biogeographic areas. Such an analysis could help predict the impact of likely future changes in land use and climate.
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370. **Conservation of piping plovers in the U.S. Alkali Lakes Core Area.**
Ivan, Jacob S.; Murphy, Robert K.; Rabenberg, Michael; and Smith, Karen A.
Intermountain Journal of Sciences 8(4): 254. (2002); ISSN: 1081-3519
Descriptors: Charadrius melodus/ birds/ conservation/ wildlife management/ endangered-threatened species/ ecosystems/ grasslands/ prairies/ predators/ predator control/ survival/ productivity/ wildlife-habitat relationships/ habitat management/ piping plover/ Montana/ North Dakota/ Alkali Lakes Core Area
Abstract: The northern Great Plains population of piping plovers has been listed as Threatened in the U.S. and Endangered in Canada since 1985. The current population decline and poor prognosis is thought to be due to inadequate reproductive success stemming from significant alteration of the prairie landscape and predator community during the last century. Planted trees, increased woody cover, rockpiles, junkpiles, and abandoned buildings now offer denning, nesting, and roosting habitat for a variety of egg and chick predators that were once uncommon on northern prairies, e.g. great-horned owl, striped skunk, raccoon, American crow. Also, in many areas, once extensive native grasslands are now reduced to small remnants that may be more efficiently searched by predators. About two-thirds of the U.S. Great Plains population breeds annually on the eight county study area, which extends from northwest North Dakota through northeast Montana. Over the past decade, the authors have documented size, distribution, habitat selection, and vital rates for this population. They have also identified and implemented a rigorous predator exclusion program that has boosted piping plover reproductive rates into the range necessary to stabilize the population decline. Currently they are evaluating landscape influences on plover productivity to determine whether habitat preservation and restoration, e.g. removal of unnatural landscape features that may house predators of facilitate predation, can contribute measurably to piping plover recovery.
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371. **Conservation value of agricultural riparian strips in the Boyer River watershed, Quebec (Canada).**
Jobin, B.; Belanger, L.; Boutin, C.; and Maisonneuve, C.
Agriculture, Ecosystems and Environment 103(3): 413-423. (2004)
NAL Call #: S601.A34; ISSN: 01678809.
Notes: doi: 10.1016/j.agee.2003.12.014.
Descriptors: farmland/ landscape modification/ Quebec/ riparian habitat/ streambank
Abstract: Riparian habitats play a major role in biodiversity conservation in intensive agricultural landscapes because they represent remnants of both wetland and woody habitats available for wildlife. The importance of herbaceous, shrubby and wooded riparian habitats for the conservation of biodiversity (plants, amphibians, reptiles, birds, small mammals) is well documented for the Boyer River watershed (southern Quebec, Canada). This paper examines their conservation value for these different taxonomic groups at the watershed level and the possible effects on wildlife of various landscape modification scenarios. The overall species richness and insectivorous bird abundance in the watershed would increase markedly if there were more wooded strips in the landscape mainly due to additional plant and bird species. A scenario where all three types of riparian strips would be well-represented in the watershed is most likely to be implemented. This scenario would be the most beneficial to wildlife communities because of high native species diversity within wooded strips combined with the presence of unique species associated with each of the three types of strips. Encouraging landowners to protect existing wooded riparian habitats would be the most effective and cost-beneficial method to maintain current level of habitats distribution in the landscape, and to favour the establishment of new shrubby and wooded strips in the Boyer River watershed. [Crown Copyright.]
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372. **Conservation value of private lands for Crested Caracaras in Florida.**
Morrison, J. L. and Humphrey, S. R.
Conservation Biology 15(3): 675-684. (2001)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1046/j.1523-1739.2001.015003675.x.
Descriptors: habitat quality/ nature conservation/ private land/ raptors/ United States/ Caracara cheriway
Abstract: In southcentral Florida, where agricultural lands are being converted rapidly to urban development, much of the remaining nonurban habitat occurs on privately owned cattle ranches. We studied the Crested Caracara (Caracara cheriway), a threatened bird of prey, to learn the role of private lands in sustaining the population. We investigated patterns of distribution and reproductive activity of breeding pairs of caracaras in relation to patterns of land ownership and use. Eighty-two percent of 73 active nest sites found were on privately owned cattle ranches. We rarely found breeding pairs on publicly owned lands, most of which are managed as natural areas (no agricultural production and limited livestock grazing) to support native plant and animal communities. In 46 breeding areas with 4 years of known histories of occupancy and reproduction, pairs nesting on lands where the major land use was cattle ranching exhibited higher rates of breeding-area occupancy, attempted breeding during more years, initiated egg laying earlier, exhibited higher nesting success, and attempted a second brood after successfully fledging a first brood more often than pairs nesting on lands managed as natural areas. Compositional analysis suggested nonrandom selection of habitats by breeding pairs of caracaras in their establishment of a home range in the current landscape of southcentral Florida. Compared with random areas and available habitat in the overall study area, caracara home ranges had higher proportions of improved pasture and lower proportions of forest, woodland, oak scrub, and marsh. Which management activities favor and do not favor caracaras is uncertain, and hypotheses should be

formulated and tested to guide future conservation applications. Particular grazing and fire management practices on privately and publicly owned lands may affect the structure of vegetation and prey communities in ways that influence caracaras. Or, replacement of native by exotic grasses may retain structurally suitable plant communities, whereas fertilization and grazing may increase productivity and nutrient cycling in ways that favor caracaras. Given continued conversion of natural habitats and agricultural lands to urban development, it is important to recognize that cattle ranches may provide important resources for wildlife conservation. Although cattle ranching is not likely to benefit all species historically associated with the native prairie ecosystem in Florida, finding ways to retain this land use may be important for the conservation of Florida's population of Crested Caracaras and other organisms of Florida's dry prairies.
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373. **Conservative and moderate grazing effects on Chihuahuan Desert wildlife sightings.**
Joseph, Jamus; Collins, Michelle; Holechek, Jerry; Valdez, Raul; and Steiner, Robert
Western North American Naturalist 63(1): 43-49. (2003)
NAL Call #: QH1.G7; ISSN: 1527-0904
Descriptors: Antilocapra americana/ Antilocapridae/ Artiodactyla/ Lepus californicus/ Sylvilagus auduboni/ Leporidae/ Lagomorpha/ Bos taurus/ Mammalia/ Zenaida macroura/ Columbiformes/ Callipepla squamata/ Galliformes/ Aves/ grazing/ deserts/ wildlife habitat/ drought/ black-tailed jackrabbit/ pronghorn/ scaled quail/ mourning doves/ desert cottontails/ Mexico/ Chihuahua Province
Abstract: Seasonal wildlife observations were made along transects on 2 pastures conservatively grazed (36% use of perennial grasses) and 2 pastures moderately grazed (47% use of perennial grasses) in south central New Mexico in non-drought (1997) and drought years (1998). Experimental pastures were similar in soils, terrain, spacing of watering points, and brush cover. Average ecological condition score for the conservatively grazed pastures was 60% compared with 64% for moderately grazed pastures. Throughout the study total standing vegetation understory herbage levels were higher (P < 0.05) on conservatively grazed than moderately grazed pastures. Total wildlife, total gamebird, and total songbird sightings did not differ (P > 0.05) between conservatively and moderately grazed pastures. Black-tailed jackrabbit (Lepus californicus) sightings were higher (P < 0.05) on moderately grazed than conservatively grazed pastures. Sightings of pronghorn (Antilocapra americana), scaled quail (Callipepla squamata), mourning doves (Zenaida macroura), and desert cottontails (Sylvilagus auduboni) showed no differences (P > 0.05) between conservatively and moderately grazed pastures. Dry conditions in 1998 depressed total wildlife sightings by > 50% compared to 1997. Both songbird and gamebird (particularly mourning dove) sightings were severely reduced in the dry compared to wet year (P < 0.05). Our results are consistent with Nelson et al. (1997) that livestock grazing at intermediate levels had no effect on most Chihuahuan Desert upland wildlife species, and that drought years severely depress wildlife sightings.
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374. **Contribution of live fences to the ecological integrity of agricultural landscapes.**
Harvey, C. A.; Villanueva, C.; Villacis, J.; Chacon, M.; Munoz, D.; Lopez, M.; Ibrahim, M.; Gomez, R.; Taylor, R.; Martinez, J.; Navas, A.; Saenz, J.; Sanchez, D.; Medina, A.; Vilchez, S.; Hernandez, B.; Perez, A.; Ruiz, F.; Lopez, F.; Lang, I.; and Sinclair, F. L.
Agriculture, Ecosystems and Environment 111(1-4): 200-230. (2005)
NAL Call #: S601.A34; ISSN: 01678809.
Notes: doi: 10.1016/j.agee.2005.06.011.
Descriptors: biodiversity conservation/ Central America/ Costa Rica/ farm management/ Faunal diversity/ landscape characterization/ landscape connectivity/ Local knowledge/ Nicaragua/ agricultural land/ boundary/ mobility/ rural landscape/ wildlife management/ Animalia/ Aves/ Bos taurus/ Coleoptera/ Papilionoidea
Abstract: Live fences are conspicuous features of agricultural landscapes across Central America but there is remarkably little information about their abundance, distribution, and function. Here we present a detailed analysis of: (1) the abundance, composition, structure and distribution of live fences in four contrasting cattle-producing areas of Costa Rica and Nicaragua; (2) the management of live fences by farmers; and (3) the ecological roles of live fences in providing habitat, resources and connectivity for wildlife. Data on botanical composition and structure are complemented by documentation of local knowledge about live fences and associated management practices, as well as an assessment of fauna that utilize them. Live fences were common, occurring on between 49% and 89% of cattle farms, with an overall mean of 0.14 ± 0.01 km ha-1 of farm land and almost 20 fences per farm. They were generally short (164.3 ± 5.4 m), narrow (3.76 ± 0.03 m) and densely planted (323.1 ± 8.6 trees km-1), consisting primarily of planted trees. The mean tree species richness for individual fences in each landscape was low (from 1.4 to 7.5 species per fence), but landscape species richness was higher (from 27 to 85 species, with over 70 species in three out of four sites). A total of 161 tree and palm species were recorded in the live fences across the four sites. The abundance, tree species composition and structure of live fences varied across farms and landscapes, reflecting differences in environmental conditions and management strategies. In all landscapes the main productive roles of live fences were to divide pastures and serve as barriers to animal movement, although they were also sources of fodder, firewood, timber and fruit. The main ecological roles were to provide habitats and resources for animal species and structural connectivity of woody habitat across the agricultural landscape. More than 160 species of birds, bats, dung beetles and butterflies were recorded visiting them. Their value for biodiversity conservation depended on their species composition, structural diversity and arrangement within the landscape, all of which were heavily influenced by management currently undertaken by farmers in pursuit of production rather than conservation goals. Live fences are important features of agricultural landscapes that merit much greater attention in sustainable land management strategies and need to be an explicit element in regulations and incentives that aim to enhance the ecological integrity of rural landscapes in Central America.
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375. **Contributions of the United States Department of Agriculture Natural Resources Conservation Service to conserving grasslands on private lands in the United States.**
Heard, L. P.
In: 20th International Grassland Congress. Dublin, Ireland. O'Mara, F. P.; Wilkins, R. J.; Mannetje, L.; Lovett, D. K.; Rogers, P. A.; and Boland, T. M. (eds.)
Wageningen, Netherlands: Wageningen Academic Publishers; pp. 665; 2005. ISBN: 9076998817
Descriptors: biogeography: population studies/ terrestrial ecology: ecology, environmental sciences/ conservation/ water quality/ conservation/ biodiversity/ soil protection/ United States Department of Agriculture/ Natural Resources Conservation Service
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376. **Conversion of tall fescue pastures to tallgrass prairie in southeastern Kansas: Small mammal responses.**
Rucker, A. D. Kansas State University, 2001.
Notes: Thesis, Kansas Cooperative Fish and Wildlife Research Unit
Descriptors: abundance/ burning/ cattle grazing/ cover/ fertilization, soil and water/ fescue/ habitat management/ mammals/ prairie/ rabbits and hares/ shrews/ species diversity/ vegetation/ wildlife-habitat relationships/ rodents
Abstract: Small mammal responses to a method of converting fescue pastures to native tallgrass prairie were examined at the Kansas Army Ammunition Plant neat Parsons, Kansas. The conversion method included removing cattle from fescue pastures, halting nitrogen fertilization and implementing spring burning one year following cattle removal. Five treatments were identified to study the trajectory of prairie restoration: (1) ungrazed, mowed native prairie; (2) currently grazed, unburned fescue pastures receiving annual nitrogen fertilizer; (3-5) fescue pastures from which cattle and fertilizer were removed on 1 January of 1997, 1998, and 1999 with annual spring burning initiated one year following cattle removal. Eleven species were captured, including cotton rat, deer mouse, white-footed mouse, western and plains harvest mice, eastern woodrat, least shrew, Elliot's short- tailed shrew, prairie vole, house mouse, and eastern cottontail rabbit.
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377. **Cover for wildlife after summer grazing on Sandhills rangeland.**
Reece, Patrick E.; Volesky, Jerry D.; and Schacht, Walter H.
Journal of Range Management 54(2): 126-131. (2001)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume54/Number2/azu_jrm_v54_n2_126_131_m.pdf
Descriptors: Bos taurus/ Galliformes/ Phasianidae/ tympanuchus phasianellus/ birds/ ecosystems/ grasslands/ habitat use/ livestock/ nests-nesting/ rangeland/ wildlife-habitat relationships/ wildlife-livestock relationships/ cattle/ sharp-tailed grouse/ foods-feeding/ interspecies relations/ cover/ Aves/ Nebraska
Abstract: Livestock production and wildlife habitat objectives become antagonistic on grasslands when the architecture of standing herbage needed for key wildlife species limits the amount of forage that can be used by livestock. However, quantitative information needed to achieve cover objectives for wildlife is not available for summer-grazed grasslands. Three replicates of seven grazing treatments were applied to the same 1.0-ha pastures for three years. Treatments included ungrazed control, and grazing at 16, 32, or 48 animal unit days (AUD) ha^{-1} for five to seven days during mid-June or mid-July. Cover was estimated after killing frost in September by measuring the average height below which complete visual obstruction occurred. Cumulative grazing pressure (AUD Mg^{-1}) was used to describe grazing effects because of measurable differences in herbage among pastures and dates. Grazing in June reduced the average height of autumn cover at a constant rate from 11.0 to 7.0 cm (R^2=0.34) as cumulative grazing pressure increased from 16 to 90 AUD Mg^{-1}. In contrast, declines in cover after grazing in July were about 2.6 times greater for cumulative grazing pressures up to 40 AUD Mg^{-1} (R^2=0.62), indicating a measurable decline in plant growth and an increasing dependence of autumn cover on the remaining herbage when grazing ended. Relatively low predictability of autumn cover after June compared to July grazing was offset by more plant growth during the balance of the growing season. Frequency of low-cover patches (<or =5.0 cm) within pastures was highly correlated (R^2=0.94) with mean estimates of autumn cover. Consequently, the quality of cover near potential nesting sites also declined as the average height of cover declined, regardless of grazing date. The interdependence of low-cover patches and mean visual obstruction indicates that either variable could be the primary criterion for nest site selection up to 12 cm in visual obstruction.
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378. **Cover of perennial grasses in southeastern Arizona in relation to livestock grazing.**
Bock, C. E. and Bock, J. H.
Conservation Biology 7(2): 371-377. (1993)
NAL Call #: QH75.A1C5 ; ISSN: 0888-8892
Descriptors: wildlife habitat/ livestock/ grazing/ perrenial grasses/ Arizona
Abstract: Southwestern grama (Bouteloua) grasslands are floristically allied to the North American Cental Plains but lie outside the historic range of the plains' principal ungulate grazer, Bison bison. The authors compared perennial grassland cover and species composition on eight sites transected by the boundary fence of a 22 yr old livestock exclosure in a grama grassland in SE Arizona. Total grass canopy cover was greatest on the ungrazed portion of each of the eight sites. Two short stoloniferous species (Hilaria belangeri and Bouteloua eriopoda) were the only taxa substantially more abundant on grazed quadrats overall. Among these and eight taller bunchgrasses, there was a strong positive correlation between potential height and response to release from grazing with the three tallest species showing the greatest increases on ungrazed treatments (Bouteloua curtipendula, Bothriochloa barbinodis, and Eragrostis intermedia). Bouteloua gracilis, the most abundant grass in the region, showed an intermediate response to livestock exclusion. Grama grasslands at the Arizona site have changed more and in different ways following livestock exclusion than those on the Central Plains of Colorado. Contributing factors may include: 1) greater annual precipitation at the Arizona site,

2) the much larger size of the Arizona livestock exclosure, and 3) the absence of extensive grazing by native ungulates in the Southwest since the Pleistocene. -from Authors
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379. **Critical demographic parameters for declining songbirds breeding in restored grasslands.**
Fletcher, R. J.; Koford, R. R.; and Seaman, D. A.
Journal of Wildlife Management 70(1): 145-157. (2006)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: brood parasitism/ Elasticity/ grassland birds/ habitat restoration/ nest predation/ population projection models/ renesting/ survival
Abstract: Land area occupied by tallgrass prairie has declined throughout the midcontinental United States during the past 2 centuries, and migratory birds breeding in these habitats have also experienced precipitous population declines. State and federal agencies have responded by restoring and reconstructing grassland habitats. To understand consequences of restoration for grassland bird populations, we combined demographic data collected over 4 breeding seasons (1999-2002) in northern Iowa, USA, with population projection models to estimate population growth rates of 2 declining migratory songbirds, dickcissels (Spiza americana) and bobolinks (Dolichonyx oryzivorus). To determine what parameters were critical for conservation of these species, we estimated relative contributions of nest predation, brood parasitism by brown-headed cowbirds (Molothrus ater), annual survival, and renesting to population growth using elasticity analysis. Based on model simulations, the population growth rate for dickcissels was not high enough to be stable without immigration into the area ($\eta < 1$). For bobolinks, populations could only be stable ($\eta = 1$) if annual survival was relatively high (adult survival >0.7, with juvenile survival between 0.2 and 0.5). Population growth rates were most sensitive to adult survival across a wide range of parameter estimates, whereas sensitivity to brood parasitism and renesting were consistently low. Elasticities associated with nest predation were highly variable and dependent on survival estimates. In the absence of changes in other demographic parameters, eliminating brood parasitism would not be enough to ensure stable populations of either species. Only management focused on increasing adult survival or decreasing nest predation could produce stable populations. Our results underscore the need for reliable adult survival estimates and conservation strategies focused throughout all phases of the annual cycle. In addition, our modeling approach provides an effective framework for investigating the importance of demographic parameters to population growth rates of birds that are influenced by nest predation, brood parasitism, and renesting. Although habitat restoration is one of the few alternatives for conserving communities in threatened landscapes, restoration strategies also need to have positive effects on population dynamics for species of concern, which has not been demonstrated in this grassland system.
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380. **Cumulative effects of wild ungulate and livestock herbivory on riparian willows.**
Brookshire, E. N.; Kauffman, J. Boone; Lytjen, Danna; and Otting, Nick
Oecologia (Berlin) 132(4): 559-566. (2002)
NAL Call #: QL750.O3; ISSN: 0029-8549
Descriptors: nutrition/ diet/ feeding behavior/ ecology/ terrestrial habitat/ land and freshwater zones/ Cervus elaphus/ Odocoileus hemionus (Cervidae): food plants/ Salix boothii and Salix geyeriana/ browsing effect on plant growth/ foraging/ browsing/ impact on habitat/ riparian habitat/ Oregon/ Blue Mountains/ Upper Meadow Creek/ browsing effect on food plant growth/ reproduction and structure/ Cervidae/ Artiodactyla/ Mammalia/ chordates/ mammals/ vertebrates
Abstract: We examined the effects of wild ungulates (deer and elk) and domestic sheep browsing on the growth, structure, and reproductive effort of two common willow species, Salix boothii and S. geyeriana, in a montane northeast Oregon riparian zone. With the use of exclosures, large herbivore effects on willows were studied in an area browsed by native mammals only and an adjacent area in which domestic sheep also lightly grazed during summer months. Growth variables were repeatedly measured on individual plants over a 5-year period to understand physiognomic and flowering responses of native willows to different levels of browsing pressure. At the beginning of the study, all willows were intensely browsed but were significantly taller in the area browsed only by native mammals than in the area also grazed by sheep (69 versus 51 cm, respectively). Willows inside exclosures responded with pronounced increases in height, crown area, and basal stem diameters while the stature of browsed plants outside exclosures stayed constant or declined. In the area browsed by both sheep and wild herbivores, the size of browsed plants remained at pre-treatment levels (<60 cm in height) for the duration of the study. There was no significant difference in growth rates of enclosed willows, indicating that current herbivory was the primary cause of growth retardation in the study area. Foliar area was strongly correlated with basal stem numbers for enclosed plants but much less so for browsed plants. Willows inside exclosures had more than twice as much foliar area per stem. Stem diameters were a positive function of crown area: stem-number ratios, suggesting lower photosynthetic potential was correlated with diminished radial growth among browsed plants. No flowering was observed until 2 years after exclusion when plants inside all exclosures and browsed willows in the wild ungulate area responded with a large pulse in flowering. Browsed plants in the sheep + wild ungulate area did not flower. The number of catkins produced per plant was significantly associated with willow height and plants <70 cm in height did not flower, thus suggesting a size threshold for reproduction in these species. Our results suggest that even relatively light levels of domestic livestock grazing, when coupled with intense wild ungulate browsing, can strongly affect plant structure and limit reproduction of riparian willows.
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381. **Current issues in sagebrush habitat management.**
Boyd, Chad S.
Northwestern Naturalist 86(2): 85-86. (2005)
NAL Call #: QL671.M8; ISSN: 1051-1733
Descriptors: Artemisia spp./ cattle/ greater sage grouse/ habitat management/ sagebrush/ grazing/ fire
Abstract: Declining populations of greater sage grouse (Centrocercus urophasianus) and other sagebrush obligates have focused attention on sagebrush habitat management. Invasive annual weeds such as cheatgrass dominate over 7,000,000 ha of Great Basin rangeland. At higher elevations, reduced fire frequency has promoted juniper invasion of sagebrush habitat. Livestock grazing affects the majority of the sagebrush biome, but there is a shortage of literature linking grazing to quality of sagebrush obligate habitat. Management is complicated by variation in monitoring protocols across professional disciplines. Solving habitat management issues will require cooperation between a diversity of professionals including wildlife biologists and range and landscape ecologists.
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382. **Daytime activity of white-tailed deer in response to short-duration and continuous grazing.**
Cohen, W. E.; Reiner, R. J.; Bryant, F. C.; Drawe, D. L.; and Bradley, L. C.
Southwestern Naturalist 34(3): 428-431. (1989)
NAL Call #: 409.6 So8 ; ISSN: 0038-4909
Descriptors: Odocoileus virginianus/ pastures/ wildlife management/ Texas
This citation is from AGRICOLA.

383. **Deer and cattle diets on heavily grazed pine-bluestem range.**
Thill, R. E. and Martin, A.
Journal of Wildlife Management 53(3): 540-548. (1989)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Odocoileus virginianus/ Pinus palustris/ Andropogon sp./ seasonality/ feeding preference/ range management/ Louisiana
Abstract: We studied dietary overlap between captive white-tailed deer (n = 3) (Odocoileus virginianus) and cattle (n = 4) for 3 years on 2 rotationally burned, 54-ha longleaf pine (Pinus palustris)-bluestem (Andropogon spp.) pastures in central Louisiana [USA]. A third of each pasture was burned each year in late February. One pasture was grazed heavily (61-77% herbage use) yearlong; the other was grazed heavily (50-67% use) from mid-April to 1 November. Deer diets were dominated yearlong by a mixture of browse (49.3-83.2%) and forbs (11.2-47.1%). Cattle consumed mostly grasses during spring and summer and 60 and 40% browse and herbage, during fall and winter, respectively. Cattle consumed more herbage on first-year burns. Dietary overlap under heavy yearlong grazing averaged 25.8, 11.8, 26.0, and 30.7% during spring, summer, fall, and winter, respectively. Overlap under heavy seasonal grazing averaged 18.5, 7.4, and 22.6% during spring, summer, and fall, respectively. Diets of both animals were diverse and overlap generally resulted from sharing small amounts of many plant taxa. Except on recent burns during summer, dietary overlap under heavy yearlong grazing was comparable to that observed under moderate yearlong grazing at half the cattle stocking rate. Moderate grazing (40-50% herbage removal) of similar range from late spring through early fall should have little negative impact on deer forage availability. Grazing during late fall and winter reduces an already limited supply of deer forage by reducing availability of evergreen browse and herbaceous winter rosettes.
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384. **Demography of a population collapse: The northern Idaho ground squirrel (Spermophilus brunneus brunneus).**
Sherman, Paul W. and Runge, Michael C.
Idaho Academy of Science. Journal 37(1): 49-50. (2001); ISSN: 0536-3012
Descriptors: Spermophilus brunneus brunneus/ survival/ succession/ population ecology/ nutrition/ mammals/ livestock/ history/ habitat use/ habitat management/ foods-feeding/ food supply/ fires-burns/ behavior/ Idaho ground squirrel/ Idaho, West-central
Abstract: Idaho ground squirrels, Spermophilus brunneus brunneus, inhabit five counties in west-central Idaho, and are made up two subspecies, the northern and southern. The northern Idaho ground squirrel has 36 historic sites. The short-grass meadow near the historical townsite of Bear in Idaho is named "Squirrel Valley" and is the largest and densest of the known populations. When studied, the Squirrel Valley population had 272 adults and juveniles. The population declined and by 1999 contained only 10 individuals. The factors causing the population decline included nutritional inadequacy of food resources, particularly seeds, due to drying of the habitat and changes in plant species composition, themselves the result of fire suppression and grazing. Survival rates and litter sizes varied among years. Survival and breeding rates of yearling females were low. Studies suggest that changes in life-history parameters and their variances can play a critical role in anthropogenic population declines.
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385. **Densities of brown-headed cowbirds in riparian and rangeland areas, with and without cattle present, along the middle Rio Grande, New Mexico.**
Tisdale Hein, Rinda E. and Knight, Richard L.
Studies in Avian Biology (26): 152-156. (2003)
NAL Call #: QL671.S8; ISSN: 0197-9922
Descriptors: brood parasitism/ cowbird management/ grazing/ habitat suitability/ livestock management/ rangeland habitat/ riparian habitat/ species density/ species distribution
Abstract: We compared the densities of total Brown-headed Cowbirds (Molothrus ater), female cow-birds, and potential hosts during the morning hours on grazed and ungrazed riparian sites along the Rio Grande, New Mexico, in an attempt to evaluate the influence of the physical presence of cattle on these variables. In addition, we compared the densities of all cowbirds, female cowbirds, and potential hosts between morning and afternoon hours at riparian and rangeland sites, both with and without cattle present. We found no significant differences in total cowbird, female cowbird, or potential host densities during morning hours between riparian sites with and without cattle, indicating that the physical presence of cattle alone did not influence cowbird abundance or potential host abundance at our study sites. Cowbirds were absent from all of our riparian sites during the afternoon hours, indicating that habitat type and/or alternative feeding/congregation opportunities may have been more

important in influencing cowbird densities during afternoon feeding periods than was the mere presence of cattle. Cowbird numbers in rangeland sites were low during both morning and afternoon periods, reflecting the low suitability of rangeland as cowbird breeding, and possibly feeding, habitat regardless of the presence of cattle. The lack of afternoon cowbird detections in both riparian and rangeland sites suggests that alternative feeding resources and/or congregation areas existed within the cowbird's commuting range. These findings have implications for current livestock management efforts to reduce cowbird parasitism of imperiled songbird species.
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386. **Density and diversity of overwintering birds in managed field borders in Mississippi.**
Smith, M. D.; Barbour, P. J.; Burger, L. W.; and Dinsmore, S. J.
Wilson Bulletin 117(3): 258-269. (2005)
NAL Call #: 413.8 W692; ISSN: 00435643
Descriptors: agricultural change/ avifauna/ habitat conservation/ population decline/ population density/ species diversity/ Mississippi/ Aves/ Melospiza melodia/ Passerculus sandwichensis/ Passeridae
Abstract: Grassland bird populations are sharply declining in North America. Changes in agricultural practices during the past 50 years have been suggested as one of the major causes of this decline. Field-border conservation practices encouraged by the U.S. Department of Agriculture's National Conservation Buffer Initiative meet many of the needs of sustainable agriculture and offer excellent opportunities to enhance local grassland bird populations within intensive agricultural production systems. Despite the abundant information on avian use of and reproductive success in, strip habitats during the breeding season, few studies have examined the potential value of field borders for wintering birds. We planted 89.0 km of field borders (6.1 m wide) along agricultural field edges on one-half of each of three row crop and forage production farms in northeastern Mississippi. We sampled bird communities along these field edges during February-March 2002 and 2003 using line-transect distance sampling and strip transects to estimate density and community structure, respectively. We used Program DISTANCE to estimate densities of Song (Melospiza melodia), Savannah (Passerculus sandwichensis), and other sparrows along bordered and non-bordered transects while controlling for adjacent plant community. Greater densities of several sparrow species were observed along most bordered transects. However, effects of field borders differed by species and adjacent plant community types. Diversity, species richness, and relative conservation value (a weighted index derived by multiplying species-specific abundances by their respective Partners in Flight conservation priority scores) were similar between bordered and non-bordered edges. Field borders are practical conservation tools that can be used to accrue multiple environmental benefits and enhance wintering farmland bird populations. Provision of wintering habitat at southern latitudes may influence population trajectories of short-distance migrants of regional conservation concern.
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387. **Density and success of bird nests relative to grazing on western Montana grasslands.**
Fondell, Thomas F. and Ball, I. J.
Biological Conservation 117(2): 203. (2004)
NAL Call #: S900.B5; ISSN: 0006-3207
Descriptors: brown-headed cowbird/ grassland/ grazing/ ground-nesting birds/ nest density/ prairie/ agriculture/ habitat/ habitat change/ change in vegetation/ brood/ egg/ fertility/ recruitment/ reproduction/ density
Abstract: Grassland birds are declining at a faster rate than any other group of North American bird species. Livestock grazing is the primary economic use of grasslands in the western United States, but the effects of this use on distribution and productivity of grassland birds are unclear. We examined nest density and success of ground-nesting birds on grazed and ungrazed grasslands in western Montana. In comparison to grazed plots, ungrazed plots had reduced forb cover, increased litter cover, increased litter depth, and increased visual obstruction readings (VOR) of vegetation. Nest density among 10 of 11 common bird species was most strongly correlated with VOR of plots, and greatest nest density for each species occured where mean VOR of the plot was similar to mean VOR at nests. Additionally, all bird species were relatively consistent in their choice of VOR at nests despite substantial differences in VOR among plots. We suggest that birds selected plots based in part on availability of suitable nest sites and that variation in nest density relative to grazing reflected the effect of grazing on availability of nest sites. Nest success was similar between grazed plots and ungrazed plots for two species but was lower for nests on grazed plots than on ungrazed plots for two other species because of increased rates of predation, trampling, or parasitism by brown-headed cowbirds (Molothrus ater). Other species nested almost exclusively on ungrazed plots (six species) or grazed plots (one species), precluding evaluation of the effects of grazing on nest success. We demonstrate that each species in a diverse suite of ground-nesting birds preferentially used certain habitats for nesting and that grazing altered availability of preferred nesting habitats through changes in vegetation structure and plant species composition. We also show that grazing directly or indirectly predisposed some bird species to increased nesting mortality. Management alternatives that avoid intensive grazing during the breeding season would be expected to benefit many grassland bird species. © 2004 Elsevier.
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388. **Desert grassland canopy arthropod species richness: Temporal patterns and effects of intense, short-duration livestock grazing.**
Forbes, G. S.; Van Zee, J. W.; Smith, W.; and Whitford, W. G.
Journal of Arid Environments 60(4): 627-646. (2005)
NAL Call #: QH541.5.D4J6; ISSN: 0140-1963.
Notes: doi: 10.1016/j.jaridenv.2004.07.004.
Descriptors: arthropods/ desert/ insects/ livestock grazing/ shrub-removal/ species richness
Abstract: Arthropods living in the canopies of two woody shrub species (a sub-shrub (Gutierrezia sarothrae) and a large shrub (Prosopis glandulosa)) and perennial grasses plus associated herbaceous species, were sampled on 18, 0.5 hectare plots in a Chihuahuan Desert grassland for five consecutive years. Mesquite shrubs were removed from

nine plots, six plots were grazed by yearling cattle in August and six plots were grazed in February for the last 3 years of the 5 year study. Arthropod species richness ranged between 154 and 353 on grasses, from 120 to 266 on G. sarothrae, and from 69 to 116 on P. glandulosa. There was a significant relationship between the number of families of insects on grass and G. sarothrae and growing season rainfall but species richness was not a function of growing season rainfall on any of the plants. Several of the arthropod families that were the most species rich in this grassland were found on all of the plants sampled, i.e. Salticid spiders, Bruchid and Curculionid beetles, Cicadellid and Psyllid homopterans, and ants (Formicidae). There were more species rich families that were shared by grasses and the sub-shrub G. sarothrae than with mesquite. The absence of a relationship between growing season rainfall and species richness was attributed to variation in life history characteristics of arthropods and to the non-linear responses of annual and perennial desert grassland plants to rainfall. There were no significant differences in insect family or species richness on any of the plant types as a result of removal of mesquite (P. glandulosa) from selected plots. Intense, short duration (24 h) grazing by livestock during in late summer resulted in reduced species richness in the grass-herb vegetation layer but had no effect on insect species richness on snakeweed or mesquite shrubs. Livestock grazing in winter had no effect on insect species richness on any of the vegetation sampled.
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389. **Desert mule deer use of grazed and ungrazed habitats.**
Ragotzkie, K. E. and Bailey, J. A.
Journal of Range Management 44(5): 487-490. (1991)
NAL Call #: 60.18 J82; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume44/Number5/azu_jrm_v44_n5_487_490_m.pdf
Descriptors: commercial activities/ nutrition/ feeding behavior/ ecology/ terrestrial habitat/ land and freshwater zones/ Odocoileus hemionus crooki: farming and agriculture/ habitat use/ foraging/ home range/ habitat utilization/ grass-shrubland habitats/ cattle grazing/ grasslands/ scrub/ Arizona/ Santa Rita Experimental Range/ Cervidae/ Artiodactyla/ Mammalia/ chordates/ mammals/ vertebrates
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390. **Desert riparian areas: Landscape perceptions and attitudes.**
Zube, Ervin H. and Sheehan, Michele R.
Environmental Management 18(3): 413-421. (1994)
NAL Call #: HC79.E5E5 ; ISSN: 0364-152X
Descriptors: human (Hominidae)/ animals/ chordates/ humans/ mammals/ primates/ vertebrates/ agriculture/ farmers/ land use/ local decision makers/ management/ natural area preservation/ realtors/ resource managers/ Safford, Arizona/ socioeconomics/ Upper Gila River/ wildlife preservation
Abstract: The perceptions and attitudes of residents and special interest groups along the Upper Gila River in the vicinity of the town of Safford, Arizona, USA, were studied with a primary focus on descriptions of the riparian landscape and attitudes towards planning and management in and around the riparian area. Special interest groups included farmers, resource managers, realtors, and local decision makers. Attention was directed to differences between resource managers and other groups. Findings from this study are compared with those from a previous study along the Upper San Pedro River. Notable differences between the two areas included perceptions of appropriate land uses, with a greater emphasis on agriculture and related activities in the Upper Gila River area and on wildlife and natural area preservation in the Upper San Pedro area. Relationships of perceptions and attitudes with the socioeconomic contexts of the two study areas are explored.
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391. **Development of a grassland integrity index based on breeding bird assemblages.**
Coppedge, B. R.; Engle, D. M.; Masters, R. E.; and Gregory, M. S.
Environmental Monitoring and Assessment 118(1-3): 125-145. (2006)
NAL Call #: TD194.E5; ISSN: 01676369.
Notes: doi: 10.1007/s10661-006-1237-8.
Descriptors: avian assemblages/ Conservation Reserve Program/ fragmentation/ grasslands/ Juniper/ landscape pattern/ Oklahoma/ response guilds
Abstract: We utilized landscape and breeding bird assemblage data from three Breeding Bird Survey (BBS) routes sampled from 1965-1995 to develop and test a grassland integrity index (GII) in a mixed-grass prairie area of Oklahoma. The overall study region is extensively fragmented from long-term agricultural activity, and native habitat remnants have been degraded by recent encroachment of woody vegetation, namely eastern redcedar (Juniperus virginiana L.). The 50 individual bird survey points along the BBS routes, known as stops, were used as sample sites. Our process first focused on developing a grassland disturbance index (GDI) as a measure of cumulative landscape disturbances for these sites. The GDI was based on five key landscape variables identified in an earlier species-level study of long-term avian community dynamics: total tree, shrub, and herbaceous vegetation cover indices, overall mean landscape patch size, and grassland patch core size. The GII was then developed based on breeding bird assemblage data. Assemblages were based on commonly used response guilds reflective of five avian life history parameters: foraging mode/location, nesting location, habitat specificity, migratory pattern, and dietary guild. We tested the response of 78 candidate assemblage metrics to the GDI, and eliminated those with no or poor response or with high correlations (redundant), resulting in 13 metrics for use in the final index. Individual metric scores were scaled to fall between 0 and 10, and the cumulative index to range from 0 to 100. Although broader application and refinement are possible, the avian-based GII has an advantage over labor-intensive, habitat-based monitoring in that the GII is derived from readily available long-term BBS data. Therefore, the GII shows promise as an inexpensive tool that could easily be applied over other areas to monitor changes in regional grassland conditions. © Springer Science + Business Media, Inc. 2006.
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392. **Development of a habitat suitability index model for burrowing owls in the eastern Canadian prairies.**
Uhmann, Tanys V.; Kenkel, Norm C.; and Baydack, Richard K.
Journal of Raptor Research 35(4): 378-384. (2001)
NAL Call #: QL696.F3J682; ISSN: 0892-1016
Descriptors: Speotyto cunicularia/ birds/ modeling/ habitat surveys/ ecosystems/ prairies/ wildlife-habitat relationships/ extirpation/ population ecology/ habitat management/ habitat alterations/ succession/ agricultural practices/ burrows/ nests-nesting/ nesting sites/ burrowing owl/ habitat evaluation/ habitat suitability index/ burrowing owl/ Canada/ prairie provinces/ Manitoba/ Saskatchewan
Abstract: Recent efforts to sustain burrowing owl (Athene cunicularia) populations in Manitoba have been unsuccessful, and the species is now effectively extirpated from the province. Although specific causes of the decline remain unknown, loss, fragmentation, and degradation of suitable habitat have likely been major contributors to this decline. The authors developed a habitat suitability index model to determine suitability of burrowing owl nesting habitat in southwestern Manitoba and southeastern Saskatchewan. Model parameters were obtained using a modified Delphi technique to solicit expert opinions. An interactive, adaptive learning approach was used in model development, iteratively refining the model until acceptable levels of accuracy and robustness were achieved. Application of the model to historical burrowing owl breeding sites in Manitoba indicated that habitat suitability is often reduced by the presence of tall vegetation at former nest burrows. A management approach involving moderate grazing to maintain low vegetation height at all nest burrow sites is recommended.
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393. **Development of fall cattle grazing prescriptions to improve deer and elk forage.**
Short, Jeffrey J. and Knight, James E.
Intermountain Journal of Sciences 5(1-4): 72. (1999); ISSN: 1081-3519
Descriptors: cattle/ grazing/ prescribed grazing/ deer/ elk/ forage/ Montana
Abstract: Cattle (Bos taurus) and wild ungulates have long been viewed as competitors. In the future the best method of preserving wildlife and cattle will be to manage them cooperatively. The objective of this project was to examine the use of fall cattle grazing to improve wildlife forage. We looked at the effects of four fall cattle grazing levels on elk (Cervus elaphus), mule deer (Odocoileus hemionus) and white-tailed deer (Odocoileus virginianus) forage. The hypothesis of this study is that fall cattle grazing will improve the quality of elk and deer forage the following spring and summer. The effects of fall foraging on wildlife forage were examined on the Blackfoot Clearwater Wildlife Management area in west central Montana. A randomized complete block design with five replications was used. Cattle were grazed in enclosures during the fall of 1997 and 1998. Grazing levels were zero percent removal (control) 50% removal, 70% removal, and 90% removal. During spring and summer we measured plant species composition, plant diversity, dead plant material, green forb biomass, and green grass biomass to evaluate quality of elk and deer forage. Preliminary data from the first year of this two-year study suggests significant positive differences in wildlife forage due to cattle grazing intensity. Information generated will be useful in making management decisions on ranges that are important spring and summer wildlife habitat.
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394. **Differences in ground beetles (Coleoptera: Carabidae) of original and reconstructed tallgrass prairies in northeastern Iowa, USA, and impact of 3-year spring burn cycles.**
Larsen, Kirk J. and Work, Timothy W.
Journal of Insect Conservation 7(3): 153-166. (2003)
NAL Call #: QL362.J68; ISSN: 1366-638X
Descriptors: conservation measures/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Carabidae: habitat management/ burn cycles/ community structure/ distribution within habitat/ grassland/ original and reconstructed tallgrass prairie habitats/ fire/ Iowa/ Insecta, Coleoptera, Adephaga, Caraboidea/ arthropods/ beetles/ insects/ invertebrates
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395. **Differences in plant composition in cattle and wild ungulate exclosures in north-central Montana.**
Hurlburt, Kris and Bedunah, Don.
In: Sharing Common Ground on Western Rangelands: Proceedings of a Livestock/Big Game Symposium. Sparks, Nevada. Evans, Keith E. (eds.); Vol. INT-GTR-343. Ogden, Utah: U.S. Department of Agriculture Forest Service, Intermountain Research Station; pp. 19-24; 1996.
Notes: ISSN: 0363-6186.
NAL Call #: aSD11.A48
Descriptors: nutrition/ diet/ ecology/ terrestrial habitat/ land and freshwater zones/ Cervus elaphus/ Odocoileus hemionus (Cervidae): food plants/ impact on habitat/ grassland plant community/ impact of grazing/ grassland/ grazing impact on plant community/ Montana/ Dupuyer/ grazing impact on grassland plant community/ Cervidae/ Artiodactyla/ Mammalia/ chordates/ mammals/ vertebrates
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396. **Direct impacts of cattle grazing on grassland nesting birds.**
Churchwell, Roy; Davis, Craig A.; Fuhlendorf, Sam D.; and Engle, David M.
Bulletin of the Oklahoma Ornithological Society 38(4): 25-32. (2005); ISSN: 0474-0750
Descriptors: commercial activities/ reproduction/ reproductive behavior/ ecology/ population dynamics/ terrestrial habitat/ land zones/ Aves: farming and agriculture/ cattle grazing/ nesting success/ breeding site/ nesting site/ reproductive productivity/ mortality/ grassland/ Oklahoma/ Osage County/ tallgrass prairie preserve/ birds/ chordates/ vertebrates
Abstract: We used nest success data from a 2003 field season to examine the direct impacts of cattle grazing on grassland nesting birds. We found that 7% of nest loss was due directly to cattle through trampling of nests (6%) and abandonment (1%). We conclude that changes in grazing management could mitigate the degree to which cattle directly impact nesting success of grassland birds, and discuss these suggestions in light of our results.
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397. **Dispersal and mortality of prairie voles (Microtus ochrogaster) in fragmented landscapes: A field experiment.**
Smith, Jennifer E. and Batzli, George O.
Oikos 112(1): 209-217. (2006)
NAL Call #: 410 OI4; ISSN: 0030-1299
Descriptors: ecology/ population dynamics/ recruitment/ terrestrial habitat/ land zones/ Microtus ochrogaster: Emigration/ mortality/ fragmented landscapes/ Immigration/ distribution within habitat/ Dispersal in fragmented landscapes/ grassland/ Illinois/ Urbana/ Mammalia, Rodentia, Muridae/ chordates/ mammals/ rodents/ vertebrates
Abstract: We conducted a field experiment that manipulated landscapes by mowing so that the amount of unfavorable habitat (low cover) for prairie voles (Microtus ochrogaster) increased while the number and size of favorable patches (high cover) remained constant. Distance between favorable patches increased as the amount of unfavorable habitat increased, so we could test two current hypotheses concerning the effect of habitat fragmentation on local populations: 1) increased distance between favorable habitat patches reduces successful per capita dispersal (emigration and immigration) because dispersers suffer greater exposure to predators (the predation hypothesis); and 2) per capita dispersal is inversely density dependent in voles because increased aggression at higher density inhibits movements (the social fence hypothesis). As predicted by the predation hypothesis, increased distance between favorable habitat patches led to decreased successful dispersal among patches and increased per capita mortality, particularly among subadult and adult males (the categories of voles most likely to emigrate). As predicted by the social fence hypothesis, dispersal was inversely density dependent, and dispersing voles displayed a greater frequency of wounding (an indication of increased aggressive interactions) than did residents. The amount of wounding in general did not increase with density, however, and, as distance between patches increased to 60 m, successful dispersal became rare and erratic. Nevertheless, our overall results supported current hypotheses regarding the effects of increased habitat fragmentation on patterns of dispersal and mortality. Examining the impact of these effects on local population dynamics within different landscapes will require longer periods of observation.
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398. **Distribution of elk and cattle in a rest-rotation grazing system.**
Knowles, C. J. and Campbell, R. B.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 47-60; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: Montana/ American elk/ Cervus elaphus nelsoni/ rotational grazing/ livestock
This citation is from AGRICOLA.

399. **Disturbance by fire frequency and bison grazing modulate grasshopper assemblages in tallgrass prairie.**
Joern, A.
Ecology 86(4): 861-873. (2005)
NAL Call #: 410 Ec7; ISSN: 00129658
Descriptors: Acrididae/ disturbance/ habitat heterogeneity/ Konza prairie/ long-term study/ Phasmida/ prescribed burning/ Tettigoniidae/ biodiversity/ bottom-up control/ disturbance/ fire/ grasshopper/ grazing/ vegetation structure/ Kansas/ Acrididae/ Arthropoda/ bison/ Bison bison/ Bos/ Bubalus/ Insecta/ Mammalia/ Phasmatodea/ Tettigoniidae
Abstract: Understanding determinants of local species diversity remains central to developing plans to preserve biodiversity. In the continental United States, climate, grazing by large mammals, fire, and topography are important ecosystem drivers that structure North American tallgrass prairie, with major impacts on plant community composition and vegetation structure. Frequency of fire and grazing by bison (Bos bison), through effects on plant community composition and altered spatial and structural heterogeneity of vegetation in tallgrass prairie, may act as bottom-up processes that modulate insect community species richness. As previously seen for plant species richness, I hypothesized that grazing had more impact than fire frequency in determining species richness of insect herbivore communities. I examined this prediction with grasshoppers at Konza Prairie, a representative tallgrass prairie site in which fire frequency and bison grazing are manipulated over long terms with landscape-level treatments. Topographic position (upland vs. lowland) and fire frequency (1-, 2-, 4-year intervals, and unburned) did not significantly influence grasshopper species richness or indices of diversity, while grazing had significant effects. On average, I found ~45% more grasshopper species and significantly increased values of Shannon H' diversity at sites with bison grazing. Species abundances were more equally distributed (Shannon's Evenness Index) in grazed sites as well. No significant interactions among burning and grazing treatments ' explained variation in grasshopper species diversity. Grasshopper species richness responded positively to increased heterogeneity in vegetation structure and plant species richness, and negatively to average canopy height and total grass biomass. Variation in forb biomass did not influence grasshopper species richness. A significant positive relationship between grasshopper species richness and overall grasshopper density was observed. Species richness increased marginally as watershed area of treatments in grazed areas increased, but not in ungrazed areas. Disturbance from ecosystem drivers operating at watershed spatial scales exhibits strong effects on local arthropod species diversity, acting indirectly by mediating changes in the spatial heterogeneity of local vegetation structure and plant species diversity. © 2005 by the Ecological Society of America.
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400. **Does body size affect a bird's sensitivity to patch size and landscape structure?**
Winter, Maiken; Johnson, Douglas H; and Shaffer, Jill A.
Condor 108(4): 808-816. (2006)
NAL Call #: QL671.C6; ISSN: 0010-5422
Descriptors: terrestrial ecology: ecology, environmental sciences/ wildlife management: conservation/ body size/

landscape structure/ patch size/ grassland habitat
Abstract: Larger birds are generally more strongly affected by habitat loss and fragmentation than are smaller ones because they require more resources and thus larger habitat patches. Consequently, conservation actions often favor the creation or protection of larger over smaller patches. However, in grassland systems the boundaries between a patch and the surrounding landscape, and thus the perceived size of a patch, can be indistinct. We investigated whether eight grassland bird species with different body sizes perceived variation in patch size and landscape structure in a consistent manner. Data were collected from surveys conducted in 44 patches of northern tallgrass prairie during 1998-2001. The response to patch size was very similar among species regardless of body size (density was little affected by patch size), except in the Greater Prairie-Chicken (Tympanuchus cupido), which showed a threshold effect and was not found in patches smaller than 140 ha. In landscapes containing 0%-30% woody vegetation, smaller species responded more negatively to increases in the percentage of woody vegetation than larger species, but above an apparent threshold of 30%, larger species were not detected. Further analyses revealed that the observed variation in responses to patch size and landscape structure among species was not solely due to body size per se, but to other differences among species. These results indicate that a stringent application of concepts requiring larger habitat patches for larger species appears to limit the number of grassland habitats that can be protected and may not always be the most effective conservation strategy.
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401. **Does management for duck productivity affect songbird nesting success?**
Koper, N. and Schmiegelow, F. K.
Journal of Wildlife Management 71(7): 2249-2257. (Sept. 2007)
NAL Call #: 410 J827
Descriptors: wildlife management/ ducks/ nesting/ songbirds/ wildlife habitats/ highlands/ prairies/ cattle/ grazing/ edge effects/ wildlife-livestock relations/ vegetation structure/ plant litter/ Alberta
Abstract: Habitat management for ducks has significantly influenced prairies and wetlands used by other species. However, the effects of management on other species have not been clearly assessed. We present the first study to compare the nesting success of ducks with the productivity of coexisting passerines. We evaluated effects of cattle grazing, subdivision of fields, habitat edges, year, and vegetation structure on duck and songbird nesting success in 32 mixed-grass prairie fields in southern Alberta, Canada. Duck and songbird nesting success were not correlated. Duck nesting success was influenced by timing of grazing and vegetation structure, and tended to be higher in wetter years, whereas nesting success of most songbirds was not influenced by vegetation structure or grazing, and was sometimes higher in drier years. Local habitat management for ducks cannot be assumed to benefit songbirds. However, some management strategies, such as those that promote tall grass and short litter, might benefit both taxa. [Authors]
This citation is from AGRICOLA.

402. **Duck nest survival in the Missouri Coteau of North Dakota: Landscape effects at multiple spatial scales.**
Stephens, S. E.; Rotella, J. J.; Lindberg, M. S.; Taper, M. L.; and Ringelman, J. K.
Ecological Applications 15(6): 2137-2149. (2005)
NAL Call #: QH540.E23 ; ISSN: 10510761
Descriptors: Anas spp./ duck populations/ fragmentation/ grassland habitat/ information-theoretic model choice/ landscape characteristics/ Missouri Coteau/ mixed models/ multiple spatial scales/ nest survival/ North Dakota/ Prairie Pothole Region/ grassland/ habitat conservation/ habitat fragmentation/ habitat loss/ nesting success/ predation risk/ survival/ waterfowl/ North America/ Prairie Pothole Region/ Anas/ Aythya
Abstract: Nest survival is one of the most important parameters in the population dynamics of grassland-nesting ducks (Anas and Aythya spp.) that breed in the Prairie Pothole Region of North America. Grassland habitats used by these species are increasingly threatened by habitat loss and the coincident fragmentation, which may indirectly alter nest survival through effects on predators. Although predators are the dominant cause of nest loss, they are difficult to monitor directly. Thus, indirect analyses of habitat variables are required. Many studies have attempted to address the relationship between fragmentation and nest survival; however, few studies have examined the influence of fragmentation at multiple spatial scales. Understanding how landscape characteristics at multiple spatial scales explain variation in nest survival is important, because no single correct scale is likely to exist for a diversity of landscape metrics. We examined the relationships between habitat variables and duck nest survival (n ≈ 4200 nests) on 18 10.4- km^2 sites selected across a gradient of landscape characteristics in the Missouri Coteau Region of North Dakota. We evaluated both a priori and exploratory competing models of nest survival that considered habitat features measured at nest sites, within nesting patches, and at multiple landscape scales. We used generalized nonlinear mixed-modeling techniques to model nest survival rates. Information-theoretic techniques were used to select among competing models. Models that included covariates measured at multiple landscape scales were better than simpler models that included only covariates measured at a single spatial scale. Landscape covariates measured at 10.4 and 41.4 km^2 resulted in the best explanation of nest survival. Nest survival was positively related to the amount of grassland habitat, negatively related to the wetland density, and related to the amount of grassland edge in a quadratic manner, with the lowest nest survival at intermediate values of grassland edge. Future research should attempt to determine the causes of these relationships, something we were unable to do with our correlative approach. Conservation efforts focused on maintaining duck populations should seek to maintain landscapes with abundant grassland and to account for the influence of configuration using GIS analyses. © 2005 by the Ecological Society of America.
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403. **Duck nesting on rotational and continuous grazed pastures in North Dakota.**
Murphy, Robert K.; Schindler, Darrell J.; and Crawford, Richard D.
Prairie Naturalist 36(2): 83-94. (2004)
NAL Call #: QH540.P7; ISSN: 0091-0376
Descriptors: visual obstruction reading (VOR)/ Prairie Pothole Joint Venture (PPJV)/ continuous grazed pastures/ nest density/ nest success/ nesting habitat/ prairie habitat conservation/ rotational cattle grazing/ rotational grazed pastures
Abstract: To improve the economic viability of grazed prairie and thus conserve it as wildlife habitat, the Prairie Pothole Joint Venture (PPJV) cost-shares establishment of rotational cattle grazing on privately owned, native rangeland. During 1996 and 1997 we evaluated duck nest density, nest success, and nesting habitat on six PPJV rotational grazed pastures on the Missouri Coteau landform in central and northwestern North Dakota. Each rotational pasture was paired with a traditional, continuous grazed pasture for comparison. We located 444 nests of eight duck species. We detected no differences (P > 0.1) between rotational and continuous grazed pastures in apparent nest density of ducks ($\bar{x}$ > +/- SD nests/ha, all species combined, 1996: 0.26 +/- 0.09 and 0.31 +/- 0.12; 1997: 0.38 +/- 0.14 and 0.25 +/- 0.12), although a grazing type x year interaction suggested rotational pastures might be more attractive to ducks in a dry spring (1997). No differences in duck nest success were detected between rotational and continuous pastures (% Mayfield estimate, 1996: 27.2 +/- 12.6 and 15.5 +/- 11.0; 1997: 21.6 +/- 10.0 and 16.7 +/- 13.7), but varied occurrence of canid species could have obscured differences. We detected no differences in vegetation height-density indices as measured by visual obstruction readings (VORs) between rotational and continuous pastures in 1996. VORs were greater on rotational pastures, however, in the relatively dry spring of 1997. Our findings suggested that rotational grazing systems can serve as a prairie conservation tool on private rangelands without altering habitat values for nesting ducks, and in relatively dry springs might provide more attractive nesting cover for ducks than prairie under continuous grazing.
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404. **Early brood-rearing habitat use and productivity of greater sage-grouse in Wyoming.**
Thompson, K. M.; Holloran, M. J.; Slater, S. J.; Kuipers, J. L.; and Anderson, S. H.
Western North American Naturalist 66(3): 332-342. (2006)
NAL Call #: QH1.G7; ISSN: 15270904
Descriptors: Centrocercus urophasianus/ early brood rearing/ forb/ greater sage-grouse/ habitat/ Invertebrate/ productivity/ sagebrush
Abstract: Populations of Greater Sage-Grouse (Centrocercus urophasianus) have been declining throughout their range since the 1960s. Productivity, which includes production and survival of young, is often cited as a factor in these declines. We monitored radio-equipped Greater Sage-Grouse at 3 sites in western Wyoming to assess early brood-rearing habitat use (through 14 days post-hatch) and productivity. Logistic and linear regression analyses with Akaike's Information Criterion were used to evaluate early brooding habitat use and to examine relationships between productivity and vegetation, insect size and abundance, and weather parameters. Females with broods were found in areas with greater sagebrush canopy and grass cover, and fewer invertebrates compared to random areas. The number of juveniles per female (estimated from wing barrel collections during fall harvest) was positively related to the abundance of medium-length Hymenoptera and grass cover, and the proportion of females with confirmed chicks 14 days post-hatch was positively related to abundance of medium-length Coleoptera and total herbaceous cover. Although the specific parameters varied slightly, Greater Sage-Grouse productivity in Wyoming appeared to be associated with a combination of insect and herbaceous cover elements. Managing for abundant and diverse insect communities within dense protective sagebrush stands should help ensure high-quality early brood-rearing habitat and increased Greater Sage-Grouse productivity.
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405. **Early response to a prairie planting project by grassland birds: 2000 to 2006.**
Shillinglaw, John
Passenger Pigeon 69(2): 175-184. (2007);
ISSN: 0031-2703
Descriptors: conservation measures/ reproduction/ reproductive behavior/ reproductive productivity/ ecology/ community structure/ terrestrial habitat/ land zones/ Aves: habitat management/ prairie planting project/ former agricultural land/ habitat use and nesting responses/ breeding site/ restored grassland/ prairie planting project/ conservation implications/ fledgeing success/ species diversity/ grassland species/ habitat utilization/ grassland/ Wisconsin/ Waushara County/ birds/ chordates/ vertebrates
Abstract: This paper describes the vegetative changes which occurred through 2006 in a series of prairie plantings done from 2000 to 2003 on former agricultural land in southwest Waushara County, Wisconsin. How these vegetative changes relate to use by grassland birds for nesting was evaluated. Breeding bird surveys were conducted in the prairie plantings from 2000 to 2006 to determine the use of the plantings by selected species of grassland birds. The surveys demonstrated an increase in the grassland bird species, an increase in the number of species fledging young, and an increase in the total number of breeding birds over time. Implications for grassland bird conservation on public and private lands are discussed.
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406. **Ecological relationships among eastern cottontail rabbits, tall fescue, and native warm-season grasses.**
Washburn, Brian Eric. University of Kentucky, 2001.
Notes: Advisor: Barnes, Thomas G.; Larson, Brian T.; Thesis/ Dissertation
Descriptors: prescribed burns/ no-till/ wildlife habitat/ cottontail rabbits/ Eastern cottontails/ Sylvilagus floridanus
Abstract: Tall fescue Festuca arundinacea grasslands may not provide suitable habitat for many wildlife species. Also, most fescue contains an endophytic fungus Neotyphodium coenophialum associated with nutritional and reproductive problems in livestock and laboratory mammals. The objectives of my research were (1) to determine the effects of the tall fescue endophyte on nutrition and reproduction in the free-ranging eastern cottontail Sylvilagus floridanus rabbit and (2) to develop effective methods of converting tall fescue grasslands to native warm-season grasslands.

Eastern cottontails (n = 111) were collected during the 1998 breeding season (May-August) from both tall fescue and non-fescue grasslands habitats. Sex, age, Condition Index, Kidney Fat Index, and paired adrenal weights were determined for each rabbit. Paired testes and epididymal weights in males, and a variety of physiological reproductive parameters in females were also assessed. In fall 1998, plant communities were described by sampling 30 1- m^2 plots in each grassland where a rabbit was collected. Also, >30 tall fescue plants from each site were collected and analyzed for the presence of the endophyte. Tall fescue cover (%) and tall fescue endophyte infection levels were used to classify cottontail collection points as tall fescue or non-fescue habitats. Tall fescue habitats were dominated by fescue (x- = 83% cover) that was highly endophyte-infected (x- = 92% infection rate), whereas non-fescue grassland habitats generally lacked tall fescue (x- = 6% cover) and were relatively uninfected (x- = 1% infection rate) by the tall fescue endophyte. Body condition (nutritional) and reproductive parameters of male and female cottontails collected from endophyte-infected tall fescue grasslands and non-fescue grassland habitats were similar. My results suggest that under natural conditions, the tall fescue endophyte is not negatively influencing the nutritional ecology or reproductive potential of free-ranging eastern cottontail rabbits in Kentucky. Conservation of tall fescue to native warm-season grasses can be accomplished by two methods. The first method includes a spring burn, followed by a pre-emergence application of imazapic, and no-till seeding native warm-season grasses. The second method involves conventional tillage and includes preparing a firm seedbed, seeding native warm-season grasses, and applying imazapic at the time of seeding. Both methods consistently resulted in established stands of native warm-season grasses in one growing season.
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407. **Ecological traps in isodars: Effects of tallgrass prairie management on bird nest success.**
Shochat, Eyal.; Patten, Michael A.; Morris, Douglas W.; Reinking, Dan L.; Wolfe, Donald H.; and Sherrod, Steve K.
Oikos 111(1): 159-169. (2005)
NAL Call #: 410 OI4; ISSN: 0030-1299
Descriptors: conservation measures/ nutrition/ diet/ prey/ reproduction/ ecology/ population dynamics/ predators/ terrestrial habitat/ land zones/ Aves: habitat management/ tallgrass prairie management/ multiple ecological consequences/ breeding success/ Invertebrata/ prey abundance/ prey breeding success/ prairie/ food availability/ reproductive productivity/ Vertebrata/ predator abundance/ grasslands/ Oklahoma/ Osage and Washington Counties/ birds/ chordates/ invertebrates/ vertebrates
Abstract: Ecological traps occur when habitat selection and habitat suitability (measured in terms of fitness) are decoupled. We developed a graphical model based on isodar theory to distinguish between an ideal distribution and an ecological trap. We tested the model's predictions using data on breeding bird populations in managed tallgrass prairie in Oklahoma. Between 1992 and 1996 we monitored success for 2600 nests of 26 breeding species in undisturbed, grazed, and burned and grazed plots. We also sampled arthropod biomass and nest predator abundance. Using the isodar model we determined that managed plots are ecological traps: compared with success on plots left undisturbed, nest success on plots that were only grazed was lower, and success on plots that were burned and grazed was substantially lower. Yet birds preferred to nest on managed plots, where arthropod abundance was measurably higher. Reptiles were the most abundant taxon of nest predators, and their abundance was highest in managed plots. Consequently, tree-nesting species had higher nest success than shrub- and ground-nesting birds. Nest success also increased with tree height. We concluded that isodar theory is a useful tool for detecting ecological traps if any component of fitness is measured in addition to animal densities. Our study also suggests that (1) human modification of the environment may alter simultaneously food and predator abundance, (2) the former affects nest site selection and the latter nest success, and (3) such ecosystems are likely to become traps for breeding birds.
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408. **Ecology and management of sage-grouse and sage-grouse habitat.**
Crawford, J. A.; Olson, R. A.; West, N. E.; Mosley, J. C.; Schroeder, M. A.; Whitson, T. D.; Miller, R. F.; Gregg, M. A.; and Boyd, C. S.
Journal of Range Management 57(1): 2-19. (2004)
NAL Call #: 60.18 J82 ; ISSN: 0022409X
Descriptors: fire ecology/ habitat/ herbicide/ landscape ecology/ livestock grazing/ population dynamics/ habitat conservation/ population decline/ North America/ Artemisia tridentata/ Centrocercus urophasianus/ Coniferophyta/ Hexapoda/ Insecta/ Poaceae
Abstract: Sage-grouse (Centrocercus urophasianus and C. minimus) historically inhabited much of the sagebrush-dominated habitat of North America. Today, sage-grouse populations are declining throughout most of their range. Population dynamics of sage-grouse are marked by strong cyclic behavior. Adult survival is high, but is offset by low juvenile survival, resulting in low productivity. Habitat for sage-grouse varies strongly by life-history stage. Critical habitat components include adequate canopy cover of tall grasses (≥ 18 cm) and medium height shrubs (40-80 cm) for nesting, abundant forbs and insects for brood rearing, and availability of herbaceous riparian species for late-growing season foraging. Fire ecology of sage-grouse habitat changed dramatically with European settlement. In high elevation sagebrush habitat, fire return intervals have increased (from 12-24 to > 50 years) resulting in invasion of conifers and a consequent loss of understory herbaceous and shrub canopy cover. In lower elevation sagebrush habitat, fire return intervals have decreased dramatically (from 50-100 to < 10 years) due to invasion by annual grasses, causing loss of perennial bunchgrasses and shrubs. Livestock grazing can have negative or positive impacts on sage-grouse habitat depending on the timing and intensity of grazing, and which habitat element is being considered. Early season light to moderate grazing can promote forb abundance/availability in both upland and riparian habitats. Heavier levels of utilization decrease herbaceous cover, and may promote invasion by undesirable species. At rates intended to produce high sagebrush kill, herbicide-based control of big sagebrush may result in decreased habitat quality for sage-grouse. Light applications of tebuthiuron (N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea) can decrease canopy cover of sagebrush and increase grass and forb

production which may be locally important to nesting bunchgrasses and shrubs. Livestock grazing can have negative or positive impacts on sage-grouse habitat depending on the timing and intensity of grazing, and which habitat element is being considered. Early season light to moderate grazing can promote forb abundance/availability in both upland and riparian habitats. Heavier levels of utilization decrease herbaceous cover, and may promote invasion by undesirable species. At rates intended to produce high sagebrush kill, herbicide-based control of big sagebrush may result in decreased habitat quality for sage-grouse. Light applications of tebuthiuron (N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N, N'-dimethylurea) can decrease canopy cover of sagebrush and increase grass and forb production which may be locally important to nesting and foraging activities. The ability of resource managers to address sage-grouse habitat concerns at large scales is aided greatly by geomatics technology and advances in landscape ecology. These tools allow unprecedented linkage of habitat and population dynamics data over space and time and can be used to retroactively assess such relationships using archived imagery. The present sage-grouse decline is a complex issue that is likely associated with multiple causative factors. Solving management issues associated with the decline will require unprecedented cooperation among wildlife biology, range science, and other professional disciplines. © 2004 Society for Range Management.
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409. **Economic tradeoffs between livestock grazing and wildlife habitat: A ranch-level analysis.**
Bernardo, Daniel J.; Boudreau, Gregory W.; and Bidwell, Terrance C.
Wildlife Society Bulletin 22(3): 393-402. (1994)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: habitat/ hunting lease/ land resources/ modeling framework/ public grazing lands/ vegetation management
Abstract: Multiple-use management of land resources for domestic livestock and wildlife is becoming an increasingly important issue on private and public lands. A modeling framework is presented to develop production plans which maximize returns from livestock grazing and meet deer and quail habitat constraints on private rangelands in Oklahoma. In the initial solution of the model, net returns are maximized from cattle grazing without concern for wildlife habitat. An intensive vegetation management program involving herbicides and prescribed burning is used to reduce forage diversity (forbs, legumes, and woody shrubs) and maximize grass production for cattle grazing. Low to moderate deer and quail habitat ratings are associated with this plan. Optimal plans to achieve incremental increases in target quail and deer habitat ratings include strip application of herbicide, fail burning, and some mechanical removal of hardwoods to produce a mosaic of small open prairie areas and wooded areas. Brush piles and disking of small portions of the prairie areas are used to improve food diversity and protective cover. Only small reductions in income from livestock production are required to attain initial improvements in quail and deer habitat ratings; however, further improvements translate to more significant income reduction. While habitat appraisal models provide means of quantifying habitat considerations in economic optimization models, several limitations still exist. First, additional research is needed to verify the positive relationship between wildlife habitat and population and-to determine the relationship between hunting lease values and habitat quality. Application of the model requires rather meticulous detail in specifying the effects of various management practices on forage production and wildlife habitat. These data are not available for all areas; however, such information is required to develop efficient multiple-use management strategies (Matulich and Adams 1987). Also, the analysis does not consider the influence of dynamics or risk on decision making. Manipulation of vegetation is a dynamic process that may occur over several years and is significantly influenced by climatic events. Risk caused by price volatility and other sources of uncertainty may also influence ranch plans. Improvements to the model should focus on these considerations. While the findings are somewhat site specific, the study does present a useful and transferable framework for simultaneously analyzing livestock management and wildlife habitat decisions. The model can be specified to accommodate alternative livestock enterprises, vegetation management treatments, and habitat improvement practices for which the required technical data are available. The model may be expanded to incorporate additional wildlife species and is adaptable to accommodate alternative wildlife habitat evaluation systems. While probably more applicable to decision making on private lands, this model could also be applied to public grazing lands.
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410. **Edge avoidance by nesting grassland birds: A futile strategy in a fragmented landscape.**
Renfrew, R. B.; Ribic, C. A.; and Nack, J. L.
Auk 122(2): 618-636. (Apr. 2005)
NAL Call #: 413.8 AU4
Descriptors: edge effect/ grasslands/ landscape/ models/ nests/ pasture/ predation
Abstract: Some grassland passerine species are considered area-sensitive, but the mechanisms underlying that phenomenon are not understood, particularly on grazed grasslands. Area sensitivity may result from edge avoidance or higher nest predation near edges, both of which may be influenced by predator activity or cattle-induced vegetational differences between pasture edge and interior. We assessed the effect of distance to edge on nest density and predation Savannah Sparrows (Passerculus sandwichensis), Grasshopper Sparrows (Ammodramus savannarum), Bobolinks (Dolichonyx oryzivorus), and meadowlarks (Sturnella spp.) along wooded and nonwooded edges of Wisconsin pastures in 1998-2000 and the activity of potential mammalian nest predators along those edges in 2000-2001. We found a positive relationship between nest density and distance from edge for all edge types combined, but that was not the result of effects of wooded edges: we found no difference in density between nests located <50 or <100 m from wooded versus nonwooded (crop or grassland) edges. Models that included combinations of vegetation structure (e.g. concealment), initiation date, year, or edge variables (or all four) were poor predictors of the probability of nest predation. Placing nests away from edges, therefore, did not reduce the risk of nest predation. Eight species known to prey on grassland bird nestswere documented along pasture edges, raccoon (Procyon lotor) being the most

common. Frequency of raccoon and thirteen-lined groundsquirrel (Spermophilus tridecemlineatus) visitation was highe ralong wooded edges and nonwooded edges, respectively. Cattle (Bostaurus) activity did not differentially affect vegetation height-density along edges compared with that in the pasture interior. Possible reasons for predation risk being similar in both pasture interiors and edges in a fragmented landscape include the ease with which predators can move within pastures, high percentage of resident grassland predators, and small size (median= 47.2 ha) of pastures.
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411. **Effect of a reduction in cattle stocking rate on brown-headed cowbird activity.**
Kostecke, Richard M.; Koloszar, James A.; and Dearborn, Donald C.
Wildlife Society Bulletin 31(4): 1083-1091. (2003)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: breeding activity/ breeding areas/ brood parasitism/ cattle stocking rate/ commute distance/ cowbird removal programs/ foraging activity/ grazing pressure/ host parasite interaction/ population sustainability/ songbird conservation/ stocking rate reduction
Abstract: Brood-parasitic cowbirds (Molothrus spp.) can severely impact host populations. Cowbird removal is the primary means of reducing parasitism. As an alternative to removal, we evaluated the reduction of cattle stocking rate as a tool to shift cowbird-breeding activity away from a breeding area of a sensitive host. Activity of radiotagged, female brown-headed cowbirds (M. ater) breeding on Fort Hood, Texas, a United States Army installation that contains a large population of federally endangered black-capped vireos (Vireo atricapilla), was monitored 2 years before and 2 years after a reduction in cattle stocking rate. We predicted that cowbirds would respond to the reduction by shifting both foraging and breeding activities toward more distant herds of cattle. Reduction in stocking rate did not have the desired effect of shifting cowbird breeding areas off the study area, though parasitism rates were lower following the reduction. Following the reduction, cowbirds eventually shifted foraging activity off the study area to sites where more cattle were present and tended to commute greater distances between breeding and foraging sites. Assuming that commute distance between breeding and foraging sites was energetically limiting, the cost of the increased commute may have reduced the number of eggs produced by female cowbirds over the breeding season, thus reducing parasitism. Effectiveness of our stocking rate reduction, even when applied at a large scale (9,622 ha), was reduced by the presence of alternative foraging sites within distances that cowbirds were willing to commute. Removal of cowbirds by trapping likely will remain the most effective means of maintaining a sustainable black-capped vireo population on Fort Hood.
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412. **Effect of cattle grazing on the density and species of grasshoppers (Orthoptera: Acrididae) of the Central Plains Experimental Range, Colorado: A reassessment after two decades.**
Welch, J. L.; Redak, R.; and Kondratieff, B. C.
Journal of the Kansas Entomological Society 64(3): 337-343. (1991)
NAL Call #: 420 K13; ISSN: 0022-8567
Descriptors: commercial activities/ ecology/ terrestrial habitat/ land and freshwater zones/ Acrididae (Saltatoria): farming and agriculture/ cattle grazing/ community structure/ grasslands/ Colorado/ Nunn/ grassland community structure/ long term changes/ Saltatoria/ Orthoptera/ Insecta/ arthropods/ insects/ invertebrates
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413. **Effect of controlled fire frequency on grassland bird abundance during the breeding season at Cheyenne Bottoms Wildlife Area, Kansas.**
Hands, Helen M.
Transactions of the Kansas Academy of Science 110(3): 201-212. (Sept. 2007)
NAL Call #: 500 K13T
Descriptors: grasslands/ birds/ wildlife habitat/ fire management/ breeding/ red-winged blackbird/ meadowlark/ dickcissel/ grasshopper sparrow/ Common Yellowthroat/ Kansas
Abstract: Cheyenne Bottoms Wildlife Area (CBWA) is an internationally recognized wetland surrounded by mixed-grass prairie. Because habitat management historically has been focused on the marsh, this study was initiated to determine the effects of spring burning on abundance and species richness of grassland-nesting birds. The effects of years since last burn and location on abundance and species richness were inconsistent among years. Unless additional bird surveys show consistent patterns in bird response to burning, frequency of burns will be determined based on vegetation characteristics rather than abundance of nesting birds.
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414. **Effect of energy development and human activity on the use of sand sagebrush habitat by lesser prairie chickens in southwestern Kansas.**
Robel, Robert J.; Harrington, John A.; Hagen, Christian A.; Pitman, James C.; and Reker, Ryan R.
Transactions of the North American Wildlife and Natural Resource Conference 69: 251-266. (2004)
NAL Call #: 412.9 N814; ISSN: 0078-1355
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Tympanuchus pallidicinctus: disturbance by man/ energy demand and human activity/ habitat management/ habitat utilization/ sand sagebrush habitat/ effect of energy development and human activity/ grassland/ sand sagebrush/ Kansas/ Finney/ Kearny and Hamilton counties/ Aves, Galliformes, Phasianidae/ birds/ chordates/ vertebrates
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415. **The effect of fire on spatial distributions of male mating aggregations in Gryllotalpa major Saussure (Orthoptera: Gryllotalpidae) at the Nature Conservancy's Tallgrass Prairie Preserve in Oklahoma: Evidence of a fire-dependent species.**
Howard, Daniel R. and Hill, Peggy S.
Journal of the Kansas Entomological Society 80(1): 51-64. (2007)
NAL Call #: 420 K13; ISSN: 0022-8567
Descriptors: reproduction/ reproductive behavior/ behavior/ social behavior/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Gryllotalpa major: mating/ spatial distributions of male mating aggregations/ aggregating behavior/ distribution within habitat/ grassland/

tallgrass prairie/ effect of fire on spatial distributions of male mating aggregations/ fire/ Oklahoma/ Nature Conservancy's Tallgrass Prairie Preserve/ Insecta, Orthoptera, Saltatoria/ arthropods/ insects/ invertebrates
Abstract: The prairie mole cricket (Gryllotalpa major Saussure) is a native of the tallgrass prairie ecosystem of the south central United States, Its populations have dwindled with the reduced availability of suitable grassland habitat. Populations are known to occupy relict prairie sites in Oklahoma, Kansas, Arkansas and Missouri. The Nature Conservancy's Tallgrass Prairie Preserve in north central Oklahoma is the largest continuous tract of tallgrass prairie remaining (about 16,100 ha). The long-term management plan for this property includes the utilization of prescribed burns, bison grazing, cattle grazing and limited mowing to restore a functional tallgrass prairie landscape. Prairie mole cricket populations were surveyed at the site during the years 1993, 1994, 1998, and by our research team in 2005, using the male cricket's acoustic call as a discrete presence indicator. Records from these surveys were integrated with prescribed burn maps to identify spatial distribution patterns of the calling aggregations at the preserve. These data were then analyzed to determine the randomness of spatial distributions with regard to pasture burn regimes. Results revealed a non-random distribution of prairie mole cricket calling sites, with advertising males found in higher numbers on sites that had been more recently burned. Analysis of soil temperature data taken from both burned and unburned prairie patches at White Oak Prairie in Oklahoma revealed no difference between the two treatments. The results of this study indicate that prairie mole cricket lek sites are somewhat transient within a broader prairie mosaic in which fire is a regular disturbance factor and tend to emerge on more recently burned patches. This information is being utilized in constructing habitat models and resource management plans for this preserve as well as other sites harboring Gryllotalpa major populations.
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416. **The effect of fire spatial scale on bison grazing intensity.**
Wallace, L. L.; Crosthwaite, K. A.; and Crosthwaite K.W.
Landscape Ecology 20(3): 337-349. (2005)
NAL Call #: QH541.15.L35 L36; ISSN: 0921-2973
Descriptors: Artiodactyla/ Bovidae/ Bison bison/ foods-feeding/ food consumption/ fires-burns/ grazing intensity/ Oklahoma/ Osage County, Tallgrass Prairie Preserve/ environmental factors/ land zones/ nutrition/ bison/ habitat/ fire/ vegetation/ food/ habitat management/ productivity/ nitrogen/ protein/ dispersion/ habitat change
Abstract: To determine whether fire spatial and temporal scales affect foraging behavior and grazing intensity by Bison (Bison bison), we burned three different patch sizes (225, 900, and 3600 m^2) across an otherwise homogeneous grassland landscape. We then monitored grazing intensity for the succeeding 14 months. During the first 5 months after the burn (August-January), the Bison grazing intensity pattern was affected by whether a plot was burned and only marginally affected by plot size. During the next 5 months (January-June), grazing intensity was unaffected by plot size, but was greatest in the unburned 225 and 3600- m^2 plots. The final 4 months (June-October), grazing intensity was unaffected by treatments other than being higher in the unburned 3600- m^2 Plots. By the final sampling date, biomass was significantly greater in the burned plots and grazing intensity appeared to be responding to the amount of biomass present and the total amount of N present. The pattern displayed within the first 5 months after the burn is congruent with the expectations of optimal foraging theory with overmatching in the smallest plot size of 225 m^2 (BioScience 37 (1987) 789-799). The next two sampling periods displayed a matching aggregate response relative to biomass availability (Oecologia 100 (1999) 107-117) and total nitrogen mass (g m^{-2}). The temporal shift that we found in Bison response to burn patch size is, to our knowledge, the first such examination of both spatial and temporal responses by Bison to landscape heterogeneity. We now have quantitative evidence of how native herbivores can alter their foraging responses to changes in landscape structure over time.
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417. **Effect of grazing by sheep on the quantity and quality of forage available to big game in Oregon's Coast Range.**
Rhodes, B. D. and Sharrow, S. H.
Journal of Range Management 43(3): 235-237. (1990)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume43/Number3/azu_jrm_v43_n3_235_237_m.pdf
Descriptors: sheep/ digestibility/ Odocoileus/ Cervus elaphus/ forest plantations/ Pseudotsuga menziesii/ grazing/ Odocoileus hemionus/ Oregon
This citation is from AGRICOLA.

418. **The effect of grazing on the land birds of a western Montana riparian habitat .**
Mosconi, S. L. and Hutto, R. L.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 221-233; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: birds/ Aves/ rangelands/ grazing/ riparian areas/ Montana
This citation is from AGRICOLA.

419. **The effect of livestock grazing upon abundance of the lizard, Sceloporus scalaris, in southeastern Arizona.**
Bock, Carl E.; Smith, Hobart M.; and Bock, Jane H.
Journal of Herpetology 24(4): 445-446. (1990)
NAL Call #: QL640.J6; ISSN: 0022-1511
Descriptors: Sceloporus scalaris/ amphibians and reptiles/ behavior/ grazing/ habitat alterations/ habitat use/ predator-prey relationships/ predators
© NISC

420. **Effect of sheep grazing and fire on sage grouse populations in southeastern Idaho.**
Pedersen, E. K.; Connelly, J. W.; Hendrickson, J. R.; and Grant, W. E.
Ecological Modelling 165(1): 23-47. (2003)
NAL Call #: QH541.15.M3E25; ISSN: 0304-3800
Descriptors: difference equation: mathematical and computer techniques/ discrete time stochastic compartment model: mathematical and computer techniques/ simulation model: mathematical and computer techniques/ biomass/

breeding habitats/ canopy growth/ community ecology/ fire frequency/ grazing effects/ habitat mosaics/ historical environmental conditions/ long term trends/ population dynamics/ sagebrush vegetation/ seasonal dynamics
Abstract: This paper describes the development, evaluation, and use of a model that simulates the effect of grazing and fire on temporal and spatial aspects of sagebrush community vegetation and sage grouse population dynamics. The model is represented mathematically as a discrete-time, stochastic compartment model based on difference equations with a time interval of 1 week. In the model, sheep graze through sage grouse breeding habitat during spring and fall, and different portions of the area can burn at different frequencies, creating a habitat mosaic of burned and unburned areas. The model was evaluated by examining predictions of (1) growth of sagebrush canopy cover after fire, (2) seasonal dynamics of grass and forb biomass under historical environmental conditions, and (3) sage grouse population dynamics associated with selected sagebrush canopy covers. Simulated changes in sagebrush canopy cover following fire correspond well with qualitative reports of long-term trends, simulated seasonal dynamics of herbaceous biomass correspond well with field data, and simulated responses of sage grouse population size and age structure to changing sagebrush canopy cover correspond well to qualitative field observations. Simulation results suggest that large fires occurring at high frequencies may lead to the extinction of sage grouse populations, whereas fires occurring at low frequencies may benefit sage grouse if burned areas are small and sheep grazing is absent. Sheep grazing may contribute to sage grouse population decline, but is unlikely to cause extinction under fire regimes that are favorable to sage grouse.
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421. **The effect of two years of livestock grazing exclosure upon abundance in a lizard community in Baja California Sur, Mexico.**
Romero-Schmidt, Heidi; Ortega-Rubio, Alfredo; Arguelles-Mendez, Cerafina; Coria-Benet, Rocio; and Solis-Marin, Francisco
Chicago Herpetological Society Bulletin 29(1): 245-248. (1994); ISSN: 0009-3564
Descriptors: grazing/ livestock/ lizards/ abundance/ North America/ Mexico: Baja California Sur
© NISC

422. **Effect of vertebrate grazing on plant and insect community structure.**
Rambo, J. L. and Faeth, S. H.
Conservation Biology 13(5): 1047-1054. (1999)
NAL Call #: QH75.A1C5 ; ISSN: 0888-8892
Descriptors: grazing/ insect abundance/ cattle/ American elk/ grazing exclosures
Abstract: We compared species diversity of plants and insects among grazed and ungrazed areas of Ponderosa pine-grassland communities in Arizona. Plant species richness was higher in two of three grassland communities that were grazed by native elk and deer and domestic cattle than in ungrazed areas inside a series of three large (approximately 40-ha) grazing exclosures. Similarly, plant species richness was higher in grazed areas relative to ungrazed areas at one of two series of smaller (approximately 25- m^2) and short-term exclosure sites. Evenness of plant distribution, however, was greater inside ungrazed long-term exclosures but was reduced inside ungrazed short-term exclosures relative to grazed areas. Relative abundances of forbs, grasses, trees, and shrubs, and native and introduced plants did not differ between the long- and short-term grazing exclosures and their grazed counterparts. Relative abundances of some plant species changed when grazers were excluded, however. In contrast, insect species richness was not different between grazed and ungrazed habitats, although insect abundance increased 4- to 10-fold in ungrazed vegetation. Our results suggest that vertebrate grazing may increase plant richness, even in nutrient-poor, semi-arid grasslands, but may decrease insect abundances.
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423. **Effectiveness of fire, disking, and herbicide to renovate tall fescue fields to northern bobwhite habitat.**
Madison, L. A.; Barnes, T. G.; and Sole, J. D.
Wildlife Society Bulletin 29(2): 706-712. (2001)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Colinus virginianus/ glyphosate/ nesting/ winter feeding/ fire management/ herbicide/ pasture/ United States/ Colinus virginianus/ Festuca arundinacea
Abstract: Fields dominated by tall fescue (Festuca arundinacea) are common throughout the southeastern United States and are poor habitat for northern bobwhites (Colinus virginianus). Our study examined effectiveness of controlled burning, disking, and Round-Up™ herbicide applications to improve bobwhite habitat in fescue-dominated fields. We conducted the study on 4 Kentucky Department of Fish and Wildlife Resources Wildlife Management Areas (WMA). On each WMA we divided a field into 16 0.1-ha plots, and at each field we randomly assigned 2 plots to the following treatments: control, fall burning, fall disking, spring burning, spring disking, spring herbicide application, summer burning, or summer disking. We measured the vegetation structure, seed production, and floristic composition within each treatment plot from fall 1990 to summer 1994. The spring herbicide application most effectively reduced tall fescue coverage. Fescue coverage was reduced for one year following disturbance by fall, spring, and summer disking, but had become similar to control plots and pre-treatment conditions by the second year post-treatment. Fall, spring, and summer burning did not reduce tall fescue coverage. Fall-disked plots improved habitat for bobwhite winter feeding during winter 1993, whereas herbicide-treated plots provided the best winter feeding habitat during winter 1994. Herbicide-treated plots provided the best habitat quality for bobwhite nesting in summer 1993, but no treatment satisfied nesting habitat requirements in summer 1994.
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424. **Effects of a savory grazing method on big game: A final report.**
Brown, R. L. Arizona Game and Fish Dept., 1990. 58 p. Arizona Game and Fish Department Wildlife Bulletin.
Notes: ISSN: 0518-5467.
Descriptors: cattle/ deer, mule/ elk/ feeding method/ fences/ food habits/ food supply/ game, big/ grazing/ history/ hunting/ movements/ population density/ pronghorn/ wildlife-habitat relationships/ wildlife-livestock relationships

Abstract: Elk, mule deer, and pronghorn antelope use levels were monitored within a radial design holistic resource management cell, and an adjacent set of rest-rotation pastures that were grazed by cattle during the summer months. A discussion of requirements for effective wildlife goals is included.
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425. **Effects of an 11-year livestock exclosure on rodent and ant numbers in the Chihuahuan Desert, southeastern Arizona.**
Heske, E. J. and Campbell, M.
Southwestern Naturalist 36(1): 89-93. (1991)
NAL Call #: 409.6 So8 ; ISSN: 0038-4909
Descriptors: small mammals/ livestock/ pastures/ ecology/ trampling/ grazing/ interactions
Abstract: Rodents were censused, ant colonies counted, and vegetative structure measured along 11 pairs of transects at a Chihuahua Desert study site in southeastern Arizona. One member of each pair of transects was inside and one was outside of a 20-ha livestock exclosure that had been in place for 11 years. Vegetative structure did not differ between transects exposed to or protected from cattle grazing, but significantly more rodents were captured inside the exclosure. However, only a subset of the rodent species present, primarily Dipodomys, were negatively affected by the presence of cattle. Ant colonies were equally abundant on transects inside and outside of the exclosures, indicating that ants are more resistant than rodents to trampling and potential competition for food with cattle.
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426. **Effects of bison grazing, fire, and topography on floristic diversity in tallgrass prairie.**
Hartnett, D. C.; Hickman, K. R.; and Walter, L. E.
Journal of Range Management 49(5): 413-420. (1996)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume49/Number5/azu_jrm_v49_n5_413_420_m.pdf
Descriptors: prairies/ plant communities/ biodiversity/ botanical composition/ bison/ grazing/ topography/ frequency/ fires/ Kansas
Abstract: Grazed and ungrazed sites subjected to different fire frequencies were sampled on the Konza Prairie Research Natural Area in northeast Kansas after 4 years of bison grazing (1987-1991). The objective was to study effects of bison grazing on plant species composition and diversity components (plant species richness, equitability, and spatial heterogeneity) in sites of contrasting fire frequency. Cover and frequency of cool-season graminoids (e.g. Poa pratensis L., Agropyron smithii Rydb., Carex spp.) and some fortes (e.g. Aster ericoides [A. Gray] Howell, and Oxalis stricta L.) were consistently higher in sites grazed by bison than in ungrazed exclosures, whereas the dominant warm-season grasses (Andropogon gerardii Vitman, Sorghastrum nutans [L.] Nash, Panicum virgatum L., Schizachyrium scoparium [Michx.] Nash) and other forbs (e.g. Solidago missouriensis Nutt.) decreased in response to bison. Plant species diversity (H') and spatial heterogeneity in all areas sampled were significantly increased by bison. Increased heterogeneity and mean species richness in grazed prairie (40 species per sample site) compared to ungrazed prairie (29 species per site) were likely a result of greater microsite diversity generated by bison, whereas preferential grazing of the dominant grasses and concomitant increases in subordinate species resulted in an increase in equitability of species abundances. Species/area relationships indicated greater effects of bison on plant species richness with increasing sample area. Increases in plant diversity components associated with bison grazing were generally greater in annually burned than in 4-year burned sites. Effects of ungulate grazers on floristic diversity have important implications given recent evidence that plant species diversity and the compositional and production stability of grassland plant communities are positively related.
This citation is from AGRICOLA.

427. **The effects of burning and grazing on habitat use by whooping cranes and sandhill cranes on the Aransas National Wildlife Refuge.**
Hunt, Howard Emery. Texas A&M University, 1987.
Descriptors: Grus canadensis/ Grus americana/ habitat disturbance [fire]/ livestock/ Texas
© NISC

428. **Effects of burning on snakes in Kansas, USA, tallgrass prairie.**
Setser, Kirk and Cavitt, John F.
Natural Areas Journal 23(4): 315-319. (2003)
NAL Call #: QH76.N37; ISSN: 0885-8608
Descriptors: Coluber constrictor/ Thamnophis sirtalis/ Serpentes/ Colubridae/ Lepidosauria/ Squamata/ terrestrial ecology/ burning/ snake refugia/ fires-burns/ grasslands/ ecosystems/ habitat use/ Kansas/ Konza Prairie Biological Station/ status/ prescribed fire/ tallgrass prairie/ environmental factors/ land zones/ population ecology
Abstract: We trapped snakes in two annually burned and two long-term unburned watersheds at the Konza Prairie Biological Station in the Flint Hills of Kansas, USA, to examine the impact of burning on tallgrass prairie snakes. Two species, Coluber constrictor L. and Thamnophis sirtalis, L. were captured in numbers sufficient for statistical analyses. Both species were more frequently captured on long-term unburned prairie than on recently burned prairie in late spring. This difference did not persist, however, during the fall. The distribution of T. sirtalis capture dates was biased toward later captures in burned prairie in comparison to unburned. We did not detect a similar pattern in C. constrictor. Our data suggest some tallgrass prairie snakes avoid freshly burned tallgrass prairie but can recolonize burned areas within a single growing season. We recommend that unburned areas be maintained adjacent to prescribed burns in managed tallgrass prairies to serve as snake refugia.
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429. **Effects of cattle grazing and haying on wildlife conservation at National Wildlife Refuges in the USA.**
Strassman, B. I.
Environmental Management 11(1): 35-44. (1987)
NAL Call #: HC79.E5E5 ; ISSN: 0364-152X
Descriptors: grass/ birds/ Fish and Wildlife Service/ regulatory agencies/ government agency/ environmental protection/ economics/ cost/ prescribed burning/ environmental law/ cattle industry/ feed industry
Abstract: The National Wildlife Refuge System is perhaps the most important system of federal lands for protecting wildlife in the USA. Only at refuges has wildlife conservation been legislated to have higher priority than

either recreational or commercial activities. Presently, private ranchers and farmers graze cattle on 981,954 ha and harvest hay on 12,021 ha at 123 National Wildlife Refuges. USA Fish and Wildlife Service policy is to permit these uses primarily when needed to benefit refuge wildlife. To evaluate the success of this policy, I surveyed grassland management practices at the 123 refuges. The survey results indicate that in fiscal year 1980 there were 374,849 animal unit months (AUMs) of cattle grazing, or 41% more than was reported by the Fish and Wildlife Service. According to managers' opinions, 86 species of wildlife are positively affected and 82 are negatively affected by refuge cattle grazing or haying. However, quantitative field studies of the effect of cattle grazing and haying on wildlife coupled with the survey data on how refuge programs are implemented suggest that these activities are impeding the goal of wildlife conservation. Particular management problems uncovered by the survey include overgrazing of riparian habitats, wildlife mortality due to collisions with cattle fences, and mowing of migratory bird habitat during the breeding season. Managers reported that they spend $919,740 administering cattle grazing and haying; thus refuge grazing and haying programs are also expensive. At any single refuge these uses occupy up to 50% of refuge funds and 55% of staff time. In light of these results, prescribed burning may be a better wildlife management option than is either cattle grazing or haying.
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430. **Effects of cattle grazing on ecology and habitat of Columbia Basin pygmy rabbits (Brachylagus idahoensis).**
Thines, Nicole J.; Shipley, Lisa A.; and Sayler, Rodney D.
Biological Conservation 119(4): 525-534. (2004)
NAL Call #: S900.B5; ISSN: 0006-3207
Descriptors: Columbia Basin/ commercial enterprises/ conservation/ disturbances/ ecosystems/ endangered-threatened species/ farming and agriculture/ grasslands/ habitat use/ land zones/ shrub grasslands/ shrub-steppe habitat/ Washington/ wildlife management/ wildlife-human relationships/ Columbia Basin pygmy rabbit/ Brachylagus idahoensis
Abstract: Dramatic declines in the endangered Columbia Basin pygmy rabbit, a genetically unique population of small, burrowing rabbits in Northwestern United States, are likely the combined results of habitat degradation and fragmentation, disease, and predation. A critical component of pygmy rabbit habitat includes big sagebrush (Artemisia tridentata), which constitutes 82-99% of their winter diet and 10-50% of their summer diet. Sagebrush also forms the bulk of hiding cover around burrow sites. Across the range of pygmy rabbits, sagebrush habitat is grazed extensively by cattle. However, grazing has unknown effects on pygmy rabbits inhabiting the remaining, fragmented shrub-steppe habitat. We evaluated the effects of four grazing treatments on the distribution of pygmy rabbit burrows, diets of pygmy rabbits, and quality and quantity of vegetation at Sagebrush Flat in central Washington. Ungrazed areas contained significantly more burrows per unit area than did grazed areas. Vegetation composition and structure differed little among treatments in early summer before annual grazing by cattle. However, cattle grazing in late summer through winter removed about 50% of the grass cover, and reduced the nutritional quality (e.g., increased fiber and decreased protein) of the remaining grass. Although pygmy rabbits ate < 2% grasses in winter, grasses and forbs comprised 53% of late summer diets. Because these endangered rabbits avoided grazed areas, removing cattle grazing from key habitat locations may benefit efforts to restore this rabbit in Washington.
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431. **Effects of cattle grazing on mule deer diet and area selection.**
Austin, Dennis D. and Urness, Philip J.
Journal of Range Management 39(1): 18-21. (1986)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume39/Number1/azu_jrm_v39_n1_18_21_m.pdf
Descriptors: Odocoileus hemionus/ grazing/ habitat alterations/ habitat use/ wildlife-livestock relationships/ deer, mule/ enclosures and exclosures/ food habits/ grasses/ habitat/ production/ proteins/ utilization/ vegetation/ wildlife-livestock relationships/ Utah/ Sheeprock Mountains
Abstract: Split enclosures, half grazed and half ungrazed by cattle in summer, were compared for mule deer habitat use in late summer using tame deer. Diet composition, dietary nutrition, and area selected for grazing were used as criteria.
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432. **Effects of cattle grazing on North American arid ecosystems: A quantitative review.**
Jones, Allison
Western North American Naturalist 60(2): 155-164. (2000)
NAL Call #: QH1.G7; ISSN: 1527-0904
Descriptors: meta analysis: analytical method/ arid ecosystems/ cattle grazing/ ecosystem integrity/ environmental impact/ litter biomass/ rangeland conservation/ soil bulk density/ species diversity/ species richness/ vegetative cover/ xeric environment
Abstract: A quantitative review was conducted of the effects of cattle grazing in and systems on 16 response variables ranging from soil bulk density to total vegetative cover to rodent species diversity. Various studies from North American arid environments that used similar measures for assessing grazing effects on the same response variables were used for the review; each study was assigned to serve as a single data point in paired comparisons of grazed versus ungrazed sites. All analyses tested the 1-tailed null hypothesis that grazing has no effect on the measured variable. Eleven of 16 analyses (69%) revealed significant detrimental effects of cattle grazing, suggesting that cattle can have a negative impact on North American xeric ecosystems. Soil-related variables were most negatively impacted by grazing (3 of 4 categories tested were significantly impacted), followed by litter cover and biomass (2 of 2 categories tested), and rodent diversity and richness (2 of 2 categories tested). Vegetative variables showed more variability in terms of quantifiable grazing effects, with 4 of 8 categories testing significantly. Overall, these findings could shed light on which suites of variables may be effectively used by land managers to measure ecosystem integrity and rangeland health in grazed systems.
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433. **The effects of cattle grazing on optimal foraging in mule deer (Odocoileus hemionus).**
Kie, John G.
Forest Ecology and Management 88(1-2): 131-138. (1996)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: animal husbandry/ climate/ competition/ ecology/ foraging/ grazing/ stocking level
Abstract: A previous study of different cattle stocking rates on activity patterns of female mule deer (Odocoileus hemionus) on summer range in California found that deer spent more time feeding and less time resting with increased cattle stocking rates (Kie et al., 1991). During a year of normal precipitation, deer spent more time feeding per day in late summer than in early summer in pastures grazed by cattle. In a drier year, deer spent less time feeding per day in late summer in grazed pastures. Deer increased their time spent feeding by including more feeding bouts each day, not by increasing the length of each foraging bout. Deer were also reluctant to forage at night, particularly when there was a full moon. Based on these results, we hypothesized that female mule deer act as time-minimizers when forage conditions are good, but shift to a energy-maximizing strategy when forage conditions are poor (Kie et al., 1991). Preliminary results from subsequent research on black-tailed deer (O. h. columbianus) on Mediterranean-climate, foothill winter range found that deer acted as energy-maximizers and spent less time feeding with increasing cattle stocking rates during the fall and early winter when herbaceous forage was in limited supply. After mid-January when herbaceous plants began growing rapidly there appeared to be no competition for forage between deer and cattle, and increased cattle stocking rates had no effect on the time spent foraging by deer. These results were consistent with the original hypothesis.
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434. **Effects of cattle grazing on passerine birds nesting in riparian habitat.**
Taylor, D. M.
Journal of Range Management 39(3): 254-258. (1986)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume39/Number3/azu_jrm_v39_n3_254_258_m.pdf
Descriptors: grazing/ cattle/ birds/ habitats/ population density/ Salix/ riparian buffers/ Oregon
This citation is from AGRICOLA.

435. **Effects of cattle grazing on salt desert rodent communities.**
Jones, Allison L. and Longland, William S.
American Midland Naturalist 141(1): 1-11. (1999)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: live trapping: monitoring method/ grazing/ home range size/ microhabitat use/ relative abundance/ salt desert shrub community
Abstract: Cattle grazing has been shown to alter various features of desert communities that may impact microhabitats required by various species of desert rodents, with unknown implications for desert rodent communities. We conducted a series of studies at heavily and lightly grazed sites to investigate effects of cattle grazing on desert rodent relative abundances, home range sizes and microhabitat use in salt desert shrub communities of the western Great Basin Desert. Monitoring of rodent populations with repeated live trapping showed that different levels of grazing were associated with differences in relative abundances of some species of rodents. Specifically, Dipodomys merriami was significantly more abundant in heavily grazed areas, and Perognathus longimembris was significantly more abundant in lightly grazed areas. Our studies showed that cattle, by preferentially feeding on certain plants, can create conditions that are more suitable for some species of rodents, while reducing important microhabitat for other species.
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436. **Effects of cattle grazing systems on shrub-grassland birds in south Texas.**
Swanson, Douglas Wayne. Texas A&M University, 1988.
Notes: Degree: M.S.
https://libcat.tamu.edu/cgi- bin/Pwebrecon.cgi?DB=local&BBID=780791
Descriptors: behavior/ birds/ communities/ ecosystems/ habitat alterations/ grazing/ habitat use/ shrub grasslands/ Texas, southern
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437. **Effects of cattle grazing upon chemical constituents within important forages for elk.**
Dragt, W. J. and Havstad, K. M.
Northwest Science 61(2): 70-73. (1987)
NAL Call #: 470 N81; ISSN: 0029-344X
Descriptors: Agropyron spicatum/ Festuca scabrella/ Festuca Idahoensis/ Cervus elaphus Nelsoni/ deferred rotation/ cattle management/ forage management/ seasonality/ indirect competition/ amensalism/ elkhorn/ mountains/ Montana
Abstract: On many western rangelands, cattle and elk use the same forages but during different seasons. This can place these species into indirect competition or amensalism. The objective of this study was to examine the effects of summer grazing by cattle upon the winter forage quality for elk. Individual plants of bluebunch wheatgrass (Agropyron spicatum), rough fescue (Festuca scabrella), and Idaho fescue (Festuca idahoensis) were monitored for phenological stage when summer grazed by cattle on a Rocky Mountain elk (Cervus elaphus nelsoni) wintering range in the Elkhorn Mountains, Montana. Assessment of winter chemical composition of these three key forage species indicated no deleterious effects of summer grazing by cattle stocked at 3.7 ha/AUM upon the winter forage quality. In general, rough fescue and Idaho fescue had lower average fiber fractions and higher crude protein than bluebunch wheatgrass. Under deferred rotation cattle management, the primary winter elk forage management concern appears to be forage quantity rather than quality.
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438. **Effects of cattle on duck food plants in southern Texas.**
Whyte, R. J. and Silvy, N. J.
Journal of Wildlife Management 45(2): 512-515. (1981)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Texas/ ducks/ cattle/ grazing
This citation is from AGRICOLA.

439. **Effects of continuous grazing on habitat and density of ground-foraging birds in south Texas.**
Baker, D. L. and Guthery, F. S.
Journal of Range Management 43(1): 2-5. (1990)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume43/Number1/azu_jrm_v43_n1_2_5_m.pdf
Descriptors: cattle/ habitats/ birds/ Colinus virginianus/ population density/ grazing/ sandy loam soils/ clay soils/ grazing intensity/ Texas
This citation is from AGRICOLA.

440. **Effects of different burn regimes on tallgrass prairie herpetofaunal species diversity and community composition in the Flint Hills, Kansas.**
Wilgers, D. J. and Horne, E. A.
Journal of Herpetology 40(1): 73-84. (2006)
NAL Call #: QL640.J6; ISSN: 00221511
Descriptors: prescribed burns/ tallgrass prairie/ wildife habitat/ herpetofauna/ reptiles/ amphibians/ Kansas
Abstract: The Flint Hills region of Kansas is the largest contiguous area of tallgrass prairie remaining today. Historically, the tallgrass prairie burned every 2-3 yr on average, but current land managers have altered burn regimes, resulting in a range of habitats from annually burned to long-term unburned. We used drift fence/funnel trap arrays and coverboards to estimate species richness, evenness, and diversity of herpetofauna within three different burn regimes: annual, 4-yr, and long-term unburned at Konza Prairie Biological Station, Riley County, Kansas. During the spring and fall of 2003-2004, 315 individuals from 20 species were captured across all burn regimes. Herpetofaunal species richness, evenness, and diversity estimates were not different between the three burn treatments. However, because of species-specific responses to individual burn regimes, community composition was significantly different between the habitats (X^2 = 158.19, df = 20, P < 0.001). Four species exhibited preferences among burn regimes, which differed significantly from independent assortment, with Eumeces obsoletus and Phrynosoma cornutum preferring annual burn treatments, Scincella lateralis preferring 4-yr burn treatments, and Diadophis punctatus preferring long-term unburned treatments. Species-specific responses were likely because of changes in vegetation structure and microhabitat (temperature and moisture content) created through different frequencies of fire disturbances. Maximizing large-scale herpetofaunal diversity across the Flint Hills' rangelands could be accomplished by creating a large number of small scale habitat types through a mosaic style burning plan. © 2006 Society for the Study of Amphibians and Reptiles.
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441. **Effects of differential livestock use on key plant species and rodent populations within selected Oryzopsis hymenoides/Hilaria jamesii communities of Glen Canyon National Recreation Area.**
Bich, Brian S.; Butler, Jack L.; and Schmidt, Cheryl A.
Southwestern Naturalist 40(3): 281-287. (1995)
NAL Call #: 409.6 So8; ISSN: 0038-4909
Descriptors: grazing/ national parks and reserves/ rodents/ grazing lands
Abstract: Four sites that varied with respect to grazing history were studied during 1990 and 1991 on an isolated 8,000 ha peninsula in Glen Canyon National Recreation Area. Density and basal area of Oryzopsis hymenoides decreased with increasing grazing intensity while density and foliar cover of Gutierrezia sarothrae increased on grazed sites. Perognathus longimembris was the most abundant rodent species trapped on all sampled sites and demonstrated a 50% decrease in abundance at the heavily grazed site compared to the nongrazed site. Peromyscus maniculatus was the second most abundant rodent species recorded and increased with increasing grazing intensity.
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442. **Effects of distance from cattle water developments on grassland birds.**
Fontaine, A. L.; Kennedy, P. L.; and Johnson, D. H.
Journal of Range Management 57(3): 238-242. (May 2004)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X
Descriptors: songbirds/ population density/ population dynamics/ cattle production/ range management/ water distribution/ prairies/ grazing intensity/ Eremophila/ Passeriformes/ plant strata/ height/ canopy/ plant litter/ botanical composition/ North Dakota
Abstract: Many North American grassland bird populations appear to be declining, which may be due to changes in grazing regimes on their breeding areas. Establishment of water developments and confining cattle (Bos taurus L.) to small pastures often minimizes spatial heterogeneity of cattle forage consumption, which may lead to uniformity in vegetative structure. This increased uniformity may provide suitable habitat for some bird species but not others. We assessed how cattle use, vegetative structure, and bird population densities varied with increasing distance from water developments (0-800 m) on the Little Missouri National Grassland (LMNG) in North Dakota. Lark buntings (Calamospiza melancorys Stejneger), which are typically associated with low vegetative cover, decreased with increasing distance from water developments. Horned larks (Eremophila alpestris L.), also a low-cover associate, followed a similar but weaker trend. Densities of another low-cover associate as well as moderate- and high-cover associates were not related to distance from water. Vegetative height-density and litter depth increased by 50 and 112%, respectively, while cowpie cover and structural variability decreased by 51 and 24%, respectively, with distance from water. Confidence interval overlap was common among all measures, showing substantial variability among study sites. Our results indicate cattle use is higher closer to water developments, and this pattern may positively affect the densities of lark buntings and horned larks. The absence of density gradients in the other bird species may be due to the paucity of locations > 800 m from water on the LMNG.
This citation is from AGRICOLA.

443. **The effects of domestic livestock grazing on breeding nongame birds in northeastern New Mexico.**
Goguen, C. B. Texas Tech University, 1994.
Descriptors: animals, non-game/ birds/ birds, passerines/ blackbirds and cowbirds/ gnatcatchers/ grazing/ habitat/ interspecies relationships/ livestock/ mortality/ nests and nesting/ predation/ statistics/ surveys/ vegetation/ New Mexico/ Colfax County
Abstract: Objectives were to compare the following features of ungrazed and grazed pinyon-juniper woodlands: habitat and vegetation characteristics; songbird diversity

and abundance; and songbird nesting success and cause-specific nest mortality levels. Study was conducted on the NRA Whittington Center and the adjacent Van Sweden Ranch in Colfax County. Thesis is divided into the following section titles: (1) The Influence of Domestic Livestock Grazing on Breeding Nongame Birds in Pinyon-Juniper Woodlands in Northwestern New Mexico; (2) Brown-headed Cowbird Parasitism of Grazed and Ungrazed Pinyon- Juniper Woodlands in Northeastern New Mexico; and (3) Nest Desertion and Moving by the Blue-Gray Gnatcatcher in Association with Brown-headed Cowbird Parasitism
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444. **The effects of elk and cattle foraging on the vegetation, birds, and small mammals of the Bridge Creek Wildlife Area, Oregon.**
Moser, B. W. and Witmer, G. W.
International Biodeterioration and Biodegradation 45(3-4): 151-157. (2000)
NAL Call #: QH301.I54; ISSN: 0964-8305
Descriptors: elk/ cattle/ forage/ grazing/ biodiversity/ wildlife habitat/ exclosures/ Oregon
Abstract: High densities of elk (Cervus elaphus), especially when combined with cattle (Bos taurus), may adversely affect local reforestation efforts and reduce forage availability. Few studies, however, have assessed the potential impacts of high densities of elk, combined with cattle, on biodiversity. We compared vegetation, bird, and small mammal diversity of three elk and cattle exclosures (ungrazed sites) to three grazed sites in the Blue Mountains of eastern Oregon. Shrub species richness was greater on ungrazed than grazed sites (P = 0.04). We found no differences in herbaceous vegetative cover, biomass, species richness, or diversity, bird abundance, species richness, or diversity between grazed and ungrazed sites. Small mammal abundance (P≤0.01), species richness (P≤0.01), and diversity (P≤0.03) were greater on ungrazed than grazed sites. In this study, foraging by elk and cattle appears to be reducing shrub and small mammal biodiversity.
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445. **The effects of fall grazing or burning bluebunch wheatgrass range on forage selection by deer and cattle in spring.**
Willms, W.; Bailey, A. W.; McLean, A.; and Tucker, R.
Canadian Journal of Animal Science 60(1): 113-122. (1980)
NAL Call #: 41.8 C163; ISSN: 0008-3984
Descriptors: Odocoileus hemionus hemionus/ Odocoileus hemionus/ fires-burns/ grazing/ habitat alterations/ mule deer/ food
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446. **The effects of farm field borders on overwintering sparrow densities.**
Marcus, J. F.; Palmer, W. E.; and Bromley, P. T.
Wilson Bulletin 112(4): 517-523. (2000)
NAL Call #: 413.8 W692; ISSN: 00435643
Descriptors: farm/ overwintering/ passerines/ population density/ United States/ Junco hyemalis/ Melospiza georgiana/ Melospiza melodia/ Passerculus sandwichensis/ Spizella passerina/ Spizella pusilla/ Zonotrichia albicollis
Abstract: Wintering birds that use farm fields may benefit from strips of uncultivated, grassy, and weedy vegetation, called field borders. Field borders were established on 4 farms in the North Carolina coastal plain in Wilson and Hyde counties in the spring of 1996. In February of 1997 and 1998, bird numbers on field edges and field interiors, with and without field borders, were surveyed using strip transect and line transect methods. Most (93%) birds detected in field edges were sparrows, including Song (Melospiza melodia), Swamp (Melospiza georgiana), Field (Spizella pusilla), Chipping (Spizella passerina), White-throated (Zonotrichia albicollis), and Savannah (Passerculus sandwichensis) sparrows and Dark-eyed Juncos (Junco hyemalis). We detected more sparrows on farms with field borders than on farms with mowed edges. This difference was most pronounced in field edges where field borders contained 34.5 sparrows/ha and mowed edges contained 12.9 sparrows/ha. Sparrow abundance did not differ by treatment in field interiors. Sparrow density in field borders was intermediate to wintering sparrow densities reported in other studies. These results suggest that establishing field border systems may be an effective way to increase densities of overwintering sparrows on farms in the southeastern U.S. coastal plain.
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447. **Effects of fire and grazing on an arid grassland ecosystem.**
Valone, Thomas J.; Nordell, Shawn E.; and Ernest, S. K. Morgan
Southwestern Naturalist 47(4): 557-565. (2002)
NAL Call #: 409.6 So8; ISSN: 0038-4909
Descriptors: commercial activities/ ecology/ community structure/ population dynamics/ terrestrial habitat/ abiotic factors/ physical factors/ land and freshwater zones/ Rodentia: farming and agriculture/ livestock grazing/ species diversity/ population size/ grasslands/ fire/ New Mexico/ Hidalgo County/ Animas Valley/ abundance/ arid grasslands/ Mammalia/ chordates/ mammals/ vertebrates
Abstract: We examined short-term responses of grasses, shrubs, and rodents on experimental plots to determine how manipulations of livestock grazing and prescribed fire affect individual species and community structure in a shrub-invaded arid grassland. Two grasses and Gutierrezia sarothrae were found in lower abundance on burned plots in the growing season after plots burned; all Prosopis glandulosa survived the fire. Total rodent captures and the number of Dipodomys spectabilis did not differ among treatments. No significant interaction between burning and grazing was observed. Fire seems to have few short-term negative effects on species in this system.
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448. **Effects of fire disturbance on grasshopper (orthoptera: acrididae) assemblages of the Comanche National Grasslands, Colorado.**
Nadeau, Lucanus; Cushing, Paula E.; and Kondratieff, Boris C.
Journal of the Kansas Entomological Society 79(1): 2-12. (2006)
NAL Call #: 420 K13; ISSN: 0022-8567
Descriptors: ecology/ population dynamics/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Orthoptera: community structure/ population density/ grassland/ fire/ prescribed burning/ Effect on population density and community structure/ Colorado/ Comanche

National Grasslands/ Insecta/ arthropods/ insects/ invertebrates
Abstract: We documented effects of spring bums on grasshopper assemblages of the shortgrass prairie at the Comanche National Grassland, Baca County, Colorado, in 1999 and 2000. We measured grasshopper density and diversity at each of four transects on both burned and unburned sites at three locations. We did not find consistent responses of these assemblages to fire in 1999 or 2000 due to site-specific assemblage dynamics. Specifically, grasshopper density exhibited three different trends between treatments at the three locations sampled: responses were similar between burned and unburned plots at Location 1, there were significantly more grasshoppers in the unburned pasture at Location 2, and there were significantly more grasshoppers in the burned pasture at Location 3. These site-specific trends were supported by species richness measurements. Furthermore, there were no significant differences in any of the subfamilies or guilds in the number of grasshoppers collected in the burned versus the unburned treatment pooled over location. The different trends between treatments at each location for the grasshopper assemblage as a whole were most likely the result of pre-existing differences among locations and sites. That the same three trends were seen in 2000, despite time for recovery, supports this explanation. The results suggest that spring bums in the shortgrass prairie do not affect the grasshopper assemblage beyond the natural variability occurring within the grasshopper assemblage.
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449. **Effects of fire management on the richness and abundance of central North American grassland land snail faunas.**
Nekola, J. C.
Animal Biodiversity and Conservation 25(2): 53-66. (2002)
NAL Call #: QL1.M87; ISSN: 1578-665X
Descriptors: conservation measures/ ecology/ population dynamics/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Gastropoda: habitat management/ fire management/ species richness/ abundance/ community structure/ population size/ grasslands/ United States, Midwest/ North America/ Mollusca/ invertebrates/ molluscs
Abstract: The land snail faunas from 72 upland and lowland grassland sites from central North America were analyzed. Sixteen of these had been exposed to fire management within the last 15 years, while the remainder had not. A total of 91,074 individuals in 72 different species were observed. Richness was reduced by approximately 30% on burned sites, while abundance was reduced by 50-90%. One-way ANOVA of all sites (using management type as the independent variable), a full 2-way ANOVA (using management and grassland type) of all sites, and a 2-way ANOVA limited to 26 sites paired according to their habitat type and geographic location, demonstrated in all cases a highly significant (up to $p < 0.0005$) reduction in richness and abundance on fire managed sites. Contingency table analysis of individual species demonstrated that 44% experienced a significant reduction in abundance on fire-managed sites. Only six species positively responded to fire. Comparisons of fire response to the general ecological preferences of these species demonstrated that fully 72% of turf-specialists were negatively impacted by fire, while 67% of duff-specialists demonstrated no significant response. These differences were highly significant ($p = 0.0006$). Thus, frequent use of fire management represents a significant threat to the health and diversity of North American grassland land snail communities. Protecting this fauna will require the preservation of site organic litter layers, which will require the increase of fire return intervals to 15+ years in conjunction with use of more diversified methods to remove woody and invasive plants.
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450. **Effects of fire on grasshopper assemblages in a northern mixed-grass prairie.**
Branson, D. H.
Environmental Entomology 34(5): 1109-1113. (Oct. 2005)
NAL Call #: QL461.E532
Descriptors: population studies/ terrestrial ecology: ecology, environmental Sciences/ Orthoptera/ Insecta/ Arthropoda/ Invertebrata/ Animalia/ Melanoplus sanguinipes (Orthoptera): species/ Melanoplus femurrubrum (Orthoptera): species/ Ageneotettix deorum (Orthoptera): species/ Phoetaliotes nebrascensis (Orthoptera): species/ Eretettix simplex (Orthoptera): species/ Opeia obscura (Orthoptera): species/ Encoptolophus costalis (Orthoptera): species/ Trachyrhachys kIowa (Orthoptera): species/ Melanoplus gladstoni (Orthoptera): species/ Melanoplus infantilis (Orthoptera): species/ biomass/ mixed grass prairie/ grasshopper assemblage/ grassland fire
Abstract: Grassland fires have been shown to influence grasshopper community composition and population dynamics, but studies of their effects on rangeland grasshopper assemblages in the northern Great Plains are lacking. This study was designed to examine the effect of a grassland wildfire on grasshopper community composition and population densities of three grasshopper subfamilies in western North Dakota northern mixed-grass prairie with sampling in paired burned and unburned plots. A rapidly moving fire occurred in late October 1999, after egg-overwintering grasshoppers had died. Vegetation biomass and nitrogen content of grasses did not differ statistically between burned and unburned plots in 2000. The fire negatively affected grasshopper population densities the year after the fire, but species diversity was not affected by the fire. Much of the reduction in grasshopper population densities was caused by a decline in densities of Gomphocerinae species. Grasshopper subfamily densities did not differ statistically between burned and unburned plots in 2001. Additional research is needed to determine the mechanisms leading to the reduction in Gomphocerinae species densities.
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451. **Effects of fire regime on birds in southeastern pine savannas and native prairies.**
Engstrom, R. T.; Vickery, P. D.; Perkins, D. W.; and Shriver, W. G.
Studies in Avian Biology (30): 147-193. (2005)
NAL Call #: QL671.S8; ISSN: 01979922
Descriptors: birds/ fire/ longleaf pine/ prairie/ United States, southeastern region/ Aimophila aestivalis/ Aves/ Picoides borealis/ Pinus palustris
Abstract: Fire, both natural and anthropogenic, has played a critical role in shaping vegetation structure and composition of many of the plant communities of the southeastern United States. Pine savannas, especially

longleaf pine (Pinus palustris), that were dominant over much of the upland coastal plain, have declined by approximately 97% over the past 100 yr. The inferred natural fire regime of this vegetation type was a fire frequency of 2-8 yr with typically low-severity fires that occurred during the lightning season (June-August). Currently, dormant-season (January through April) fires are used most frequently. Approximately 110-120 species, excluding migrants, comprise the avian community of southeastern pine savannas; and some of these are among the most rapidly declining bird species in the eastern United States. Disruption of the natural fire regime by fire exclusion or lengthened fire interval was detrimental to bird species associated with tree (e.g., Red-cockaded Woodpecker [Picoides borealis] and ground cover components (e.g., Bachman's Sparrow [Aimophila aestivalis] of the ecosystem. Lightning-season fire has mixed effects on birds (e.g., loss of some nests, but improved brood habitat); therefore, creation of patches of different burn treatments should be carefully considered. The foremost management and conservation challenge is to increase the number of acres of southeastern pine savannas burned frequently through thoughtful application of prescribed burning. Important research challenges include measuring tradeoffs among bird species and other wildlife for different fire regimes, evaluating metapopulation effects of different landscape applications of fire, and considering the nutrient dynamics of different fire regimes on bird populations.
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452. **The effects of grassland management using fire on habitat occupancy and conservation of birds in a mosaic landscape.**
Pons, P.; Lambert, B.; Rigolot, E.; and Prodon, R.
Biodiversity and Conservation 12: 1843-1860. (Sept. 2003)
NAL Call #: QH75.A1B562
Descriptors: range management/ prescribed burning/ grazing/ environmental impact/ wild birds/ wildlife habitats/ habitat preferences/ wildlife management/ France/ bird communities/ natural resources, environment, general ecology, and wildlife conservation/ animal ecology and behavior/ plant production range and pasture grasses
This citation is from AGRICOLA.

453. **The effects of grazing and browsing animals on wildlife habitats.**
Urness, P. J. and Austin, D. D.
Utah Science 50(2): 104-107. (1989)
NAL Call #: 100 Ut1F
Descriptors: grassland management/ grasslands/ rangelands/ grazing/ nature conservation
Abstract: The effects of stocking different species of animal on rangelands in Utah, USA, is discussed, with particular reference to the possible impact on wildlife through alteration of their habitat.
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454. **Effects of grazing and burning on densities and habitats of breeding ducks in North Dakota.**
Kruse, Arnold D. and Bowen, Bonnie S.
Journal of Wildlife Management 60(2): 233-246. (1996)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: land use/ Lostwood National Wildlife Refuge/ native grasslands/ nest density/ nest success/ seasonality/ wildlife management
Abstract: Native grassland communities controlled by public agencies become increasingly important to the maintenance of many wildlife species as privately owned grasslands are destroyed or degraded for farming, mining, and development. In turn, wildlife on publicly owned grasslands are affected by the management techniques practiced by local managers. We studied the effects of grazing and prescribed burning on upland-nesting ducks and the structure and type of vegetation from 1980 to 1988 at the Lostwood National Wildlife Refuge (NWR) in northwestern North Dakota. Mallard (Anas platyrhynchos), the most abundant species at Lostwood NWR, had lower (P < 0.05) annual nest densities on experimental and control fields in the later years than in the early years of the study. Spring burning reduced (P = 0.016) nest densities of gadwall (A. strepera). Spring grazing reduced nest densities of gadwall (P = 0.014), and blue-winged teat (A. discors, P = 0.023). Nest density of gadwall increased (P = 0.018) after spring grazing was terminated. On the summer burn/spring graze fields, blue-winged teal had lower (P = 0.010) nest densities after treatments (1987-88) than before treatments (1980-81). Nest success was high (mallard 34%, gadwall 45%, blue-winged teal 31%) but was not influenced (P ≥ 0.16) by the burning and grazing treatments. During the study, the amount of grass/brush increased, whereas the amount of brush and brush/grass decreased on control and treatment fields. During the years with burning and grazing, short vegetation increased and tall vegetation decreased. On the spring graze fields, 1 year after grazing ended the vegetation was similar to that on the control fields. The spring burn and summer burn/spring graze fields recovered more slowly. Brushy species such as western snowberry (Symphoricarpos occidentalis) provided attractive nesting habitat for many upland-nesting waterfowl species, especially mallard, gadwall, American wigeon (A. americana), and northern pintail (A. acuta). Habitat needs of additional species of wildlife that depend on grasslands may need to be considered when deciding how to manage habitat.
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455. **Effects of grazing intensity and temporal application of grazing treatments of nongame birds in North Dakota mized-grass prairie.**
Salo, Eric D. South Dakota State University, 2003.
Notes: Thesis (M.S.)
http://wfs.sdstate.edu/wfsdept/Publications/Theses/Salo,%20Eric%20D.%20MS-2003.pdf
Descriptors: Conservation Reserve Program/ birds/ Aves/ grazing/ rangelands/ North Dakota/ Great Plains
Abstract: Grazing occurred naturally in the northern Great Plains and influenced many natural processes in grassland ecosystems, including the habitat selection of breeding birds. Grazing, mainly for livestock production, is still an important land use practice and is one that impacts millions of hectares on both public and private land in the United States. In North Dakota alone, various grazing practices affect over 4 million hectares (10 million acres), making it one of the most important land uses, second only to cereal and oil crop production. To better understand how grazing affects nongame breeding birds, a study was conducted at Central Grasslands Research Extension Center (CGREC) to determine the effects of four levels of grazing intensity on nongame bird populations and grassland habitat. In addition, two earlier studies, conducted at CGREC were

repeated, one in native prairie and the other in Conservation Reserve Program (CRP) grasslands, to determine the temporal effects of grazing systems on nongame bird populations and habitat. Bird surveys were conducted along permanent belt transects and during a 15 minute “walk-about” three times per year on treatment plots during the summers of 2001 and 2002. Vegetation structure was characterized from measurements taken parallel to the bird survey transects, two times per year for each treatment plot. Many species of nongame birds responded differently to the effects of grazing intensity and to the temporal effects of grazing systems in both native prairie and CRP grasslands. Overall breeding bird densities and vegetation structure were negatively affected by increasing levels of grazing intensity in mixed-grass prairie. Clay-colored sparrows, grasshopper sparrows, and savannah sparrows reached their highest densities in the light and moderate grazing intensity treatments whereas their lowest populations occurred in the high and extreme grazing intensity treatments. In contrast, densities of chestnut-collared longspurs, horned larks, and various species of shorebirds were highest in the high and extreme grazing treatment plots. Nongame bird densities and species richness during this study period were lower for all grazing treatments in native prairie and CRP grazing system grasslands when compared to earlier studies. Among grazing treatments, season-long pastures exhibited similar or slightly higher densities of nongame birds when compared to rotational grazing treatments in the native prairie and CRP study areas. However, rotational grazing treatments supported more species and are probably beneficial because they provide areas of undisturbed habitat during the breeding season. Results from this study suggest that management of grassland habitats can be manipulated to provide nesting habitat for certain species of grassland birds depending on particular management goals.

456. **Effects of grazing management treatment on grassland plant communities and prairie grouse habitat.**
Manske, L. L.; Barker, W. T.; and Biondini, M. E.
In: Prairie chickens on the Sheyenne National Grasslands, General Technical Report-RM 159/ Bjugstad, Ardell J., ed.; Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1988. pp. 58-72.
Notes: Paper presented at a "Symposium on Prairie Chickens on the Sheyenne National Grasslands," September 18, 1987, Crookston, Minnesota. Includes references.
NAL Call #: aSD11.A42
Descriptors: birds/ wildlife/ grasslands/ range management/ grazing/ North Dakota
This citation is from AGRICOLA.

457. **Effects of grazing on long-billed curlew (Numenius americanus) breeding behavior and ecology in southwestern Idaho.**
Bicak, T. K.; Redmond, R. L.; and Jenni, D. A.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 74-85; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: Idaho/ long-billed curlew/ Numenius americanus/ grazing/ breeding behavior

458. **Effects of grazing on nesting by upland sandpipers in southcentral North Dakota.**
Bowen, Bonnie S. and Kruse, Arnold D.
Journal of Wildlife Management 57(2): 291-301. (1993)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: endangered species/ field method/ marshland management/ protection
Abstract: Grazing by livestock is often used to reduce litter, improve plant vigor, and alter plant species composition, but additional information is needed on the effects of these management practices on upland-nesting birds. Thus, we conducted an experimental study of the effect of grazing on nest density and nest success of upland sandpipers (Bartramia longicauda) in southcentral North Dakota from 1981 to 1987. Our experimental design consisted of 4 treatments and 1 control, each applied to 1 field in each of 3 study areas. The treatments represented options available to grassland managers: spring grazing, autumn grazing, autumn-and-spring grazing, season-long grazing, and control (ungrazed during the study). Nests (n = 342) were found by searching study areas with a cable-chain drag. Nest density was lower (P = 0.006) for treatments where cattle were present (spring, autumn-and-spring, and season-long) than where cattle were not present (autumn and control) during the nesting season. We concluded that grazing during the nesting season reduced the nest density of upland sandpipers. Nest success varied among years (P = 0.01) and was low in the first year of grazing and higher at the end of the study period. We found little evidence that the grazing treatment influenced nest success. We recommend that public lands with breeding populations of upland sandpipers include a complex of fields under various management practices, including fields undisturbed during the nesting season.
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459. **Effects of grazing on small mammal abundance in eastern South Dakota.**
Bouska, Wesley W. and Jenks, Jonathan A.
Proceedings of the South Dakota Academy of Science 85: 113-118. (2006)
NAL Call #: 500 So82; ISSN: 0096-378X
Descriptors: commercial activities/ conservation measures/ ecology/ population dynamics/ terrestrial habitat/ land zones/ Blarina brevicauda/ Microtus ochrogaster/ Microtus pennsylvanicus/ Peromyscus maniculatus/ Sorex cinereus: farming and agriculture/ cattle grazing/ habitat management/ population density/ cattle grazing/ management implications/ grassland/ South Dakota/ Brookings/ Mammalia, Insectivora, Soricidae/ chordates/ Insectivores/ mammals/ rodents/ vertebrates
Abstract: Variation in small mammal abundance was compared between ungrazed and grazed pasture in Brookings County, South Dakota from 28 September through 27 October 2005. Total relative abundance and absolute abundance of small mammal populations did not differ (p=0.476) between grazed and ungrazed pastures. However, there were significantly more (p<0.05) masked shrews (Sorex cinerus) trapped on ungrazed than grazed pasture. Conversely, there were significantly more (p<0.05) deer mice (Peromyscus maniculatus) and meadow voles

(Microtus pennsylvanicus) trapped on grazed than ungrazed pasture. Because little information is available on effects of grazing on small mammal communities in the Northern Great Plains, these results will aid range and wildlife managers in developing local grazing programs that maintain the abundance and diversity of small mammal populations.
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460. **Effects of grazing on the demography and growth of the Texas tortoise.**
Kazmaier, Richard T.; Hellgren, Eric C.; Ruthven, Donald C.; and Synatzske, David R.
Conservation Biology 15(4): 1091-1101. (2001)
NAL Call #: QH75.A1C5 ; ISSN: 0888-8892
Descriptors: demography/ disturbance tolerance/ grazing effects/ growth/ species management
Abstract: Considerable effort has been exerted in attempts to understand the complex ecological effects of grazing. North American tortoises, by virtue of their distribution, provide a good model taxon through which to study how grazing effects vary with grazing regime, habitat, and climate. We studied the Texas tortoise (Gopherus berlandieri), which is restricted primarily to privately owned rangelands of southern Texas and northeastern Mexico. Management of this species is hampered by a lack of information on the effects of common land-use practices. We evaluated the effects of moderate grazing by cattle (short-duration, winter-spring rotational grazing regime; 6-28 animal-unit days/ha/year) on this tortoise by comparing two grazed and two ungrazed sites in the Western Rio Grande Plains, Texas (U.S.A.), from April 1994 to October 1997. We made 132 captures of 106 individuals in the ungrazed pastures and 324 captures of 237 individuals in the grazed pastures. We also radiotracked 22 tortoises in the ungrazed pastures and 25 tortoises in the grazed pastures. Comparisons of relative abundance, body-size distribution, age distribution, body mass, sex ratio, adult survival, proportion of juveniles, and growth rates revealed no differences (p>0.05 for all parameters) between tortoises on grazed and ungrazed areas. Based on these results, we suggest that moderate grazing by cattle is not incompatible with maintenance of Texas tortoise populations. Our data were consistent with a general model of tortoise biogeography and tolerance of disturbance which suggests that Texas tortoises are tolerant to intermediate levels of disturbance. Generalities about the effect of cattle grazing on the four North American tortoises should be avoided unless they can be placed in the context of grazing regime, precipitation, habitat quality, and tortoise requirements.
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461. **Effects of grazing on vegetation structure, prey availability, and reproductive success of Grasshopper Sparrows.**
Sutter, B. and Ritchison, G.
Journal of Field Ornithology 76(4): 345-351. (2005)
NAL Call #: 413.8 B534; ISSN: 02738570
Descriptors: Ammodramus savannarum/ cattle/ grasshopper sparrow/ grazing/ nest success/ Ammodramus savannarum/ Animalia/ Aves/ Bos taurus/ Insecta/ Invertebrata/ Passeridae
Abstract: Populations of Grasshopper Sparrows (Ammodramus savannarum) have been declining, and agricultural practices, such as grazing by domestic cattle (Bos taurus), are likely contributing factors. Grazing can alter the composition and structure of vegetation and influence prey availability, and such changes can impact the nesting success of grassland birds. Our objective was to examine the nesting success of Grasshopper Sparrows in grazed and ungrazed habitats on the Blue Grass Army Depot in Madison County, Kentucky. Clutch sizes of female Grasshopper Sparrows nesting in grazed and ungrazed areas differed significantly, with mean clutch sizes of 4.48 in ungrazed areas and 3.91 in grazed areas. In addition, nest success was higher in ungrazed areas (70%) than grazed areas (25%). Insect sweeps revealed that invertebrate biomass in ungrazed areas was greater than in grazed areas, and analysis of vegetation indicated that grazed areas had less litter, more shrubs, and shorter, less dense vegetation than ungrazed areas. Most unsuccessful nests were depredated, and the higher predation rates on nests in grazed areas may have been due to differences in vegetation structure. Shorter, less dense vegetation in grazed areas may make it easer for predators to observe adults and locate nests, while taller, denser vegetation in ungrazed areas may provide greater concealment. While the results of previous studies suggest that light to moderate grazing can produce habitat suitable for Grasshopper Sparrows, more intense grazing, as on our study area (one animal unit/ha), creates habitat less suitable for these sparrows.
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462. **Effects of grazing practices and fossorial rodents on a winter avian community in Chihuahua, Mexico.**
Desmond, M.
Biological Conservation 116(2): 235-242. (2004)
NAL Call #: S900.B5; ISSN: 0006-3207
Descriptors: deserts/ grasslands/ grazing/ land use/ natural grasslands/ population density/ species diversity/ wild birds/ winter/ Dipodomys spectabilis
Abstract: Chihuahuan Desert grasslands are important wintering grounds for grassland and shrub-adapted birds. Many species belonging to these assemblages are currently exhibiting population declines. One area recognized for its importance to biological diversity, including grassland birds, is the Janos-Nuevo Casas Grandes black-tailed prairie dog (Cynomys ludovicianus) complex in northwestern Chihuahua, Mexico, an area containing 58 colonies with 30,000 ha of prairie dogs. This is one of the largest remaining prairie dog complexes and the only intact complex in the Chihuahuan Desert. In its current condition, a large percentage of this complex is of reduced value to wildlife. Overgrazing on communal (ejido) lands has resulted in areas being comprised of annual grasses and forbs. The density of active prairie dog burrows and banner-tailed kangaroo rat (Dipodomys spectabilis) mounds as well as avian diversity and abundance were lower on ejido lands than an adjacent private ranchland with and without prairie dogs. Few avian species used overgrazed portions of the prairie dog colony. Community similarity among plot types was low due to different management practices and differences on and off colony. To retain, and in many instances restore the biological diversity of this important region it is essential to work with local ejidos on grazing management.
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463. **Effects of grazing systems on sharp-tailed grouse habitat.**
Mattise, S. N.; Linder, R. L.; and Kobriger, G. D.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 124-132; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: sharp-tailed grouse/ grazing/ livestock

464. **Effects of habitat management for ducks on target and nontarget species.**
Koper, N. and Schmiegelow, F. K. A.
Journal of Wildlife Management 70(3): 823-834. (2006)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2006)70[823:EOHMFD]2.0.CO;2.
Descriptors: Alberta/ cattle grazing/ dry mixed-grass prairie/ ducks/ edge effects/ field size/ shorebirds/ songbirds/ surrogate species
Abstract: Habitat management for ducks has significant implications for the conservation of other species. We hypothesized that, because of their flagship and umbrella characteristics, upland-nesting ducks might be effective surrogate species for songbird and shorebird conservation in the dry mixed-grass prairie. We tested this by comparing effects of habitat management (cattle grazing deferments and field size), distance to other habitat (water, cropland/forage, roads), and vegetation, on the richness and density of ducks, songbirds, and shorebirds in southern Alberta, Canada. There were no consistently similar responses to these habitat characteristics among ducks, songbirds and shorebirds. Despite their conceptual appeal, ducks are, therefore, unlikely to be good surrogate species for avian conservation in the dry mixed-grass prairie. Habitat managers and conservation planners should empirically validate whether habitat management for ducks positively affects other species, if this is a management objective. Our results suggest that in dry mixed-grass prairie, deferring cattle grazing is likely to increase densities of only lesser scaup but that grazing, in general, can be used by managers to create a heterogeneous habitat that supports many species.
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465. **Effects of hay management on grassland songbirds in Saskatchewan.**
Dale, B. C.; Martin, P. A.; and Taylor, P. S.
Wildlife Society Bulletin 25(3): 616-626. (1997)
NAL Call #: SK357.A1W5
Descriptors: birds/ environmental impact/ agricultural practices/ Saskatchewan/ grassland birds/ songbird conservation/ songbirds
Abstract: Evaluated impacts of hay management on endemic grassland birds.

466. **Effects of haying and agricultural practices on a declining species: The North American wood turtle, Glyptemys insculpta.**
Saumure, R. A.; Herman, T. B.; and Titman, R. D.
Biological Conservation 135(4): 581-591. (2007)
NAL Call #: S900.B5; ISSN: 00063207.
Notes: doi: 10.1016/j.biocon.2006.11.003.
Descriptors: agriculture/ erosion/ haying/ Injury/ mortality/ survivorship
Abstract: In North America, the spatio-temporal scale of deforestation has resulted in a 94% decrease in temperate forests within 360 years. Despite the enormous scale of this disturbance, agriculture is so pervasive in modern society that its impacts are highly underappreciated. We investigated the impact of current agricultural practices on a disturbance-dependent species in southern Quebec, Canada. Of 30 wood turtles (Glyptemys insculpta) followed via radio-telemetry, 20% died as a result of agricultural activities. Anthropogenic mortality estimates for adults and juveniles in 1998 were 0.10 and 0.18, respectively. For 1999, these values were 0.13 and 0.17, respectively. Of those turtles that survived, many had injuries inflicted by agricultural machinery. Sub-lethal mutilation rates for adults were 90 ± 3% in both years, whereas the maximum frequency for juveniles was 57%. A Carapace Mutilation Index was derived to quantify the distribution and severity of injuries observed. Only male and juvenile Carapace Mutilation Index values differed significantly. Adults had significantly more carapace injuries and limb amputations on their right sides. This bilateral asymmetry of injuries resulted from of a combination of turtle flight behavior and traditional harvesting practices. We reiterate the recommendations of forage researchers: setting the cutting height of disc mowers to 100 mm increases harvest yields, reduces wear on machinery, and decreases soil erosion. A by-product of such a change in cutting height is that turtle mortality and injury rates should be reduced, as wood turtle carapace height is <87 mm. Without changes in agricultural practices, this population will be extirpated.
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467. **Effects of invasive exotic grasses on South Texas rangeland breeding birds.**
Flanders, A. A.; Kuvlesky, W. P.; Ruthven, D. C.; Zaiglin, R. E.; Bingham, R. L.; Fulbright, T. E.; Hernandez, F.; and Brennan, L. A.
Auk 123(1): 171-182. (2006)
NAL Call #: 413.8 AU4 ; ISSN: 00048038
Descriptors: breeding birds/ exotic grasses/ Guilds/ invertebrates/ South Texas
Abstract: Invasive exotic plants are a major threat to many species of wild birds. When these plants become established and widespread, the floristic composition of native plant communities becomes simplified, which can result in long-term and often irreversible habitat degradation for birds and other animals. Until recently, few studies have focused on the effect of invasive exotic grasses on breeding birds in southwestern rangelands. During the 2001 and 2002 breeding seasons (May-June), we compared the abundance and species richness of breeding birds, native flora, and arthropods on South Texas rangeland plots dominated by native grasses and plots dominated by two invasive exotic grasses, Lehmann lovegrass (Eragrostis lehmanniana) and buffelgrass (Cenchrus ciliaris). Native-grass cover was >400% greater on native-grass sites than on exotic-grass sites. Forb and grass species-richness were higher on native-grass sites. Shrub canopy cover, bare ground, and vegetation height measurements were similar on native-grass and exotic-grass sites. Overall bird abundance was 32% greater on native-grass sites than on exotic-grass sites. Lark Sparrows (Chondestes grammacus) were 73% more abundant on

native-grass sites. Four other species - Blackthroated Sparrow (Amphispiza bilineata), Northern Mockingbird (Mimus polyglottos), Northern Bobwhite (Colinus virginianus), and Cassin's Sparrow (Aimophilla cassini) - were 26-70% more abundant on native-grass sites. The guild of birds that foraged on the ground under open brush canopies was almost twice as abundant on native-grass sites. Arthropod abundance was 60% greater on the native-grass site we sampled. Specifically, spiders, beetles, and ants were 42-83% more abundant on a native-grass site than on a buffelgrass site. Compared with rangelands dominated by native vegetation, areas dominated by Lehmann lovegrass and buffelgrass in South Texas appear to provide less suitable habitat for breeding birds, especially for bird species that forage on or near the ground. © The American Ornithologists' Union, 2006.
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468. **Effects of land management on nesting success of sandhill cranes in Oregon.**
Littlefield C. D. and Paullin D. G.
Wildlife Society Bulletin 18(1): 63-65. (1990)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Grus canadensis tabida/ cattle grazing/ habitat/ refuge/ wetland
© Thomson Reuters Scientific

469. **Effects of livestock grazing on bird abundance and vegetation structure in shortgrass prairie.**
Reinking, Dan L.; Wolfe, Donald H.; and Wiedenfeld, David A.
Oklahoma Ornithological Society Bulletin 33(4): 29-36. (2000); ISSN: 0474-0750
Descriptors: agricultural practices/ birds/ communities/ ecosystems/ grazing/ habitat alterations/ prairies/ wildlife-livestock relationships/ horned lark/ western meadowlark/ grasshopper sparrow/ mourning dove/ common nighthawk/ killdeer/ Aves/ Texas/ Rita Blanca Natl. Grasslands
Abstract: The authors studied the present avian community composition in a shortgrass prairie ecosystem and determined the effects of differing grazing regimes on this composition. Six species of birds were recorded in the study area. Horned larks and western meadowlarks made up 49% and 40% of the birds observed, respectively.
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470. **Effects of livestock grazing on duck nesting habitat in Utah.**
West, B. C. and Messmer, T. A.
Rangeland Ecology and Management 59(2): 208-211. (Mar. 2006)
NAL Call #: SF85.J67
Descriptors: ducks/ nesting/ livestock/ grazing/ Utah
Abstract: Periodic vegetation disturbance is an important yet controversial tool for waterfowl managers. Some have reported livestock grazing removes residual vegetation and thus is detrimental to nesting ducks, and others argue that such disturbance is necessary to maintain grassland health. We evaluated the impact of winter livestock grazing on duck nesting at Bear River Migratory Bird Refuge, Utah. During winter 1999, 6 experimental plots were grazed by cattle and 6 were ungrazed; in winter 2000, 8 plots were grazed and 8 were ungrazed. All grazing treatments were conducted during 15 November-15 March and averaged a stocking rate of 9.5 animal unit months/ha. During the following spring nesting season, we measured visual obstruction readings (VOR) on grazed and ungrazed sites. Although VOR on ungrazed sites were greater than those on grazed sites, this difference became less important as the nesting season progressed. Winter grazing impacted the nesting habitat of early-nesting ducks such as mallards (Anas platyrhynchos), but not that of late-nesting species such as cinnamon teal (Anas cyanoptera) and gadwall (Anas strepera). When using livestock grazing to manage grasslands, waterfowl managers should consider their management goals, the species composition of breeding duck populations, and environmental conditions.
This citation is from AGRICOLA.

471. **Effects of livestock grazing on Mearns quail in southeastern Arizona.**
Brown, R. L.
Journal of Range Management 35(6): 727-732. (1982)
NAL Call #: 60.18 J82; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume35/Number6/azu_jrm_v35_n6_727_732_m.pdf
Descriptors: Cyrtonyx montezumae mearnsi/ census-survey methods/ changes detrimental to wildlife/ cover/ food supply/ grassland/ grazing/ habitat/ livestock/ nests and nesting/ population density/ quail, Mearns harlequin/ wildlife-livestock relationships/ woodland climax/ Arizona/ Santa Cruz County
Abstract: The mechanics of the relationship between livestock grazing and quail densities are determined and estimates of the level of grazing intensity that is limiting to local quail populations are presented. Effects of cover removal on Mearns quail populations are examined: quail food supply was not reduced, but the elimination of escape cover and nesting grass was detrimental, especially to breeding populations.
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472. **Effects of livestock grazing on rangeland grasshopper (Orthoptera: Acrididae) abundance.**
O'Neill, Kevin M.; Olson, Bret E.; Rolston, Marni G.; Wallander, Roseann; Larson, Deanna P.; and Seibert, Catherine E.
Agriculture, Ecosystems and Environment 97(1-3): 51-64. (2003)
NAL Call #: S601.A34; ISSN: 0167-8809
Descriptors: food availability/ grazing impacts/ grazing intensity/ grazing management/ habitat characteristics/ habitat quality/ heavily grazed areas/ livestock grazing/ microclimate alteration/ microhabitats/ plant cover impacts/ potential oviposition sites/ ungrazed pastures
Abstract: Livestock may impact habitat quality for grasshoppers by reducing food availability and by altering microclimate and potential oviposition sites. A 5-year study was conducted to create consistent grazing impacts on replicated plots and measure their effects on plant cover, microclimate, and grasshopper abundance. Cattle were used to produce two levels of grazing intensity that were compared to ungrazed controls. Differences in plant cover were greatest immediately after grazing each summer, grasshopper microhabitats tending to be shadier, cooler, less windy, and more humid in the ungrazed plots. The grasshopper assemblage included five of the worst pest grasshopper species in North America: Ageneotettix deorum, Aulocara elliotti, Melanoplus sanguinipes, M. packardii, and Camnula pellucida. Most species had

greater abundance on ungrazed pastures, particularly during the 4-6 weeks after grazing each year. However, A. elliotti was often more abundant in heavily grazed areas early in the year when early instars were present and in late summer when adults were predominant. There was no strong evidence that the effect of grazing on grasshopper abundance increased over the 5-year study. At this time, all changes in grasshopper numbers cannot be directly attributed to particular habitat characteristics that changed after grazing, but the results suggest that grazing management could be used to reduce pest grasshopper densities.
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473. **Effects of livestock grazing on the invertebrate prey base and on the survival and growth of larvae of the Columbia spotted frog, Rana luteiventris.**
Howard, Amy and Munger, James C., 2003. 28 p. Idaho Bureau of Land Management Technical Bulletin.
http://www.blm.gov/id/st/en/info/publications/technical_bulletins/TB03-7.html
Descriptors: commercial activities/ nutrition/ diet/ life cycle/ development/ ecology/ population dynamics/ freshwater habitat/ lentic water/ lotic water/ land zones/ Invertebrata: biomass/ community structure/ Rana luteiventris/ ponds/ streams/ biomass structure/ amphibian predators/ Idaho/ Owyhee Mountains/ livestock grazing/ amphibian predator-prey base/ Ranidae/ Anura/ Lissamphibia/ Amphibia/ amphibians/ chordates/ invertebrates/ vertebrates
Abstract: This report discusses results primarily from the second of two field seasons in which two aspects of grazing were examined for possible effects on Columbia spotted frogs (Rana luteiventris). First, exclosures were used to prevent grazing on portions of the streams and ponds to ascertain the effects of grazing on the invertebrate prey base utilized by the frogs. Although we found no statistically significant effect of grazing on either biomass or diversity of invertebrate prey, care must be taken in the interpretation of these results. While it is possible that there was no effect of the specific grazing regimes of these sites on the invertebrate community, the small sample size, the very general taxonomic identification used, and weaknesses in study design may have masked any true differences. Adult spotted frogs were apparently not actively feeding during late August to late September. Metamorphs and subadults, however, would need to forage at that time to accumulate necessary fat reserves and would therefore be affected by changes in the invertebrate community. Further work is needed to more solidly document the effects of grazing on invertebrates. Second, spotted frog larvae were raised in microcosms located at the Mudflat Guard Station and were subjected to four levels of cattle waste. During the first year, survival of larvae was very low and growth was stunted, indicating that the experimental design needed modification for the second year's experiment. During the second year, we found that addition of waste negatively affected survival rate. We also found that cattle waste does not appear to be directly toxic, nor does the decreased survival seem to be due to decreased dissolved oxygen levels. The cause of decreased survival is probably an indirect effect of addition of waste, such as an increased ammonia concentration. We also found that addition of waste led to an increased growth rate of larvae. Further study is needed to determine whether, in the more natural conditions of the field, cattle waste affects survival and growth in the same way as was observed in the microcosms.
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474. **Effects of livestock management on southwestern riparian ecosystems.**
Krueper, D. J.
In: Desired future conditions for southwestern riparian ecosystems: Bringing interests and concerns together, General Technical Report-RM 272/ Shaw, Douglas W. and Finch, Deborah M., eds.; Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1996. pp. 281-301.
NAL Call #: aSD11.A42 no. 272
Descriptors: ecosystems/ livestock/ grazing/ environmental degradation/ habitat destruction/ wildlife/ riparian buffers/ United States, southwestern region
Abstract: Conference held September 18-22, 1995 in Albuquerque, N. Mex.
This citation is from AGRICOLA.

475. **The effects of livestock on California ground squirrels (Spermophilus beecheyii).**
Fehmi, J. S.; Russo, S. E.; and Bartolome, J. W.
Rangeland Ecology and Management 58(4): 352-359. (2005)
NAL Call #: SF85.J67; ISSN: 1550-7424
Descriptors: burrow patterns/ ground squirrels/ California/ grasslands/ cattle grazing/ oak savanna/ livestock exclosures
Abstract: Understanding the impacts of livestock grazing on wildlands is important for making appropriate ecosystem management decisions. Using livestock exclosures, we examined the effects of moderate cattle grazing on the abundance of California ground squirrels (Spermophilus beecheyii Richardson) and the spatial distribution of active burrows within their colonies in grassland and blue oak (Quercus douglasii Hook. & Arn.) savanna habitats in the coastal range of California over a 3-year period (1991-1994). Overall, relative population densities of California ground squirrels declined significantly throughout the experiment, but did not differ between grazed and ungrazed colonies or between habitats. There was also no significant interaction between these 2 factors. The spatial distribution of burrows, as measured by the mean nearest neighbor distance of active entrances within a colony, did not differ significantly between grazed and ungrazed colonies or between habitats, nor was the interaction significant. Thus, low to moderate levels of cattle grazing did not appear to have a strong effect on the population dynamics of California ground squirrels, and grazing may be compatible with maintenance of ground squirrel populations. Based on multivariate analysis of variance of 1994 data, live plant cover, native plant cover, and standing biomass were lower where the number of burrows was higher on grazed colonies but were little affected on ungrazed colonies. Ground squirrels may increase the impact of livestock grazing and thus reduce the capacity of the land to support other activities. However, it is clear that the effects of livestock grazing are complex and that detailed studies of potential mechanisms by which grazing impacts California ground squirrel populations are necessary.
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476. **Effects of long-term cattle exclosure on vegetation and rodents at a desertified arid grassland site.**
Valone, T. J. and Sauter, P.
Journal of Arid Environments 61(1): 161-170. (2005)
NAL Call #: QH541.5.D4J6; ISSN: 0140-1963
Descriptors: commercial activities/ ecology/ population dynamics/ terrestrial habitat/ land zones/ Rodentia: farming and agriculture/ community structure/ population density/ grasslands/ arid grassland/ Arizona/ arid grasslands/ faunal responses/ cattle grazing/ Mammalia/ chordates/ mammals/ rodents/ vertebrates
Abstract: Arid grasslands are often presumed to exist in one of two alternate stable states: grassland or desertified shrubland. While the conversion to shrubland can occur rather rapidly following intense overgrazing, the recovery of perennial grasses is often presumed to be difficult or impossible even with livestock removal. We examined vegetation and rodent communities at a desertified shrubland site from which livestock had been removed for more than four decades. Total shrub cover was similar but differed in composition across the grazing fence. Larrea tridentata had significantly higher cover Outside while Parthenium incanum had significantly higher cover inside the fence. Basal perennial grass cover was significantly higher inside the fence. Rodent diversity was significantly higher inside the fence due to higher abundance and diversity of pocket mice. These data suggest that recovery of perennial grasses at severely desertified sites is possible but may require several decades and that rodent diversity responds positively to such recovery. © 2004 Elsevier Ltd. All rights reserved.
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477. **Effects of management burning on prairie insect species richness within a system of small, highly fragmented reserves.**
Panzer, Ron and Schwartz, Mark
Biological Conservation 96(3): 363-369. (2000)
NAL Call #: S900.B5; ISSN: 0006-3207
Descriptors: conservation measures/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ land and freshwater zones/ Insecta: habitat management/ community structure/ grassland/ fire/ management burning/ community structure effects/ Indiana and Wisconsin/ Illinois/ Indiana/ Wisconsin/ management burning effects/ prairie habitat/ Insecta/ arthropods/ insects/ invertebrates
Abstract: A growing number of entomologists are expressing concern that insect species are being extirpated from fire-managed (F-M) reserves and are urging that management burning be substantially reduced. In accord with this view, the fire attrition hypothesis predicts that fire-excluded (F-E) sites will support greater species richness, greater mean population densities, and an inordinately large number of species that are absent from F-M sites. Comparative studies of remnant-dependent (r-d) species among F-M and F-E systems in northern Illinois, northwest Indiana, and southeast Wisconsin failed to support these predictions. Our results suggest that the fire-attrition model, based on prevailing burn practices, may be applicable to few if any species. We conclude that prevailing rotational, cool season burning practices have generally been compatible with the conservation of insect biodiversity within the highly fragmented prairie reserve system in the Chicago region.
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478. **Effects of management practices on grassland birds.**
Douglas H. Johnson, D. H.; Igl, L. D.; and Dechant Shaffer, J. A.: Northern Prairie Wildlife Research Center, U.S. Geological Survey. (2001).
Notes: See also http://www.npwrc.usgs.gov/resource/literatr/wetbird/index.htm (Effects of Management Practices on Wetland Birds). http://www.npwrc.usgs.gov/resource/literatr/grasbird/index.htm
Descriptors: ecological requirements/ dispersion/ desert habitat/ brood-egg/ habitat management/ management/ North America
Abstract: These reports are a series of literature syntheses on North American grassland birds. The need for these reports was identified by the Prairie Pothole Joint Venture (PPJV), a part of the North American Waterfowl Management Plan. The PPJV adopted the goal to stabilize or increase populations of declining grassland- and wetland-associated wildlife species in the Prairie Pothole Region. To further that objective, it is essential to understand the habitat needs of birds other than waterfowl, and how management practices affect their habitats. The focus of these reports is on management of breeding habitat, particularly in the northern Great Plains. Resource contains over 40 species accounts.
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479. **Effects of mowed trails on depredation of artificial nests in grassland.**
Rosenblatt, Daniel L.; Newton, Julianne L.; and Heske, Edward J.
Prairie Naturalist 32(1): 29-41. (2000)
NAL Call #: QH540.P7; ISSN: 0091-0376
Descriptors: wildlife management: conservation/ terrestrial ecology: ecology, environmental sciences/ artificial nests/ grasslands: habitat/ ground nesting/ mowed trail effects/ nest depredation
Abstract: We used artificial nests to assess the effects of mowed trails on nest survival in small patches of grassland in east-central Illinois. In 1997 and 1998, we placed nests on the ground 5 m, 10 m, 25 m, and 50 m away from mowed trails in oldfields to examine if the distance from mowed trails influenced nest survival. We also placed nests in control fields without mowed trails to determine if there was an increase in overall nest depredation when mowed trails were present. We detected no difference in either the number of depredation events or in depredation rates among the four distance classes of nest in fields with mowed trails. We also detected no difference in depredation between fields with mowed trails and without mowed trails. We did measure significantly higher rates of depredation in fields closest to a campground and park area than elsewhere in 1997, but not in 1998. Track stations, automated cameras, and clay eggs were used to determine the identity of potential nest predators. Data from clay eggs indicated that much of the observed egg depredation in grasslands might be due to small mammals, a group of predators that are unlikely to be affected by the presence of mowed trails.
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480. **Effects of mowing and burning on shrubland and grassland birds on Nantucket Island, Massachusetts.**
Zuckerberg, B. and Vickery, P. D.
Wilson Journal of Ornithology 118(3): 353-363. (2006)
NAL Call #: QL671.W55 ; ISSN: 15594491.
Notes: doi: 10.1676/05-065.1.
Descriptors: mowing/ prescribed burns/ shrublands/ birds/ habitat management/ habitat preference/ Massachusetts
Abstract: Throughout the United States, declines in breeding populations of grassland and shrubland birds have prompted conservation agencies and organizations to manage and restore early-successional habitats. These habitats support a variety of birds, some of which have been classified as generalists; thus, often these birds are thought to be less affected by habitat manipulation. More information, however, is needed on the response of early-successional generalists to habitat management, because conservation agencies are increasing their focus on the regional preservation and management of common species. On Nantucket Island, Massachusetts, the goal of the Partnership for Harrier Habitat Preservation (PHHP) has been to restore more than 373 ha of grassland for the island's population of Northern Harriers (Circus cyaneus). This management program has entailed methods such as prescribed burning and mowing (e.g., brushcutting) to restore and maintain grassland habitat. Over a 3-year period, we found that songbird response to burning and mowing varied among species, depending on subtle habitat preferences and the intensity and type of management. In shrublands, Eastern Towhee (Pipilo erythrophthalmus) and Common Yellowthroat (Geothlypis trichas) abundance declined in mowed areas but were unaffected by prescribed burning. In grasslands, Savannah Sparrow (Passerculus sandwichensis) abundance showed no response to either burning or mowing, whereas Song Sparrows (Melospiza melodia) preferred unmanaged grasslands. In shrublands, mowing was the most effective method for restoring grassland habitat, whereas prescribed burning had little effect on abundances of shrubland birds and vegetation structure. In grasslands, both mowing and burning were successful in restricting shrubland encroachment and maintaining grassland habitat.
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481. **Effects of mowing and summer burning on the massasauga (Sistrurus catenatus).**
Durblan, Francis E.
American Midland Naturalist 155(2): 329-334. (2006)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: Lepidosauria/ Serpentes/ Squamata/ Viperidae/ Sistrurus catenatus/ environmental factors/ conservation/ wildlife management/ habitat use/ fires-burns/ grasslands/ ecosystems/ habitat management/ Holt County, Squaw Creek National Wildlife Refuge/ land zones/ Missouri/ mortality/ mortality rate/ mowing/ summer burning/ population ecology/ terrestrial ecology/ wet prairies
Abstract: Prescribed fire is used to reduce coverage of woody vegetation in early successional habitats, but burning may also result in direct and indirect mortality of reptiles inhabiting the burn site. Mowing prior to burning has been hypothesized to render grassland habitats unsuitable for the massasauga (Sistrurus catenatus), thereby reducing the number of individuals that may be affected in the management unit at the time of burning. I evaluated the impact of mowing prior to summer burning on massasaugas at Squaw Creek National Wildlife Refuge, in northwestern Missouri, during the summer of 2003 rising radiomarked snakes. Pre-burn mowing resulted in the direct mortality of three (43%) of seven radiomarked massasaugas present in the treatment area. Prescribed fire resulted in a mortality of one of two remaining individuals. Pre-burn mowing did not reduce mortalities as hypothesized and likely added to the overall snake mortality rate. Management alternatives other than mowing and prescribed fire when snakes are active Should be considered when managing massasauga habitat.
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482. **Effects of Old World bluestem (Bothriochloa ischaemum) on food availability and avian community composition within the mixed-grass prairie.**
Hickman, K. R.; Farley, G. H.; Channell, R.; and Steier, J. E.
Southwestern Naturalist 51(4): 524-530. (2006)
NAL Call #: 409.6 So8 ; ISSN: 00384909.
Notes: doi: 10.1894/0038-4909(2006)51 [524:EOOWBB]2.0.CO;2.
Descriptors: birds/ arthropod biomass/ food availability/ grasslands/ habitat management
Abstract: Various grassland bird species have displayed population declines over the past 30 to 40 years, and interest in explaining possible causes for the declines has prompted numerous studies. Many of these studies have focused on changes in agricultural practices; few have evaluated possible effects of the presence of nonnative grasses in grasslands. The objective of our study was to determine the effects a nonnative grass, Old World bluestem (OWB; Bothriochloa ischaemum), might have on grassland bird species abundance and richness, and on bird food availability (arthropod biomass). Three pastures each of native range, expired Conservation Reserve Program (CRP), and OWB were sampled from May to July 2001 in Comanche County, Kansas. Bird abundance and species richness were assessed by using a point-count method along 3 transects in each pasture. Food availability was estimated by collecting arthropods along 10 transects in each pasture by sweep-netting. Results showed significantly lower bird abundance and species richness in OWB pastures than in native pastures. OWB pastures also had significantly less arthropod biomass than native pastures. Because food availability (arthropod biomass) was directly related to percent forb cover within fields and was mostly absent in OWB pastures, we contend these were the primary factors contributing to lower avian richness and abundance in OWB fields when compared to CRP and native pastures.
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483. **Effects of plant cover improvements for nesting ducks on grassland songbirds.**
Lapointe, S.; Belanger, L.; Giroux, J.-F.; and Filion, B.
Canadian Field Naturalist 117(2): 167-172. (2003)
NAL Call #: 410.9 Ot8 ; ISSN: 0008-3550
Descriptors: aquatic birds/ nesting/ Canada, Quebec, St. Lawrence R., Varenne I.
Abstract: Several islands located along the St. Lawrence River in southern Quebec have been used as natural pastureland by cattle for decades. Recently, a rest-rotation grazing system and dense nesting cover were established on four islands near Varennes to improve duck nesting

conditions. The effects of these two plant cover improvements on the abundance of grassland songbirds were assessed through four treatments: 1) idle fields with no vegetation improvement but exclusion of cattle (IDLE), 2) improved pastures with seeding of forage plants for cattle (IMPP), 3) dense seeded nesting cover fields improved for ducks and where cattle were excluded (DNC), and 4) natural or unimproved pastures grazed by cattle after the duck nesting season (UIPP). The overall abundance of birds was similar among treatments before cover improvements as well as two years after.
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484. **Effects of prairie fragmentation on the nest success of breeding birds in the midcontinental United States.**
Herkert, James R.; Reinking, Dan L.; Wiedenfeld, David A.; Winter Maiken; Zimmerman, John L.; Jensen, William E.; Finck, Elmer J.; Koford, Rolf R.; Wolfe, Donald H.; Sherrod, Steve K.; Jenkins, M Alan; Faaborg, John; and Robinson, Scott K.
Conservation Biology 17(2): 587-594. (2003)
NAL Call #: QH75.A1C5; ISSN: 0888-8892
Descriptors: wildlife management: conservation/ prairie fragmentation: breeding bird nest success/ reproductive success: brood parasitism, nest predation
Abstract: Grassland fragmentation and habitat loss are hypothesized to be contributing to widespread grassland bird declines in North America due to the adverse effects of fragmentation on breeding bird abundance and reproductive success. To assess the effects of fragmentation on the reproductive success of grassland birds, we measured rates of nest predation and brood parasitism for four species of birds (Grasshopper Sparrow (Ammodramus savannaru), Henslow's Sparrow(Ammodramus henslowii), Eastern Meadowlark (Sturnella magna), and Dickcissel (Spiza Americana)) in 39 prairie fragments ranging from 24 to >40,000 ha in size in five states in the mid-continental United States. Throughout the region, nest-predation rates were significantly influenced by habitat fragmentation. Nest predation was highest in small (<100 ha) and lowest in large (>1000 ha) prairie fragments. Rates of brood parasitism by Brown-headed Cowbirds (Molothrus ater), however, were not consistently related to fragment size and instead were more strongly related to regional cowbird abundance, being significantly higher in regions with high cowbird abundance. Differences in nest-predation rates between large fragments (54-68% of all nests lost to predators) and small fragments (78-84% lost to predators) suggest that fragmentation of prairie habitats may be contributing to regional declines of grassland birds. Maintaining grassland bird populations, therefore, may require protection and restoration of large prairie areas.
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485. **Effects of prairie restoration methods on small mammal seed predation.**
Key, R M; Gohde, D.M.; Lindee, K A.; and Carrington, M. E.
Transactions of the Illinois State Academy of Science 95(Supplement): 89. (2002)
NAL Call #: 500 IL6; ISSN: 0019-2252.
Notes: Meeting abstract; 94th Annual Meeting of the Illinois State Academy of Science, Edwardsville, Illinois, USA; April 19-20, 2002.
Descriptors: terrestrial ecology: ecology, environmental sciences/ wildlife management: conservation/ clipping/ management method/ mowing/ management method/ raking/ management method/ snap trapping/ collection method/ soil tamping/ management method/ tilling/ management method/ agricultural fields: abandoned/ prairie restoration/ seed predation
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486. **Effects of prescribed burning and cattle grazing on deer diets in Louisiana.**
Thill, R. E.; Martin, A.; Morris, H. F.; and Harrel, A. T.
New Orleans, LA: U.S. Dept. of Agriculture Southern Forest Experiment Station, 1995. 13 p. Research Paper.
NAL Call #: A99.9 F7628Us
http://www.srs.fs.usda.gov/pubs/rp/rp_so289.pdf
Descriptors: Odocoileus virginianus/ forage/ nutritive value/ prescribed burning/ grazing/ cattle/ nutrient content/ crude protein/ phosphorus/ calcium/ Louisiana
Abstract: A study was conducted on the dietary and nutritional effects of cattle grazing and rotational prescribed burning on the diets of three to five captive white-tailed deer (Odocoileus virginianus) on longleaf pine (Pinuspalustris Mill.-bluestem (Andropogon spp. and Schizachyrium spp.) sites in central Louisiana from October 1980 through February 1987. Deer diets were evaluated under ungrazed, moderate year-long, heavy seasonal, and heavy yearlong cattle grazing treatments. Deer diets were composed mostly of browse and forbs under all grazing treatments, but were less diverse under heavy grazing when compared with moderate and no grazing treatments. Foraging efficiency (computed as the ratio of forage intake per 30-minute trial to the distance traveled) was comparable among treatments during spring and fall but was lower under the heavy grazing treatment during summer and winter. Diets selected under ungrazed conditions contained the highest percentage of uncommon and ephemeral plant taxa during all seasons except fall. Dietary crude protein (CP), phosphorus (P), and calcium-to-phosphorus ratios varied significantly under various grazing treatments for certain seasons. Prescribed burning did not significantly affect diet diversity; however, diets from areas of first-year burns were higher in CP and P than from areas of older burns during spring and summer, but these differences disappeared by the first fall after burning. From a nutritional standpoint, burning and seasonal influences generally had more impact than grazing treatments on deer diets. No evidence was found that seasonal or yearlong cattle grazing at moderate levels (40- to 50-percent herbage removal) adversely affected deer nutrition.
This citation is from AGRICOLA.

487. **Effects of prescribed burns and bison (Bos bison) grazing on breeding bird abundances in tallgrass prairie.**
Powell, A. F. L. A.
Auk 123(1): 183-197. (2006)
NAL Call #: 413.8 AU4 ; ISSN: 00048038
Descriptors: burning/ grassland birds/ grazing/ tallgrass prairie
Abstract: Grassland birds have declined more than any other avian assemblage in North America, with nearly every species showing negative population trends. In the Flint Hills of Kansas, the largest remnant of the tallgrass prairie biome, annual spring burning of rangeland has recently

replaced burning every 2-3 years. I examined effects of different burning and bison (Bos bison) grazing regimes on June abundances of seven bird species using a 23-year data set from the Konza Prairie Biological Station. Fire significantly affected the abundances of six of the seven species. Effects varied among species but, notably, four grass-dependent species - Grasshopper Sparrow (Ammodramus savannarum), Henslow's Sparrow (A. henslowii), Dickcissel (Spiza americana), and Eastern Meadowlark (Sturnella magna) - and the shrub-dependent Bell's Vireo (Vireo bellii) - were least abundant or absent at sites in the breeding season immediately following burning. Upland Sandpipers (Bartramia longicauda) were most abundant at sites in the season following burning, whereas Brown-headed Cowbirds (Molothrus ater) exhibited no significant response. Bison grazing increased abundance of Upland Sandpiper and Grasshopper Sparrow, nearly eliminated Henslow's Sparrow, and (in combination with recent fire) lowered the abundance of Dickcissel. Although fire and grazing are natural forces that maintain tallgrass prairie, their action was, until recently, intermittent and patchy, providing grassland birds with a variety of levels of disturbance. If the vast Flint Hills prairie is to serve as a grassland bird stronghold, the region-wide practice of annual burning with intensive grazing must be replaced with alternatives that restore heterogeneity to the landscape. © The American Ornithologists' Union, 2006.
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488. **Effects of prescribed fire on an ant community in Florida pine savanna.**
Izhaki, Ido; Levey, Douglas J.; and Silva, Wesley R.
Ecological Entomology 28(4): 439-448. (2003)
NAL Call #: QL461.E4; ISSN: 0307-6946
Descriptors: conservation measures/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Formicidae: habitat management/ prescribed fire/ community structure/ prescribed fire effects/ forest and woodland/ pine savanna/ fire/ Florida/ Interlachen Karstic Highland/ Katharine Ordway Preserve/ Insecta, Hymenoptera, Apocrita, Aculeata, Formicoidea/ arthropods/ Hymenopterans/ insects/ invertebrates
Abstract: 1. The effects of prescribed fire on ant community structure were examined in a regenerating longleaf pine savanna in Florida, U.S.A. The presence of ants on 20, 10x10 m plots was determined by baiting every 1-3 months from 18 months before a fire until 6 months afterwards. 2. Expected species richness (based on rarefaction) and species density 6 months post-fire were significantly lower than for the same month (September) 6 months before the fire. 3. Cluster analysis revealed that the effects of fire were far less important predictors of ant community structure than seasonality and unexplained inter-annual variation. Thus, overall, the impacts of fire were relatively minor and short term at the community level. 4. Different functional groups of ants (as defined by Andersen, 1997) responded to fire in strikingly different ways. Generalised Myrmicinae (e.g. Pheidole spp., Monomorium viride) were affected more severely by fire than were the other functional groups. In contrast, the dominant Dolichoderinae (Forelius pruinosus) exhibited a large increase after the fire and seemed to be responsible for the decline in abundance of several species. 5. A strong negative correlation between F. pruinosus and other groups of ants immediately after the fire suggested more intense competition among ants at that time. Six months post-fire, the abundance of F. pruinosus decreased markedly and the abundance of other species rebounded. 6. The rapid post-fire recovery of the ant community probably reflects adaptations of ants to a chronic fire regime.
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489. **Effects of prescribed fire on prairie arthropods: An enclosure study.**
Harper, Mary G.; Dietrich, Chris H.; Larimore, Richard L.; and Tessene, Paul A.
Natural Areas Journal 20(4): 325-335. (2000)
NAL Call #: QH76.N37; ISSN: 0885-8608
Descriptors: conservation measures/ ecology/ habitat utilization/ terrestrial habitat/ abiotic factors/ physical factors/ land and freshwater zones/ Arthropoda: habitat management/ community ecology/ refuge maintenance/ community structure/ population dynamics/ prescribed fire/ habitat colonization/ recolonization/ grasslands/ prairie/ Illinois/ Lee County/ Vermilion County/ prairie management/ arthropods/ invertebrates
© Thomson Reuters Scientific

490. **Effects of protective fencing on birds, lizards, and black-tailed hares in the western Mojave Desert.**
Brooks, M.
Environmental Management 23(3): 387-400. (1999)
NAL Call #: HC79.E5E5 ; ISSN: 0364-152X
Descriptors: grasslands/ deserts/ plant communities/ prey/ seeds/ species diversity/ nature reserves/ fencing/ ground cover/ wild birds/ wild animals/ grazing/ range management/ revegetation/ Hymenoclea salsola/ Achnatherum spinosa/ Achnatherum hymenoides/ grazing behavior/ Hymenoclea/ Achnatherum
Abstract: Effects of protective fencing on wild birds, lizards, black-tailed hares (Lepus californicus), perennial plant cover, and structural diversity of perennial plants were evaluated during spring 1994 to winter 1995 at the Desert Tortoise Research Natural Area (DTNA), in the Mojave Desert, California, USA. At the northern study site the plant cover consisted of Larrea tridentata, Ambrosia dumosa, Hymenoclea salsola, Achnatherum spinosa and A. hymenoides and at the southern study site of Atriplex polycarpa and H. salsola. Abundance and species richness of birds were higher inside than outside the DTNA, and effects were larger during the breeding than during the wintering seasons and during a high rainfall than during a low rainfall year. Ash-throated flycatchers (Myiarchus cinerascens), cactus wrens (Campylorhynchus brunneica-pillus), LeConte's thrashers (Toxostoma lecontei), logger-head shrikes (Lanius ludovicianus), sage sparrows (Amphispiza belli), and verdins (Auriparus flaviceps) were more abundant inside than outside the DTNA. Nesting activity was also more frequent inside. Total abundance and species richness of lizards and individual abundances of western whiptail lizards (Cnemidophorous tigris) and desert spiny lizards (Sceloporus magister) were higher inside than outside. In contrast, abundance of black-tailed hares was lower inside. Structural diversity of the perennial plant community did not differ due to protection, but ground cover was 50% higher in protected areas. Black-tailed hares generally preferred areas of low perennial plant cover, which may explain why they were more abundant outside than inside the DTNA. Habitat structure may not affect bird and lizard communities as much as availability of

food at this desert site, and the greater abundance and species richness of vertebrates inside than outside the DTNA may correlate with abundances of seeds and invertebrate prey.
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491. **Effects of rangeland fires and livestock grazing on habitat for nongame wildlife.**
Ivey, G. L.
In: Proceedings of a symposium on sustaining rangeland ecosystems. Eastern Oregon State College, La Grande, Oregon. Edge, W. D. and Olsen-Edge, S. L. (eds.); Vol. Special Report 953.
Corvallis, Ore.: Oregon State University Extension Service; pp. 130-139; 1996.
NAL Call #: 100 Or3M no.953
Descriptors: regrowth/ seed output/ wild birds/ wild animals/ vegetation/ ground cover/ range management/ grassland management/ endangered species/ grasslands/ rangelands/ nature conservation/ grazing/ burning/ plant succession/ species diversity
Abstract: Non-game wildlife (including wild birds and rodents) has a wide variety of requirements that may be influenced by burning or livestock grazing. These practices generally reduce ground cover and cause retrogression to an earlier seral stage, consequently favouring species that prefer short cover or bare areas and disadvantaging species requiring ground cover or vegetation structure. Degradation of riparian zones by burning or grazing generally reduced species diversity and populations. Species dependent on ungrazed habitat may be at risk of local extinction as a result of grazing in some areas. Using management techniques to provide a mosaic of habitats is recommended to preserve species diversity. Some non-game wildlife benefited from fire because of an increase in the growth of herbaceous and seed-producing plants.
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492. **Effects of rangeland management on community dynamics of the herpetofauna of the tallgrass prairie.**
Wilgers, D. J.; Horne, E. A.; Sandercock, B. K.; and Volkmann, A. W.
Herpetologica 62(4): 378-388. (2006); ISSN: 00180831
Descriptors: amphibians/ Flint Hills/ mark-recapture/ POPAN/ reptiles/ species loss
Abstract: The Flint Hills of Kansas and Oklahoma are the largest remaining tracts of tallgrass prairie in North America. This area has undergone major changes in land management practices in the past 30 years. Traditional season-long cattle stocking with variable burn schedules has diversified to include intensive-early cattle stocking accompanied by annual burning. To understand how different land management practices affect the herpetofauna of a tallgrass prairie, we used mark-recapture statistics to analyze herpetofaunal community dynamics. We analyzed survey data collected over a 15-year time span (1989-2003) from a rangeland site in Cowley County, KS, USA. A modified Jolly-Seber open population model, POPAN-5, was used to estimate four community parameters: probability of species loss (φ'), probability of detection (p), probability of entry (Pent), and species richness (N). The top models included burn status as a covariate for species loss rate, while cattle stocking received moderate support as a covariate. Rates of species loss were higher during burn years (φ' = 0.04, 95% CI: 0.02 to 0.08) than nonburn years (φ' = 0.00, 95% CI: 0.00 to 0.01). Analysis of the impacts of different management practices was difficult due to confounding effects of changes in both burning and grazing. Declines in species richness tended to be steepest during a period of season-long stocking, but results were not statistically significant. Though our limited data set does not allow us to draw strong conclusions on the effects of land management on herpetofaunal populations, the mark-recapture models illustrated in our study should prove to be a valuable tool in future analyses of similar data. © 2006 by The Herpetologists' League, Inc.
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493. **The effects of rest-rotation grazing of mule deer and elk populations inhabiting the Herd Creek Allotment, East Fork Salmon River, Idaho.**
Yeo, Jeffrey J. University of Idaho, 1981.
Descriptors: Cervus elaphus/ Odocoileus hemionus/ behavior/ grazing/ fires-burns/ habitat alterations/ interspecies relationships/ land use/ mammals/ wildlife-livestock relationships/ Idaho
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494. **The effects of rest-rotation grazing on the distribution of sharp-tailed grouse.**
Nielsen, L. S. and Yde, C. A.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 147-165; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: sharp-tailed grouse/ livestock/ rotational grazing

495. **Effects of restoring oak savannas on bird communities and populations.**
Brawn, J. D.
Conservation Biology 20(2): 460-469. (2006)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1111/j.1523-1739.2006.00310.x.
Descriptors: bird conservation/ disturbance/ fragmentation/ habitat restoration/ nest success/ prescribed fire
Abstract: Efforts to restore and maintain oak savannas in North America, with emphasis on the use of prescribed fire, have become common. Little is known, however, about how restoration affects animal populations, especially those of birds. I compared the breeding densities, community structure, and reproductive success of birds in oak savannas maintained by prescribed fire (12 sites) with those in closed-canopy forests (13 sites). All sampling was conducted in Illinois (U.S.A.). Of the 31 bird species analyzed, 12 were more common in savannas, 14 were not affected by habitat structure, and 5 were more common in forest habitat. The species favored by disturbance and restoration included Northern Bobwhites (Colinus virginianus), Mourning Doves (Zenaida macroura), Red-headed Woodpeckers (Melanerpes erythrocephalus), Indigo Buntings (Passerina cyanea), and Baltimore Orioles (Icterus galbula). Those more common in closed-canopy forest included Ovenbirds (Seiurus aurocapilla) and Wood Thrushes (Hylocichla mustelina). Few species were unique to one type of habitat, but overall avian community structure in oak savannas and closed-canopy forests was generally

distinctive. Estimates of nesting success (derived from 785 nests) revealed that 6 of the 13 species considered experienced greater productivity in the savanna habitat. Rates of brood parasitism were unaffected by restoration and habitat structure. Within savannas, tract size had little effect on breeding abundances and reproductive success. My results illustrate that restoration techniques can significantly affect the ecology of constituent animal populations and communities and have key implications regarding avian conservation and the management of forest habitat in fragmented landscapes. Small patches of forest habitat that regularly function as population sinks may offer far better prospects for birds if they are subjected to disturbance and ecosystem restoration. © 2006 Society for Conservation Biology.
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496. **Effects of road baiting on home range and survival of northern bobwhites in southern Texas.**
Haines, A. M.; Hernandez, F.; Henke, S. E.; and Bingham, R. L.
Wildlife Society Bulletin 32(2): 401-411. (2004)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Colinus virginianus/ movement/ northern bobwhites/ road baiting/ supplemental feeding/ survival/ Colinus virginianus/ Sorghum/ Zea mays
Abstract: An increasingly common practice in southern Texas is baiting roads with grains such as milo (Sorghum spp.) and corn (Zea mays) to facilitate northern bobwhite (Colinus virginianus) harvest. However, baiting roads might have a negative impact on bobwhite survival by increasing predation or harvest rates. The objective of this project was to determine the effects of road baiting on bobwhite survival, home-range size, and predator abundance. The project involved 2 study sites (baited=treatment and nonbaited=control) that were monitored over 3 periods, pre-baiting (September-October), baiting (November-December), and post-baiting (January-February), during 2001-2002 and 2002-2003. We captured, radiomarked, and monitored bobwhites (n = 60 [treatment site]; n = 58 [control site]) in Jim Hogg County, Texas. We assessed relative abundance and activity of avian and mammalian predators using scent-station and road surveys, respectively. The effects of baiting roads varied between years. During 2001-2002, a relatively dry period, bobwhite survival (S' = 1.00±0.00 [control site]; S' = 0.68 ±0.10 [treatment site], P = 0.01), covey home-range size (15.6±1.43 ha [control site]; 12.7 ±2.22 ha [treatment site], P = 0.046), and covey distance to roads (193 ±24.6 m [control site]; 95 ±41.57 m [treatment site], P≤0.001) were lower on the treatment site during the feeding period in contrast to the control site. A nonsignificant trend was noted for higher avian predator abundance on the treatment site during the feeding period. During 2002-2003, a relatively wet period, no difference in bobwhite survival, covey home-range size, and covey distance to roads was found between sites and time periods due to baiting, and no trend in predator abundance was found between pastures and time periods. The practice of baiting ranch roads does not appear to benefit bobwhites in southern Texas, and during dry conditions the practice might be detrimental to bobwhite numbers by lowering survival. Baiting or other methods of dietary supplementation are more likely to benefit bobwhites in more northern climates with colder winters.
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497. **Effects of rotational grazing on nesting ducks in California.**
Carroll, L. C.; Arnold, T. W.; and Beam, J. A.
Journal of Wildlife Management 71(3): 902-905. (2007)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: grassland management/ grasslands/ habitat selection/ nesting/ rotational grazing/ upland areas/ valleys/ Anas
Abstract: Grazing is thought to be incompatible with nesting by dabbling ducks (Anas spp.), but this belief is based on little data. We therefore conducted a 2-year, replicated field experiment to determine whether the habitat requirements of nesting ducks could be met on uplands managed by rotational grazing (1 Jul-1 Nov) in the northern San Joaquin Valley, California, USA. Grazed fields had shorter vegetation than ungrazed fields throughout the winter, but vegetation height did not differ by the beginning of the nesting season in late March, and by the end of the nesting season in late May, previously grazed fields had taller vegetation than did ungrazed fields. In 1996, densities of duck nests were >3 times higher in grazed than in ungrazed fields (least-squares means [+or-1 SE]: grazed=2.18 [0.34] nests/ha, ungrazed=0.59 [0.34] nests/ha), but nest densities were substantially lower in 1997 and did not differ between treatment groups (grazed=0.65 [0.32] nests/ha, ungrazed=0.39 [0.32] nests/ha). Mayfield nest success did not differ between grazed fields (5.3%) and ungrazed fields (2.9%). We conclude that rotational grazing was successful in providing summer nesting habitat for dabbling ducks, and we recommend that it be considered for other managed habitats within the Central Valley, California, USA.
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498. **Effects of short-duration and continuous grazing on bobwhite and wild turkey nesting.**
Bareiss, L. J.; Schulkz, P.; and Guthery, F. S.
Journal of Range Management 39(3): 259-260. (1986)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume39/Number3/azu_jrm_v39_n3_259_260_m.pdf
Descriptors: turkeys/ nests/ nesting/ grazing/ livestock/ pastures/ Texas
This citation is from AGRICOLA.

499. **Effects of short duration grazing on bobwhites and wild turkeys in south Texas.**
Schulz, P. A. Texas A&M University, 1986.
Descriptors: Colinus virginianus/ Meleagris gallopavo intermedia/ livestock/ habitat disturbance/ land use/ Texas/ bobwhite quail/ wild turkey
© NISC

500. **Effects of short duration grazing on deer home ranges.**
Kohl, Timothy F.; DeYoung, Charles A.; and Garza, Andres
Proceedings of the Annual Conference: Southeastern Association of Fish and Wildlife Agencies 41: 299-302. (1987)
NAL Call #: SK1.S6; ISSN: 0276-7929
Descriptors: commercial activities/ reproduction/ sex differences/ behavior/ land and freshwater zones/ Odocoileus virginianus (Cervidae): farming and agriculture/ short term and continuous cattle grazing/ home range size relationships/ behavioral sex differences/ home range/ size/ short term and continuous cattle grazing effect/ Texas/ Brooks County/ King Ranch/ home range size/ sex differences/ short term and continuous cattle grazing effects/ Cervidae/ Artiodactyla/ Mammalia/ chordates/ mammals/ vertebrates
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501. **Effects of short duration grazing on wild turkey home ranges.**
Schulz, P. A. and Guthery, F. S.
Wildlife Society Bulletin 15(2): 239-241. (1987)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Meleagris gallopavo intermedia/ grazing management/ rangeland management/ habitat quality/ Texas
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502. **Effects of specialized grazing systems on waterfowl production in southcentral North Dakota.**
Barker, W. T.; Sedivec, K. K.; Messmer, T. A.; Higgins, K. F.; and Hertel, D. R.
Transactions of the North American Wildlife and Natural Resource Conference 55: 462-474. (1990)
NAL Call #: 412.9 N814.
Notes: ISSN 0078-1355 (ISSN); Conference held: 16-21 Mar 1990 in Denver, CO (USA).
Descriptors: aquatic birds/ population dynamics/ agriculture/ grazing/ North Dakota/ ducks/ livestock
Abstract: The recent decline in numbers of several waterfowl species and poor nesting success indicates that there is insufficient production of ducks in the prairie pothole region to maintain populations at desirable levels. About 50 percent of the ducks in North America are produced in the prairie pothole region and about 95 percent of the production occurs on private lands. Thus, a major effort to reverse the decline in duck numbers should emphasize the use of new and improved management techniques on private lands, particularly the use of new rangeland grazing systems. Numerous studies have evaluated the effects of grazing on duck production in North America. However, most of these evaluations were designed to compare differences of duck production between grazed lands and idle lands or among different land uses. Also, nearly all of the earlier studies of grazing effects involved seasonlong grazing treatments with occasional differences in grazing intensities. Seasonlong grazing has been shown to be detrimental to production of most upland nesting birds and also to maximum livestock production. A study of livestock and waterfowl relationships was initiated in 1982 on the Central Grasslands Research Center.
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503. **Effects of successional old fields on butterfly richness and abundance in agricultural landscapes.**
Sanford, Monte P.
Great Lakes Entomologist 35(2): 193-207. (2003)
NAL Call #: QL461.M5; ISSN: 0090-0222
Descriptors: conservation measures/ life cycle and development/ ecology/ terrestrial habitat/ man-made habitat/ land zones/ Papilionoidea: habitat management/ life cycle/ life history attributes/ community structure/ grassland/ successional old fields/ cultivated land habitat/ Minnesota/ Cedar Creek Natural History Area/ Insecta, Lepidoptera, Glossata, Heteroneura/ arthropods/ insects/ invertebrates/ lepidopterans
Abstract: Native grasslands cover less than 1% of land area in the Midwestern United States; agricultural areas cover the majority of the remaining land. Abandoned agricultural lands provide areas for successional development of grasslands, which can provide critical habitat for many butterfly species in this habitat-deprived region. I examined butterfly communities in successional old fields at Cedar Creek Natural History Area, Minnesota, USA, to determine how butterfly species richness, abundance, and life-history attributes change across a successional gradient from middle to late successional stages (15-72 years after abandonment). Butterfly species richness and abundance did not change across the successional gradient, but species composition changed. Butterfly larval and adult food plant specialization weakly increased, body size decreased, generation time per species decreased, and butterflies overwintered at an earlier life stage as field age increased. This research identifies that a mosaic of successional fields in a predominantly agricultural landscape provided benefits to butterflies, and that successional mosaics should be an important goal to conserve butterfly richness in agricultural areas.
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504. **Effects of the size of prescribed fire on insect predation of northern blazing star, a rare grassland perennial.**
Vickery, P. D.
Conservation Biology 16(2): 413-421. (2002)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1046/j.1523-1739.2002.00494.x.
Descriptors: fire management/ grassland/ habitat management/ perennial plant/ predation/ United States/ Animalia/ Aves/ Insecta/ Invertebrata/ Lepidoptera/ Liatris/ Liatris scariosa/ Microlepidoptera
Abstract: Loss of native grassland habitat in New England has reached >90%. Consequently, remaining grasslands persist as small, geographically isolated fragments, and populations of many plants and animals have declined or disappeared. Given the rarity of the fauna and flora of these habitats, ecological management of many of the remaining native grassland fragments in a manner that attempts to mimic natural processes has been intensive, and the effects of this management on some taxa, such as grassland birds, are now well understood. But the effects of management, especially prescribed fire, on native plants and invertebrates are less well known. I studied the effects of prescribed fire on northern blazing star (Liatris scariosa var. novae-angliae), a rare grassland perennial endemic to the northeastern United States. Once distributed from southern Maine to northern New Jersey, northern blazing

star has disappeared from 69% of the sites where it formerly occurred. Seed predation appears to be a critical proximate factor limiting recruitment of juveniles into local populations. Seven of 8 study sites in Maine and Massachusetts had a 65% average rate of seed predation, and there was no evidence of juvenile recruitment at these sites. None of these sites had been burned in the past 5 years. Experimental research at Kennebunk, Maine, demonstrated that, in the absence of fire, seed viability of northern blazing star was low, the result of larval microlepidopteran (moth) predators in the flower heads. Prescribed fire temporarily reduced seed predation from approximately 90% to approximately 16% for 1 year following fire, but seed-predation levels once again approached 90% within 2 years. Prescribed fires larger than 13 ha helped reduce predation rates, but fires smaller than 6 ha did not, suggesting that dispersal of adult moths from unburned source areas was spatially limited. Preferably, prescribed burns should be larger than 10 ha, large enough to have core areas larger than 100 m from adjoining unburned units. My results suggest that prescribed fire should be an important component of habitat management for northern blazing star, and they emphasize the need to carefully study the effects of the spatial scale of prescribed fires in other geographic regions and for a broad range of taxa.
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505. **Elk and cattle forage use under a specialized grazing system.**
Halstead, L. E.; Howery, L. D.; Ruyle, G. B.; Krausman, P. R.; and Steidl, R. J.
Journal of Range Management 55(4): 360-366. (2002)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X
Descriptors: beef cattle/ grazing/ Cervus elaphus canadensis/ stubble/ rotational grazing/ topography/ wildlife management/ Pascopyrum smithii/ canopy/ Arizona
Abstract: The Walker Basin Allotment grazing system in central Arizona is designed to allocate resource use under elk (Cervus elaphus L.) and cattle (Bos taurus L.) grazing. The grazing system was designed to promote biologically acceptable levels of forage use on the half of the allotment scheduled for cattle grazing and to rest the other half by attracting elk to pastures recently grazed by cattle. The objectives of our 2-year study were to determine whether the grazing system facilitated proper forage use as defined by recent forage use and residual stubble height guidelines (i.e., 30 to 40% use and an 8- to 10-cm stubble height) and whether the system rested one half of the allotment from elk and cattle grazing. Mean (+/- SEM) total elk and cattle forage use for western wheatgrass (Pascopyrum smithii Rydb.), the key forage species, was 32 and 61% +/- 7 in 1997 and 1998, respectively; corresponding mean (+/- SEM) stubble heights were 11 and 10 cm +/- 0.6. Mean total cattle and elk forage use in 1998 (61%) exceeded the 30 to 40% use guidelines. However, mean end-of-year stubble height was never below 10 cm. The grazing system did not provide half the allotment with complete rest; elk used all study pastures. Elk use was higher in pastures with heavier tree cover and steeper terrain in both years, regardless of where cattle grazing occurred. Elk grazing patterns were apparently more dependent on tree cover and topography than any changes in forage caused by the grazing system.
This citation is from AGRICOLA.

506. **Elk (Cervus elaphus nelsoni) use of winter range as affected by cattle grazing fertilizing and burning in southeastern Washington.**
Skovlin, J. M.; Edgerton, P. J.; and McConnell, B. R.
Journal of Range Management 36(2): 184-189. (1983)
NAL Call #: 60.18 J82; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume36/Number2/azu_jrm_v36_n2_184_189_m.pdf
Descriptors: bunch grass/ elk/ Cervus elaphus nelsoni/ Washington/ rangelands/ conservation practices/ burning/ cattle grazing
Abstract: A study of ways to increase winter use by elk of Pacific bunchgrass foothill range in southeastern Washington employed fertilizing and rangeland burning, with and without spring cattle grazing. First-year response of elk to fertilizer applied in fall (56 kg N/ha) was a 49% increase in use; but no significant carry-over effect was noted in subsequent years. Fall burning to remove dead standing litter and enhance forage palatability provided no increase in elk use in winter. Intensive cattle grazing in spring to promote regrowth did not increase elk use. In fact, cattle grazing decreased winter elk use by 28% in 1 of the 3 yr studied. The cost effectiveness of increasing elk use by fertilizing appeared marginal except perhaps in special situations. A discussion of forage allocation to both elk and cattle is presented.
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507. **Elk forage utilization within rested units of rest-rotation grazing systems.**
Werner, Scott J. and Urness, Philip J.
Journal of Range Management 51(1): 14-18. (1998)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume51/Number1/azu_jrm_v51_n1_14_18_m.pdf
Descriptors: Cervus elaphus/ Cervus canadensis/ Bos taurus/ behavior/ foods-feeding/ grazing/ habitat management/ mammals/ management/ wildlife/ wildlife-livestock relationships/ wapiti/ cattle/ competition/ vegetation/ rest-rotation grazing/ elk/ Utah/ Fish Lake Natl. Forest
Abstract: Researchers determined elk forage utilization during the summers of 1994 and 1995 at the forest-grassland ecotone of three rest-rotation grazing allotments in Fishlake National Forest, Utah.
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508. **Elk use of winter range as affected by cattle grazing, fertilizing, and burning in southeastern Washington.**
Skovlin, Jon M.; Edgerton, Paul J.; and McConnell, Burt R.
Journal of Range Management 36(2): 184-189. (1983)
NAL Call #: 60.18 J82; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume36/Number2/azu_jrm_v36_n2_184_189_m.pdf
Descriptors: Cervus elaphus nelsoni/ Cervus canadensis/ fertilization/ soil and water/ fires-burns/ grazing/ habitat alterations/ habitat use/ wildlife-livestock relationships/ wapiti/ home-range/ winter/ agriculture/ habitat/ disturbance/ fire/ ecology/ ethology/ prairie/ fertilizer/ Washington, southeastern area
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509. **Essay: Bison restoration in the Great Plains and the challenge of their management.**
McDonald, J. L.
Great Plains Research 11(1): 103-121. (2001)
NAL Call #: QH104.5.G73 G755; ISSN: 10525165
Descriptors: Bison/ grasslands/ species diversity/ tribal lands/ values conflicts/ grassland/ indigenous population/ restoration ecology/ species conservation/ North America/ Bison bison/ Bos taurus
Abstract: Efforts to save remnant wild bison from extermination have resulted in the establishment of herds on private, public, and tribal lands. Ironically, their successful restoration has evolved into a profitable agricultural industry and a practical alternative to raising domestic cattle. Bison restoration actively managed by humans raises ecological, ethical, and evolutionary questions about whether we are compromising their native ability to function in a grasslands ecosystem. In this essay I examine current bison management practices, conflicting human values about land-use practices, and emerging land-use initiatives focusing on wild bison and ecosystem restoration in the northern Great Plains.
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510. **Evaluating grazing strategies for cattle: Nutrition of cattle and deer.**
Ortega, I. M.; Soltero-Gardea, S.; Drawe, D. L.; and Bryant, F. C.
Journal of Range Management 50(6): 631-637. (1997)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume50/Number6/azu_jrm_v50_n6_631_637_m.pdf
Descriptors: Coastal Bend, Texas/ continuous grazing/ crude protein/ digestibility/ IVDOM/ Odocoileus virginianus/ short-duration grazing
Abstract: We studied cattle and deer diet quality within replicated grazing treatments of continuous and short-duration grazing at heavy and moderate stocking rates. The study was conducted at the Welder Wildlife Refuge, Sinton, Tex. from October 1987 to July 1989. We obtained cattle diet samples from esophageally fistulated steers. Deer diets were reconstructed using data obtained through the bite-count technique. Digestibility (IVDOM) and crude protein (CP) of cattle diets were similar between grazing systems and stocking rates. Digestibility of deer diets was affected by both grazing systems and stocking rates. Dietary CP and IVDOM of deer and rattle diets both differed among seasons. Dietary CP levels met maintenance requirements for deer throughout the study. Also, CP levels were high enough to meet low- to mid-gestation requirements. Deer dietary protein requirements for growth and lactation were never met regardless of grazing strategy. Although protein content of cattle diets was relatively low, these values satisfied cattle maintenance needs. Nursing cows, however, would not have met their requirement in any season sampled regardless of grazing system or stocking rate. Continuous grazing and moderate stocking rates may provide white-tailed deer the opportunity for selecting diets containing more desirable forbs and greater nutrient concentration. Less intensive rotational grazing at moderate rates may be preferred to maintain to relatively high seral stage.
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511. **Evaluation of a collaborative approach to mediate conflict between parties with interests in wildlife and livestock in Colorado.**
McAndrews, Gina Marie. Iowa State University, 2001.
Notes: Thesis (Ph.D.); Advisor: Salvador, Ricardo J.
Descriptors: sociology, General/ agriculture, range management/ biology, ecology/ hunting/ wildlife/ habitat restoration
Abstract: The Habitat Partnership Program (HPP) is a collaborative initiative of the Colorado Division of Wildlife and the Colorado Cattleman's Association. The program consists of 15 committees, distributed over western Colorado, representing the interests of public resource managers, livestock growers and hunters. Through partnerships and projects, each committee strives to reduce fence damage and forage loss from big game activity. Information gathered from interviews, documents, projects and observation was used to assess the effectiveness of HPP in meeting its stated goals: resolve conflicts, improve ecosystem health, raise local knowledge about resource management and improve communication and understanding. Over seven years (1991-1998), committees completed habitat improvement projects on 77,856 hectares of public and private land, established 124 water developments and assisted with noxious weed control on 5,904 hectares. In addition, 193 kilometers of new 'wildlife friendly' fence and 60 big game crossings were built. For educational purposes, committees sponsored 31 workshops in holistic resource management and developed 37 brochures on natural resource issues. Ninety-four percent of committee members thought the program improved communication between landowners, sportspersons and government agencies. As measured by independent indicators and the degree of satisfaction of program participants, HPP can be considered an improvement over previous directive programs. However, the continuous influx of people and the loss of habitat in Colorado-over 110,000 hectares per year-may render moot the issues addressed by collaborative wildlife and natural resource management programs.
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512. **Evaluation of habitat structural measures in a shrubland community.**
Harrell, W. C. and Fuhlendorf, S. D.
Journal of Range Management 55(5): 488-493. (2002)
NAL Call #: 60.18 J82; ISSN: 0022409X
Descriptors: cone of vulnerability/ gallinaceous birds/ heterogeneity/ patchiness/ sand shinnery/ vegetation structure/ visual obstruction/ habitat structure/ measurement method/ rangeland/ shrubland/ wildlife management
Abstract: Accurate and efficient monitoring of habitat structure on rangelands is important for understanding wildlife responses to land management practices. Unfortunately, studies of wildlife responses to changes in habitat structure often use monitoring techniques that fail to measure variation in multiple structural dimensions. Our objectives were to evaluate relationships between measures of habitat structure in a shrubland community and to discuss the usefulness of several techniques in integrating multiple structural dimensions into a single index of habitat structure. We evaluated relationships between shrub cover, herbaceous cover, shrub patch number, average shrub patch size, average vegetation height, visual

obstruction across multiple strata of a profile board, cone of vulnerability, and angle of obstruction using a principle component analysis. Many of these variables were redundant with each other. Average visual obstruction estimates, using a profile board, were associated with variability in vertical structure as indicated by its association with height. Coefficients of variation for cone of vulnerability and visual obstruction were dependent upon their means and of limited use in describing horizontal patchiness. In contrast, shrub patch number was not linearly correlated with any other single measure in our analysis, and may be useful in describing horizontal patchiness. Cone of vulnerability and angle of obstruction are recently developed techniques that provided useful, single indices of multidimensional habitat structure. Efficient monitoring of wildlife habitat structure should employ multiple, independent techniques that measure distinct dimensions of habitat structure or a single measure that integrates multiple dimensions.
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513. **Evaluation of isolated and integrated prairie reconstructions as habitat for prairie butterflies.**
Shepherd, Stephanie and Debinski, Diane M.
Biological Conservation 126(1): 51-61. (2005)
NAL Call #: S900.B5; ISSN: 0006-3207
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Papilionoidea: habitat management/ Isolated and integrated prairie reconstructions/ habitat suitability/ community structure/ grassland/ Iowa/ Ames/ Insecta, Lepidoptera, Glossata, Heteroneura/ arthropods/ insects/ invertebrates/ Lepidopterans
Abstract: Reconstructing prairie habitat is one of the most promising techniques for conserving the imperiled prairie ecosystem and its associated organisms. However, the degree to which reconstructed prairies function like remnant prairies has not been fully examined. We evaluated the effect of restoration planting prescriptions, as well as vegetative quality on butterfly communities inhabiting prairie reconstructions in central Iowa, USA. Twelve isolated reconstructed prairies (small, surrounded by agriculture), 12 integrated reconstructions (planting units in a larger matrix of reconstructed and remnant prairies), and 12 remnant prairies were surveyed for butterfly and plant diversity, abundance and composition. Remnant prairies supported significantly higher richness and abundance of habitat-sensitive butterfly species. Butterfly richness on integrated reconstructions was intermediately positioned between remnant and isolated reconstructions. The best vegetative predictors of butterfly richness (R^2 = 0.38) and abundance (R^2 =0.13) were the availability of nectar and the percent cover of litter (which is related to management issues such as time since burning). Most significantly, we found that the response of the butterfly community to vegetation in a reconstructed prairie is more complex than simply a response to vegetation diversity. Both management within the reconstruction and the landscape context around the reconstruction affect local patterns of butterflies species distribution and abundance. Integrated reconstructions develop richer butterfly communities than isolated reconstructions. © 2005 Elsevier Ltd. All rights reserved.
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514. **Evaluation of rest-rotation grazing in the Missouri River Breaks on the Charles M. Russell National Wildlife Refuge, Montana.**
Oldemeyer, J. L.; Reid, V. H.; Nickey, D. A.; and Hedrick, M.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'Alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 32-46; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: rotational grazing/ wildlife/ livestock/ Missouri River/ Montana

515. **Evaluation of the impacts of grazing on grassland wildlife populations: Evaluation of vegetation structure and floristic composition on continuous and rotational grazing systems with 4 different stocking rates in north central Missouri.**
Schulz, J. H. Missouri Department of Conservation, 2002. 52 pp. Annual Report.
Descriptors: grazing/ grassland/ vegetation/ invertebrates/ habitat/ cattle/ size/ statistics/ sampling/ livestock/ Missouri/ Linn County
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516. **Factors affecting butterfly use of filter strips in midwestern USA.**
Reeder, Kathleen F.; Debinski, Diane M.; and Danielson, Brent J.
Agriculture, Ecosystems and Environment 109(1-2): 40-47. (2005)
NAL Call #: S601.A34; ISSN: 0167-8809
Descriptors: ecology/ terrestrial habitat/ man-made habitat/ land zones/ Papilionoidea: community structure/ Influencing factors/ riparian filter strips/ agricultural landscapes/ habitat utilization/ riparian habitat/ agricultural landscape riparian filter strips/ cultivated land habitat/ Minnesota/ Insecta, Lepidoptera, Glossata, Heteroneura/ arthropods/ insects/ invertebrates/ lepidopterans
Abstract: Filter strips are areas of herbaceous vegetation planted between agricultural fields and streams. In 2002 and 2003, the butterfly community in filter strips of a variety of widths and vegetative compositions was studied. Transect surveys were used to quantify butterfly abundance and diversity and measured vegetative variables in conjunction with each butterfly survey round. Overall butterfly diversity (H') and abundance of habitat-sensitive butterflies were positively correlated with filter strip width. Using stepwise regression, the best models to explain butterfly abundance included the coverage of forbs and the number of ramets in bloom in the strips, and indicated positive relationships between forbs and the butterfly community (R^2 = 0.33 and 0.07, respectively). The models that best explained abundances of large, habitat-sensitive butterflies included the height and vertical density of vegetation. The planting of forbs in filter strips is rare, but may be useful for providing food sources to butterflies.
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517. **Factors associated with grassland bird species richness: The relative roles of grassland area, landscape structure, and prey.**
Hamer, T. L.; Flather, C. H.; and Noon, B. R.
Landscape Ecology 21(4): 569-583. (2006)
NAL Call #: QH541.15.L35 L36; ISSN: 09212973.
Notes: doi: 10.1007/s10980-005-2167-5.
Descriptors: AIC model-selection/ Eastern Wyoming/ grasshopper/ habitat amount/ habitat configuration/ mark-recapture/ matrix effects/ Orthoptera/ richness estimation/ thematic mapper
Abstract: The factors responsible for widespread declines of grassland birds in the United States are not well understood. This study, conducted in the short-grass prairie of eastern Wyoming, was designed to investigate the relationship between variation in habitat amount, landscape heterogeneity, prey resources, and spatial variation in grassland bird species richness. We estimated bird richness over a 5-year period (1994-1998) from 29 Breeding Bird Survey locations. Estimated bird richness was modeled as a function of landscape structure surrounding survey routes using satellite-based imagery (1996) and grasshopper density and richness, a potentially important prey of grassland birds. Model specification progressed from simple to complex explanations for spatial variation in bird richness. An information-theoretic approach was used to rank and select candidate models. Our best model included measurements of habitat amount, habitat arrangement, landscape matrix, and prey diversity. Grassland bird richness was positively associated with grassland habitat; was negatively associated with habitat dispersion; positively associated with edge habitats; negatively associated with landscape matrix attributes that may restrict movement of grassland bird; and positively related to grasshopper richness. Collectively, 62% of the spatial variation in grassland bird richness was accounted for by the model (adj-R^2 = 0.514). These results suggest that the distribution of grassland bird species is influenced by a complex mixture of factors that include habitat area affects, landscape pattern and composition, and the availability of prey. © Springer 2006.
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518. **Fall and winter habitat use by scaled quail in southeastern Arizona.**
Bristow, K. D. and Ockenfels, R. A.
Rangeland Ecology and Management 59(3): 308-313. (2006)
NAL Call #: SF85.J67; ISSN: 15507424.
Notes: doi: 10.2111/04-117R2.1.
Descriptors: Callipepla squamata/ Chihuahuan desertscrub/ exotic grasses/ grazing/ livestock/ semidesert grasslands
Abstract: Scaled quail (Callipepla squamata pallida Vigors) are closely associated with semidesert grasslands of the southwestern United States, and populations have declined by as much as 50% since 1960. Livestock grazing, shrub encroachment, and exotic grass invasion are considered important factors reducing scaled quail distribution and density in Arizona. We investigated habitat use by scaled quail across their range in southeastern Arizona to determine the habitat conditions important for survival and reproduction. Pointing dogs located quail during autumn and winter of 2002-2003 and 2003-2004, and we measured habitat characteristics at 52 flush sites and 54 nonuse plots, where scaled quail were not found. We recorded information on landform, substrate, vegetation, and cover. Scaled quail used areas with grass canopy cover ≥ 26%, tree canopy cover ≤ 10%, and higher grass species richness than randomly available. Short (≤ 50 cm tall) visual obstruction (i.e., cover), usually associated with low shrubs, cacti, and bunchgrass, was greater at use sites than at nonuse plots. A logistic-regression equation, including visual obstruction and tree canopy variables, correctly predicted ≥ 91% of quail use sites. Greater amounts of visual obstruction and lower percentages of tree canopy cover best-predicted scaled quail sites. Land management practices that reduce grass species richness and cover and increase tree cover may reduce scaled quail habitat quality and availability in southeastern Arizona. Based on habitat use patterns of scaled quail, we recommend that semidesert grassland habitats contain a maximum tree canopy of < 6% and > 25% grass canopy cover at the 20-cm height to provide optimum cover availability.
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519. **Fall cattle grazing versus mowing to increase big-game forage.**
Taylor, Nancy; Knight, James E.; and Short, Jeffrey J.
Wildlife Society Bulletin 32(2): 449-455. (2004)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Blackfoot Clearwater Wildlife Management Area/ nutrition/ seasons/ vegetation removal
Abstract: The effects of 3 levels of mowing and cattle (Bos taurus) grazing were examined on rough fescue (Festuca scabrella) range on the Blackfoot Clearwater Wildlife Management Area in west-central Montana. Treatments were implemented in enclosures during the fall of 1997 and 1998 at 50%, 70%, and 90% removal of herbaceous standing crop. Elk (Cervus elaphus) and mule deer (Odocoileus hemionus) forage measurements were obtained in spring and summer on standing dead vegetation, green grass and forb biomass, total biomass, and percent live vegetation, and compared between mowing and prescribed cattle grazing at the same removal level. At the 50% mowing level, there was increased (P<0.05) availability of grass and biomass in the spring, with increased standing dead and decreased percent live vegetation in the summer. At the 70% mowing level, there was increased standing dead and grass and decreased percent live vegetation available to elk and mule deer in the spring when compared with the same level of grazing (P<0.05). At the 90% mowing level, there was decreased availability of grass and total biomass during spring and summer (P<0.05). Results indicated that at moderate (50%) levels of vegetation removal, fall mowing might be adequate to increase grass and total biomass availability in the spring, but fall grazing by cattle might remove more standing dead material, leaving more nutritious plants available to wildlife in the summer. Fall mowing at 70% removal might provide more grass for wildlife in the spring, but reduces percent live vegetation and leaves more standing dead when compared to fall cattle grazing. This would make it more difficult for wildlife to select preferred forage in the spring, when nutrition is needed for calf and fawn production. Fall cattle grazing might be a better tool to use at the 90% level, since mowing removes more grass and total biomass, leaving reduced vegetation for elk and mule deer.
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520. **Fall grazing affects big game forage on rough fescue grasslands.**
Short, J. J. and Knight, J. E.
Journal of Range Management 56(3): 213-217. (2003)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X
Descriptors: cattle/ rotational grazing/ grazing intensity/ wildlife management/ Cervus elaphus/ Odocoileus/ range management/ Festuca altaica/ biomass/ spring/ summer/ botanical composition/ forbs/ wildlife-livestock relations/ Montana
Abstract: Prescribed cattle grazing is often used to purposely enhance wildlife habitat. This study investigated the effects of fall cattle (Bos taurus) grazing intensity on elk (Cervus elaphus) and deer (Odocoileus spp.) forage in the following spring and summer. These effects were examined on rough fescue (Festuca scabrella Torr.) range on the Blackfoot Clearwater Wildlife Management Area in west central Montana. Cattle were grazed in enclosures during the fall of 1997 and 1998. A randomized complete block design with 5 replications of enclosures per year was used. Grazing levels were 0% removal (control), 50% removal, 70% removal, and 90% removal of herbaceous standing crop. To evaluate elk and deer forage, measurements were obtained in spring and summer on green grass standing crop, green forb standing crop, percent green vegetation, species richness, and plant species composition. There were no differences among grazing levels for plant species composition based on canopy coverage, species richness, and green forb standing crop variables (P > 0.10). The 50% and 90% treatments reduced green standing crop in spring (P = 0.07) but not in summer (P > 0.10). Grazing treatments increased percent green vegetation (P < 0.01). Fall cattle grazing can be used as a wildlife habitat improvement tool to reduce unpalatable standing dead material. The 70% removal treatment was the most favorable for habitat improvement without degrading the range.
This citation is from AGRICOLA.

521. **Fallow land patches and ecosystem health in California's Central Valley agroecosystem.**
Hopkins, John D.
In: Managing for healthy ecosystems/ Rapport, D. J.; Lasley, W. L.; Rolston, D. E.; Nielsen, N. O.; Qualset, C. O.; and Damania, A. B., 2003; pp. 981-992.
Notes: 1566706122 (ISBN).
Descriptors: commercial activities/ conservation measures/ ecology/ man-made habitat/ land zones/ comprehensive zoology: farming and agriculture/ agroecosystem health/ role of fallow land patches/ habitat management/ strategies in agroecosystems/ ecology/ cultivated land habitat/ California/ Central Valley
© Thomson Reuters Scientific

522. **Fencerows as habitat for birds in an agricultural landscape in central Alberta, Canada.**
Sykes, A. K. and Hannon, S. J.
Ecoscience 8(4): 441-449. (2001)
NAL Call #: QH540.E366; ISSN: 11956860
Descriptors: birds/ fencerows/ fragmentation/ landscape/ vegetation/ agricultural ecosystem/ avifauna/ field margin/ habitat fragmentation/ habitat use/ species richness/ Canada
Abstract: Fencerows (strips of trees along field edges) are common in agricultural landscapes and may represent valuable habitat for forest birds in areas where woodland is scarce. We examined the relationship between avian presence (species richness, territory density, and abundance) in 26 fencerows and vegetation structure in the fencerows and forest cover in the adjacent landscape in central Alberta, Canada. Species richness was positively related to fencerow area, but not to other vegetation or landscape characteristics. In contrast, territory density was highest in smaller fencerows with high tree diversity and those with a low amount of forest cover in the sorrounding landscape. Redundancy analysis indicated that abundance of 16 common species was associated with vegetation in the fencerow and/or forest cover in the sorroundings. Species composition in seventeen woodlots in the area was compared with fencerow species composition. Species recorded in fencerows represented 50% of the regional species pool found in woodlots. Fencerows had mainly edge species, no interior forest species, but harbored two species (Vesper Sparrow and Eastern Kingbird) not found in woodlots. Although we advocate the retention and even restoration of fencerows, this cannot be done to the exclusion of retaining large blocks of forest in the landscape for interior forest species.
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523. **Fire and cattle grazing on wintering sparrows in Arizona grasslands.**
Gordon, C. E.
Journal of Range Management 53(4): 384-389. (2000)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume53/Number4/azu_jrm_v53_n4_384_389_m.pdf
Descriptors: wild birds/ beef cattle/ grazing/ prescribed burning/ grazing intensity/ wildlife management/ Arizona
Abstract: This paper reports on the results of a 3-year field study of the effects of spring/summer burning and cattle grazing on wintering sparrows in the grasslands of southeastern Arizona. The effects of fire were studied with 1 year of pre-burn data and 1 year of post-burn data from 1 fire, plus limited sampling from a second fire at Buenos Aires National Wildlife Refuge in Pima County, Ariz. The effects of grazing were studied by comparing study plots at a site that has not been grazed by cattle since 1968 with a nearby grazed pasture in Santa Cruz County, Ariz. Sparrow abundance was measured as the number of captures from flush-netting sessions conducted by groups of 13-30 volunteers. Vesper (Pocecetes gramineus (Gmelin)) and Savannah (Passerculus sandwichensis (Gmelin)) Sparrows responded positively to fire, while Cassin's Sparrows (Aimophila cassinhi (Woodhouse)) responded negatively. The ecologically and geographically restricted Baird's (Ammodramus bairdil (Audubon)) and Grasshopper (A. savannarum (Gmelin)) Sparrows utilized burned areas during the first post-burn winter and did not significantly respond to fire. Both Ammodramus sparrows also utilized the grazed pasture; they were more abundant there than in the ungrazed study area in 1 year. While field observations and a prior study suggest that heavy grazing can have a strong detrimental effect on Ammodramus sparrows, the results of this study suggest that moderate cattle grazing may be compatible with the conservation of these species.
This citation is from AGRICOLA.

524. **Fire and restoration of sagebrush ecosystems.**
Baker, W. L.
Wildlife Society Bulletin 34: 177-185. (2006)
NAL Call #: SK357.A1W5.
Notes: Literature review.
Descriptors: Artemisia/ fire ecology/ prescribed burning/ history/ ecological restoration/ wildlife management/ Wyoming/ fire rotation/ habitat management for wildlife/ forest fire management/ forestry production natural regeneration/ natural resources, environment, general ecology, and wildlife conservation
This citation is from AGRICOLA.

525. **Fire frequency and mosaic burning effects on a tallgrass prairie ground beetle assemblage.**
Cook, W. M. and Holt, R. D.
Biodiversity and Conservation 15(7): 2301-2323. (2006)
NAL Call #: QH75.A1B562; ISSN: 09603115.
Notes: doi: 10.1007/s10531-004-8227-3.
Descriptors: Carabidae/ fire frequency/ ground beetles/ pitfall trapping/ species richness/ tallgrass prairie/ beetle/ biomass burning/ grazing/ physical disturbance/ pitfall trap/ prairie/ species diversity/ vegetation structure/ Kansas/ Konza prairie/ Aves/ Carabidae/ Coleoptera/ Mammalia/ Tracheophyta
Abstract: Fire frequency has significant effects on the biota of tallgrass prairie, including mammals, vascular plants and birds. Recent concern has been expressed that widespread annual burning, sometimes in combination with heavy livestock grazing, negatively impacts the biota of remaining prairie remnants. A common management recommendation, intended to address this problem, is to create a landscape with a mosaic of different burn regimes. Pitfall trapping was used to investigate the impacts of fire pattern on the diversity and species composition of ground beetles (Coleoptera: Carabidae) at Konza Prairie Biological Station in eastern Kansas, USA. Trapping was conducted over three seasons in landscape units burned on average every 1, 4, or 20 years, and in a fourth season across the available range of vegetative structure to assess the variability of the community within the study system. In the fifth season communities were also followed immediately after two fire events to detect within-season effects of fire and to study short-term patterns of post-disturbance community assembly. Fire frequency had comparatively minimal effects on ground beetle diversity measures, and most numerically common species were observed widely across habitat and management types. Fire frequency effects were manifested primarily in changes in abundance of common species. Colonization of burned areas apparently did not occur from juxtaposed non-burned areas, but from underground or from long distances. While these results suggest that widespread annual burning of tallgrass prairie remnants may not have dramatic effects on prairie ground beetles, we urge caution regarding the application of these results to other taxa within tallgrass prairie. © Springer 2006.
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526. **Fire history, passerine abundance, and habitat on a North Dakota drift plain prairie.**
Ludwick, Timothy J. and Murphy, Robert K.
Prairie Naturalist 38(1): 1-11. (2006)
NAL Call #: QH540.P7; ISSN: 0091-0376
Descriptors: conservation measures/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ Passeriformes: habitat management/ prescribed fire/ community structure/ prescribed fire history relationship/ population dynamics/ abundance/ breeding bird species/ prescribed fire history relationships/ grassland/ Drift plain prairie/ fire/ prescribed fire history/ spatial environment/ Aves/ birds/ chordates/ vertebrates
Abstract: Prescribed fire is among key tools for restoring and managing prairies in the northern Great Plains, yet there are no published reports of its impacts on grassland passerine birds on native prairie in the Drift Plain, a major physiographic subregion. We examined relationships between prescribed fire history and abundance and habitat of breeding passerines in Drift Plain prairie at Des Lacs National Wildlife National Refuge in northwestern North Dakota. In 2003, we used point counts (n = 79 75 m radius plots) to survey bird abundance on 16 management units that had been prescribe-burned one to three times each since 1992. General habitat composition and structure also were measured at each point count plot. We detected 14 passerine species, six of which were common (occurred on greater than 10 % of plots). Three endemic, historically common passerine species were rare or absent regardless of fire history. Abundances of common bird species were not influenced strongly by fire history, which contrasts with data from research on the adjacent Missouri Coteau physiographic subregion. Vegetation structure (litter depth and plant height-density) and occurrence of an exotic grass species, smooth brome (Bromus inermis), decreased with fire history. However, we detected no relationships between bird species abundances and these particular vegetation variables, perhaps because smooth brome continued to be a pervasive structural influence on all management units. Our findings indicate a need for better understanding of bird-fire relationships on remnant prairies in the vast Drift Plain.
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527. **Fire regimes and avian responses in the central tallgrass prairie.**
Reinking, D. L.
Studies in Avian Biology (30): 116-126. (2005)
NAL Call #: QL671.S8; ISSN: 01979922
Descriptors: fire/ grassland birds/ habitat loss/ habitat management/ nest success/ prairie ecology/ tallgrass prairie/ vegetation response/ Ammodramus henslowii/ Ammodramus savannarum/ Aves/ Passeridae/ Spiza/ Spiza americana/ Sturnella/ Tympanuchus cupido
Abstract: Grasslands make up the largest vegetative province in North America, and one that has been significantly altered over the past two centuries. The tallgrass prairie of the eastern Great Plains and Midwest has declined to a greater extent than any other ecosystem, primarily due to plowing for cereal grain production. Grassland bird populations have declined at a greater rate and over a wider area than any other group of species. Past fire regimes shaped and maintained the tallgrass prairie ecosystem. Fires set by American Indians and caused by lighting were common and probably differed in

timing, frequency, and scale from contemporary fire regimes, although historical regimes are not well understood. Fire affects both the composition and the structure of vegetation, and can affect birds in a variety of ways. Direct effects of fire on birds include destruction of nests, while indirect effects may involve changes to vegetation, which favor some bird species over others. Greater-Prairie Chickens (Tympanuchus cupido), Henslow's Sparrows (Ammodramus henslowii), and Dickcissels (Spiza americana) respond negatively to annual fire. Grasshopper Sparrows (Ammodramus savannarum) and meadowlarks (Sturnella spp.) appear unaffected or respond positively to annual fire. Fire management across the largest remaining portions of tallgrass prairie frequently overemphasizes or de-emphasizes fire over large areas, creating homogenous habitat that does not support the full compliment of tallgrass prairie birds. Availability of adequately sized grasslands in a variety of seral stages is needed to ensure long-term population stability for the suite of bird species inhabiting tallgrass prairie.
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528. **Food of vagrant shrews Sorex vagrans from Grant County, Oregon as related to livestock grazing pressures.**
Whitaker, J. O.; Cross, S. P.; and Maser, C.
Northwest Science 57(2): 107-111. (1983)
NAL Call #: 470 N81; ISSN: 0029-344X
Descriptors: earthworm/ spider/ cricket/ caterpillar/ june bug/ moth/ slug/ snail/ trampling/ compression
Abstract: Major foods of the vagrant shrew (S. vagrans) in a relatively non-grazed portion of a mountain meadow in Grant County were earthworms, spiders, crickets, caterpillars, moths, slugs and snails and June beetles and their larvae. In 2 similar areas subjected to greater recent grazing, flightless forms (except caterpillars) were much less used; they were replaced primarily by caterpillars and flying insects. The hypothesized cause for these changes was that grazing trampled and compressed the ground, thus decreasing the populations of some forms.
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529. **Foraging behavior by mule deer: The influence of cattle grazing.**
Kie, J. G.; Evans, C. J.; Loft, E. R.; and Menke, J. W.
Journal of Wildlife Management 55(4): 665-674. (1991)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Odocoileus hemionus/ reproductive energy demand/ activity patterns/ seasonality/ home range size/ wildlife management/ California
Abstract: We studied the effects of different cattle stocking rates on activity patterns of female mule deer (Odocoileus hemionus) on a summer range in the Sierra Nevada of California [USA]. Using an automated telemetry system, we determined that deer averaged 32 ± 2.2 (SE)% of the time feeding, 8 ± 1.1% traveling, and 60 ± 2.4% resting per 24-hour period. Deer spent more time feeding and less time resting with increased cattle stocking rates. During 1984, a year of average precipitation, deer spent more time feeding per day in late summer than in early summer in range units grazed by cattle but did not do so in ungrazed range units. In 1985, a drier year, deer spent less time feeding per day in late summer in grazed range units. Time spent feeding by deer was negatively correlated with standing crop of herbaceous forage in meadow-riparian habitats. Deer increased their time spent feeding by shortening the length of resting bouts and including more feeding bouts each day, not by increasing the length of each foraging bout. Companion studies indicated that with cattle grazing, deer home-range sizes were larger (Loft 1988), and hiding cover for fawns was reduced (Loft et al. 1987). The results are consistent with the hypothesis that cattle competed with deer, particularly at high stocking rates and during a year of below-average precipitation. We suggest that female mule deer were acting as time-minimizers to meet the high energic demands of lactation while minimizing their exposure to predators. Management options to reduce adverse effects include reducing or eliminating cattle grazing during early summer on all or part of the grazing allotment.
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530. **Fragmention by agriculture influences reproductive success of birds in a shrubsteppe landscape.**
Vander Haegen, W. M.
Ecological Applications 17(3): 934-947. (2007)
NAL Call #: QH540.E23; ISSN: 10510761
Descriptors: agriculture/ Amphispiza belli/ brood parasitism/ fragmentation/ landscape effects/ nest survival/ Oreoscoptes montanus/ seasonal productivity/ shrubsteppe/ Spizella breweri/ Washington
Abstract: Shrubsteppe communities are among the most imperiled ecosystems in North America as a result of conversion to agriculture and other anthropogenic changes. In the Intermountain West of the United States, these communities support a unique avifauna, including several species that are declining and numerous others that are of conservation concern. Extensive research in the eastern and central United States and in Scandinavia suggests that fragmentation of formerly continuous forests and grasslands adversely affects reproductive success of birds, yet little is known of the potential effects on avian communities in Western shrublands. I used multi-model inference to evaluate the potential effects of local and landscape variables on nest predation and brood parasitism, and behavioral observations of color-banded birds to evaluate the potential effects of habitat fragmentation on seasonal reproductive success of passerines in the shrubsteppe of eastern Washington State, USA. Reproductive success of shrubsteppe-obligate passerines was lower in landscapes fragmented by agriculture than in continuous shrubsteppe landscapes. Daily survival rates for nests of Brewer's Sparrows (Spizella breweri; n = 496) and Sage Thrashers (Oreoscoptes montanus; n = 128) were lower in fragmented landscapes, and seasonal reproductive success (percentage of pairs fledging young) of Sage Sparrows (Amphispiza belli; n = 146) and Brewer's Sparrows (n = 59) was lower in fragmented landscapes. Rates of parasitism by Brown-headed Cowbirds (Molothrus ater) overall were low (4%) but were significantly greater in fragmented landscapes for Brewer's Sparrows, and parasitism resulted in fewer young fledged from successful nests. Simple models of population growth using landscape-specific fecundity and estimates of adult survival derived from return rates of banded male Sage Sparrows and Brewer's Sparrows suggest that fragmented shrubsteppe in Washington may be acting as a population sink for some species. Immediate conservation needs include halting further fragmentation of shrubsteppe,

restoring low-productivity agricultural lands and annual grasslands to shrubsteppe where possible, and convincing the public of the intrinsic value of these imperiled ecosystems. © 2007 by the Ecological Society of America.
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531. **From the field: Efficacy of visual barriers in reducing black-tailed prairie dog colony expansion.**
Merriman, Joel W.; Zwank, Phillip J.; Boal, Clint W.; and Bashore, Terry L.
Wildlife Society Bulletin 32(4): 1316-1320. (2004)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Rodentia/ Sciuridae/ Cynomys ludovicianus/ black-tailed prairie dog/ conservation/ wildlife management/ New Mexico/ control/ environmental factors/ wildlife-human relationships/ land zones/ prairie dog colony/ dispersal/ barriers/ stimulus reaction/ control
Abstract: Assesses the efficacy of visual barriers in reducing prairie dog colony expansion, and the utility and durability of silt fencing and galvanized roofing as materials for construction of visual barriers. Methods used; Factors that led to a decline in black-tailed prairie dogs across most of their North American range; Problems encountered in previous studies of visual barriers.
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532. **Grasshopper densities on grazed and ungrazed rangeland under drought conditions in southern Idaho.**
Fieldin, Dennis J. and Brusven, Merlyn A.
Great Basin Naturalist 55(4): 352-358. (1995)
NAL Call #: 410 G79; ISSN: 0017-3614
Descriptors: livestock grazing/ population density/ range management
Abstract: Low-density grasshopper populations were sampled at 15 pairs of rangeland sites in south central Idaho. One site of each pair had not been grazed by livestock for at least 10 years. Grazed sites were managed under normal grazing regimes established by the Bureau of Land Management. Mean grasshopper density was higher on ungrazed sites than on grazed sites. Proportions of Melanoplus sanguinipes were higher on ungrazed sites than on grazed sites and were higher on annual grasslands than on other vegetation types. Effects of grazing appeared to be independent of vegetation type. Proportions of Gomphocerinae, a subfamily of grasshoppers that feeds almost exclusively, on grasses, were affected by vegetation type, but not grazing. Crested wheatgrass seedings supported the highest proportions of Gomphocerinae. Proportions of Oedipodinae were affected by grazing and vegetation type. Higher proportions of Oedipodinae were found on grazed sites than on ungrazed sites, and on sagebrush/grass sites than on annual grasslands. Results indicate that livestock grazing during drought conditions tends to reduce grasshopper populations on southern Idaho rangeland.
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533. **Grassland bird densities in seral stages of mixed-grass prairie.**
Fritcher, S. C.; Rumble, M. A.; and Flake, L. D.
Journal of Range Management 57: 351-357. (July 2004)
NAL Call #: 60.18 J82 .
http://www.fs.fed.us/rm/rapidcity/PDF/grasslandbird.pdf
Descriptors: habitat management/ birds/ grasslands/ prairies
Abstract: Birds associated with prairie ecosystems are declining and the ecological condition (seral stage) of remaining grassland communities may be a factor. Livestock grazing intensity influences the seral stage of grassland communities and resource managers lack information to assess how grassland birds are affected by these changes. We estimated bird density, species diversity, and species richness on 37 sites in 4 seral stages of western wheatgrass [Pascopyrum smithii (Rydb.) A. Love]-green needlegrass [Nassella viridula (Trin.) Barkworth] communities of the Fort Pierre National Grassland. Bird species richness did not differ among seral stages (P = 0.57), but bird species diversity was greater (P > 0.10) in early seral stages compared to late-intermediate seral stages. Grasshopper sparrow (Ammodramus savannarum Gmlin), bobolink (Dolichonyx oryzivorus Linnaeus), dickcissel (Spiza americana Gmlin), and brown-headed cowbird (Molothrus ater Boddaert) density increased (P > 0.10) from early to late seral stages. Burrowing owl (Athene cunicularia Molina), upland sandpiper (Bartramia longicauda Bechstein), chestnut-collared longspur (Calcarius ornatus Townsend), and horned lark (Eremophila alpestris Linnaeus) density decreased (P > 0.10) from early to late seral stages. Western meadowlarks (Sturnella neglecta Audubon) were more abundant in early (P = 0.05) and early-intermediate (P = 0.01) seral stages than late seral stages. Birds with habitat requirements including tall vegetation and residual cover were more abundant in later seral stages. Early seral stages were beneficial to birds that prefer short grass and sparse vegetative cover. Seral stage was an effective predictor of density for many bird species. A mosaic that includes all seral stages is necessary to maximize grassland bird species diversity and abundance across the landscape. Managers can assess the effects on grassland birds of management actions that alter the seral stage of the vegetation.
This citation is from AGRICOLA.

534. **Grassland birds: An overview of threats and recommended management strategies.**
Vickery, Peter D.; Herkert, James R.; Knopf, Fritz L.; Ruth, Janet; and Keller, Cherry E.
In: Strategies for Bird Conservation: The Partners in Flight Planning Process; Proceedings of the 3rd Partners in Flight Workshop, Proceedings-RMRS 16; Ogden, UT: Rocky Mountain Research Station, Forest Service, U.S. Department of Agriculture, 2000. pp. 74-77.
http://www.birds.cornell.edu/pifcapemay/vickery.htm
Descriptors: conservation/ terrestrial habitat/ land and freshwater zones/ Aves: conservation/ grassland/ conservation threats/ North America/ grassland species/ birds/ chordates/ vertebrates
Abstract: Grassland ecosystems are dependent on periodic disturbance for habitat maintenance. Historically, grazing by native herbivores and prairie fires were the agents principally responsible for maintaining grassland areas. However, elimination of native herbivores, widespread fire suppression, and conversion for agriculture have greatly altered grasslands in the United States and Canada. Because of these landscape changes, many grassland birds are increasingly dependent on land managers for habitat creation, maintenance, and health. Grazing, prescribed burning, and mowing/haying are the most frequently used, and versatile, grassland

management techniques. Grassland birds prefer a wide range of grass heights and densities, with some species preferring short sparse vegetation, and others preferring taller, more dense vegetation. Due to differences in species habitat preferences and regional differences in soils and floristics, the responses of individual grassland species to specific grassland management practices can be variable and often are regionally dependent. As a result, management of grassland areas is best directed toward the creation of a mosaic of grassland habitat types. This habitat mosaic is probably best maintained through some type of rotational management system in which sections of large grassland areas receive management on a regular schedule. Such a rotational system would provide a variety of habitat types in every year, would ensure the availability of suitable habitat for birds at either end of the grassland management spectrum, and also would provide habitat for birds whose preferences lie between these extremes.
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535. **Grassland birds and habitat structure in Sandhills prairie managed using cattle or bison plus fire.**
Griebel, Randall L.; Winter, Stephen L.; and Steuter, Allen A.
Great Plains Research 8(2): 255-268. (1998)
NAL Call #: QH104.5.G73 G755; ISSN: 1052-5165
Descriptors: Bison bison/ birds/ communities/ ecosystems/ fires-burns/ grasslands/ grazing/ habitat alterations/ interspecies relationships/ mammals/ prairies/ bison/ Nebraska
Abstract: The authors provide information on bird abundance, distribution, and habitat structure from similar sandhill prairie landscapes managed traditionally with grazing by cattle and by a dynamic bison plus fire regime in the Great Plains. Specific habitat patches produced by fire and intensivie bison grazing appear to have different bird communities and habitat structure at the local scale.
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536. **Grassland birds in restored grasslands of the Rainwater Basin region in Nebraska.**
Utrup, J. S. and Davis, C. A.
Great Plains Research 17(2): 203-213. (2007)
NAL Call #: QH104.5.G73 G755; ISSN: 10525165
Descriptors: grassland birds/ grassland restoration/ Nebraska/ Rainwater Basin Region
Abstract: Conservationists and managers mention grassland restorations as a conservation strategy to reverse the decline of grassland bird populations in the Great Plains. In the Rainwater Basin Region of south-central Nebraska, state and federal resource agencies have used grassland restorations to protect wetlands from sedimentation and agrichemical runoff. These grassland restorations may also provide important habitat for breeding grassland birds. In this paper, we describe the abundance, composition, nesting success, and habitat requirements of breeding birds in grassland restorations in the Rainwater Basin Region. We observed 14 grassland bird species in 12 grassland restorations. The most abundant species were dickcissels (Spiza americana), grasshopper sparrows (Ammodramus savannarum), and bobolinks (Dolichonyx oryzivorus). We found a total of 84 nests composed of 11 species in restorations. Dickcissels and grasshopper sparrows accounted for 77% of all nests found. Nest success was 31% (26 nests), and the major cause of nest loss was predation, which accounted for 66% (38 nests) of all nest failures. The occurrence of 10 of the species in grassland restorations was influenced by a variety of vegetation variables. Grassland bird species have benefited from grassland restorations in the Rainwater Basin Region. Conservation strategies for grassland birds in the Rainwater Basin Region should continue to focus on restoring marginal croplands back to grasslands. © 2007 Center for Great Plains Studies, University of Nebraska-Lincoln.
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537. **Grassland birds nesting in haylands of southern Saskatchewan: Landscape influences and conservation priorities.**
McMaster, D. G.; Devries, J. H.; and Davis, S. K.
Journal of Wildlife Management 69(1): 211-221. (2005)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2005)069<0211:GBNIHO>2.0.CO;2.
Descriptors: Anas acuta/ cropland/ haying/ hayland/ landscape composition/ nest success/ northern pintail/ Pooecetes gramineus/ Prairie Pothole Region/ Saskatchewan/ Vesper sparrow/ waterfowl/ abundance/ grassland/ hay/ land use/ nest site/ nesting success/ Canada/ North America/ Prairie Pothole Region/ Saskatchewan/ Anas/ Anas acuta/ Anatidae/ Anser/ Aves/ Pooecetes gramineus
Abstract: To determine the benefits to grassland birds of converting cropland to hayland in southern Saskatchewan, Canada, we quantified the relative nest abundance and success of grassland nesting birds in haylands and the influence landscape variables have on these parameters. We found nests of 26 species of grassland nesting birds, primarily waterfowl and vesper sparrow (Pooecetes gramineus). With the exception of the northern pintail (Anas acuta), few nesting attempts were recorded for species of high priority in the Prairie Pothole Bird Conservation Region. Mayfield nest success for all waterfowl (20 and 13% in 1999 and 2000, respectively) was high relative to previously reported nest success estimates in other habitat types - especially spring-seeded cropland - and was near levels thought to be required to sustain populations (15-20%). Vesper sparrow nest success (39 and 33% in 1999 and 2000, respectively) also was high relative to that reported in other studies. Haying destroyed few nests as wet weather delayed operations in 1999 and 2000. More nests may be destroyed by haying in other years as approximately 25% of nests in this study were still active on the long-term average haying date for southern Saskatchewan. Among models we developed to explain waterfowl relative nest abundance, amount of cropland in the surrounding landscape and field area were the most informative. Evidence that a specific set of landscape variables was important to models of waterfowl nest success was equivocal. Landscape variables did not explain variation in vesper sparrow relative nest abundance or nest success. Within our study area, conversion of cropland to hayland appears to provide significant benefits to a variety of grassland species, including some species of high conservation priority (e.g., northern pintail). Grassland species of conservation concern nested less frequently in hayland than in native grassland.
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538. **Grassland establishment for wildlife conservation.**
Jones-Farrand, D. Todd; Johnson, Douglas H.; Burger, Loren W.; and Ryan, Mark R.
In: Fish and Wildlife Response to Farm Bill Conservation Practices; Bethesda, MD: The Wildlife Society, 2007. 19 pp.
ftp://ftp-fc.sc.egov.usda.gov/NHQ/nri/ceap/fwfb3.pdf
Descriptors: conservation practices/ grassland birds/ grassland habitat/ grassland management/ terrestrial habitat/ wildlife species/ wildlife management
Abstract: This report describes the importance of grassland conservation efforts for wildlife, especially in areas historically rich in grasslands that have since been converted to row crop agriculture. Most grasslands established under farm conservation programs have replaced annual crops with perennial cover that provides year-round resources for wildlife. This change in land use has had a huge influence on grassland bird populations; little is known about its impacts on other terrestrial wildlife species. Grassland succession makes management a critical issue. Decisions on how frequently to manage a field depend on many factors, including the location (especially latitude) of the site, the phenology at the site in the particular year, the breeding-bird community associated with the site, and weather and soil conditions. The benefits for a particular species of any management scenario will depend, in part, on the management of surrounding sites, and may benefit additional species but exclude others. Thus, the benefits of grassland establishment and management are location- and species-specific.

539. **Grassland management for the conservation of songbirds in the midwestern USA.**
Walk, Jeffery W. and Warner, Richard E.
Biological Conservation 94(2): 165-172. (2000)
NAL Call #: S900.B5; ISSN: 0006-3207
Descriptors: abundance/ grassland management/ grazing/ habitat type/ mowing/ prescribed burning
Abstract: We monitored breeding eastern meadowlarks, dickcissels, Henslow's sparrows, grasshopper sparrows and field sparrows using strip transect surveys in 1995 and 1996. The 473-ha study area was an array of 3-ha management units of burned, mowed, hayed, grazed and undisturbed (>1 year) cool- and warm-season grasses and annual weeds. Management units grouped by habitat type (management regime and grass type) had different (P < 0.05) abundances of each species. Eastern meadowlarks and dickcissels were most frequently observed in grazed warm-season grasses. Observation rates of Henslow's sparrows and field sparrows were highest in undisturbed warm-season grasses, whereas eastern meadowlarks and grasshopper sparrows were observed least often in this habitat type. Grasshopper sparrows were observed most frequently in annual weeds; Henslow's sparrows and field sparrows were not observed in this habitat type. Overall avian abundance was lowest in recently burned cool-season grasses. The low-intensity, late-season grazing system was important for creating a heterogeneous habitat mosaic attractive to the five species studied.
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540. **Grassland regeneration and reconstruction: The role of grazing animals.**
Whalley, Wal
Ecological Management and Restoration 6(1): 3-4. (2005); ISSN: 1442-7001.
Notes: doi: 10.1111%2Fj.1442-8903.2005.00213.x.
Descriptors: biogeography: population studies/ terrestrial ecology: ecology, environmental sciences/ wildlife management: conservation/ spatial variability/ ecosystem/ grassland regeneration/ grassland management/ grassy woodland/ grassland reconstruction
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541. **Grassland restoration: Strengthening our underpinnings.**
Mcdonald, Tein
Ecological Management and Restoration 6(1): 2. (2005); ISSN: 1442-7001
Descriptors: biogeography: population studies/ terrestrial ecology: ecology, environmental sciences/ wildlife management: conservation/ rural area/ urban development/ conservation management/ ecosystem/ grassland restoration/ grassy woodland/ restoration management
© Thomson Reuters Scientific

542. **Grassland songbird nest-site selection and response to mowing in West Virginia.**
Warren, K. A. and Anderson, J. T.
Wildlife Society Bulletin 33(1): 285-292. (2005)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Agelaius phoeniceus/ bobolink/ Dolichonyx oryzivorus/ eastern meadowlark/ grassland birds/ nest success/ Passerculus sandwichensis/ red-winged blackbird/ Savannah sparrows/ Sturnella magna/ West Virginia/ grassland/ habitat management/ habitat selection/ mowing/ nesting success/ songbirds/ Canaan Valley National Wildlife Refuge
Abstract: Grassland bird populations in the eastern United States have become increasingly dependent on human-altered grassland habitats such as former hayfields and pastures for nesting. We compared grassland bird nest success and nest placement on former hayfields (n = 3) and former pastures (n = 3) and on mowed and unmowed areas on the Canaan Valley National Wildlife Refuge (CVNWR), West Virginia, 1999-2000. We located 83 nests of the 4 dominant grassland species: bobolinks (Dolichonyx oryzivorus; 19% nest success), Savannah sparrows (Passerculus sandwichensis; 34%), red-winged black-birds (Agelaius phoeniceus; 21%), and eastern meadowlarks (Sturnella magna; 70%). Vertical density of vegetation was taller at successful bobolink nests and maximum height was greater at successful Savannah sparrow nests than at unsuccessful nests. Eastern meadowlarks chose nest sites with more standing dead vegetation, deeper litter, and a greater maximum height of vegetation. Although there were no differences in nest success between mowed and unmowed treatments, mowing some fields at the conclusion of the breeding season may provide long-term advantages to grassland bird nesting success by maintaining former fields as grassland habitats.
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543. **Grassland songbirds in a dynamic management landscape: Behavioral responses and management strategies.**

Perlut, N. G.; Strong, A. M.; Donovan, T. M.; and Buckley, N. J.

Ecological Applications 16(6): 2235-2247. (2006)
NAL Call #: QH540.E23 ; ISSN: 10510761
Descriptors: bobolink/ Dolichonyx oryzivorus/ fledglings per year/ grassland management/ hayfield/ logistic exposure/ nest success/ New York/ Passerculus sandwichensis/ rotationally grazed pasture/ Savannah sparrow/ Vermont

Abstract: In recent decades, earlier and more frequent harvests of agricultural grasslands have been implicated as a major cause of population declines in grassland songbirds. From 2002 to 2005, in the Champlain Valley of Vermont and New York, USA, we studied the reproductive success of Savannah Sparrows (Passerculus sandwichensis) and Bobolinks (Dolichonyx oryzivorus) on four grassland treatments: (1) early-hayed fields cut before 11 June and again in early- to mid-July; (2) middle-hayed fields cut once between 21 June and 10 July; (3) late-hayed fields cut after 1 August; and (4) rotationally grazed pastures. Both the number of fledglings per female per year and nest success (logistic-exposure method) varied among treatments and between species. Although birds initiated nests earlier on early-hayed fields compared to others, haying caused 99% of active Savannah Sparrow and 100% of active Bobolink nests to fail. Both the initial cutting date and time between cuttings influenced renesting behavior. After haying, Savannah Sparrows generally remained on early-hayed fields and immediately renested (clutch completion 15.6 ± 1.28 days post-haying; all values are reported as mean ± SE), while Bobolinks abandoned the fields for at least two weeks (mean clutch completion 33 ± 0.82 days post-haying). While female Savannah Sparrows fledged more offspring per year (1.28 ± 0.16) than female Bobolinks (0.05 ± 0.05), reproductive success on early-hayed fields was low. The number of fledglings per female per year was greater on middle-hayed fields (Savannah Sparrows, 3.47 ± 0.42; Bobolinks, 2.22 ± 0.26), and late-hayed fields (Savannah Sparrows, 3.29 ± 0.30; Bobolinks, 2.79 ± 0.18). Reproductive success was moderate on rotationally grazed pastures, where female Savannah Sparrows and female Bobolinks produced 2.32 ± 0.25 and 1.79 ± 0.33 fledgling per year, respectively. We simultaneously conducted cutting surveys throughout the Champlain Valley and found that 3-8% of hayfield habitat was cut by 1-4 June, 25-40% by 12-16 June, and 32-60% by 28 June-2 July. Thus, the majority of grassland habitat was cut during the breeding season; however, late-hayed fields served as high-quality reserves for late-nesting female Bobolinks that were displaced from previously hayed fields. For fields first cut in May, a 65-day interval between cuts could provide enough time for both species to successfully fledge young. © 2006 by the Ecological Society of America.

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544. **Grassland vegetation and bird abundances on reclaimed midwestern coal mines.**

Scott, P. E.; DeVault, T. L.; Bajema, R. A.; and Lima, S. L.

Wildlife Society Bulletin 30(4): 1006-1014. (2002)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: bird conservation/ exotic grasses/ grassland birds/ Indiana/ mine grasslands/ reclaimed coal mines/ vegetation analysis/ avifauna/ coal mine/ conservation/ grassland/ plant community/ restoration ecology/ United States/ Agelaius phoeniceus/ Ammodramus henslowii/ Ammodramus savannarum/ Bromus inermis/ Festuca arundinacea/ Geothlypis trichas/ Solidago/ Spiza americana/ Sturnella magna

Abstract: Reclamation of surface coal mines in the midwestern United States has produced large grasslands, which support both obligate and facultative grassland birds. We sought to characterize vegetation and determine whether birds breeding in these habitats responded to vegetation as they do in other kinds of grasslands. We measured vegetation characteristics on 9 Indiana mine grasslands and related those measures to abundance or occurrence of 6 common bird species. Eurasian grasses such as tall fescue (Festuca arundinacea) and smooth brome (Bromus inermis), prominent in seed mixtures planted decades earlier, comprised 64% of canopy cover. Forb cover averaged 27%, with as much cover by native invaders such as goldenrod (Solidago spp.) as by legumes planted during reclamation. Despite a superficial appearance of homogeneity, mine grassland vegetation varied sufficiently to affect local abundances of birds. Abundances of 3 ubiquitous species varied and were correlated with at least 1 characteristic; red-winged blackbirds (Agelaius phoeniceus) were negatively associated with percent cover by litter and by grass, whereas eastern meadowlarks (Sturnella magna) and grasshopper sparrows (Ammodramus savannarum) were negatively associated with vegetation density. No variables were associated with occurrence of dickcissels (Spiza americana) or common yellowthroats (Geothlypis trichas), although yellowthroat abundance at the occupied sites appeared to increase with greater vegetation density. Occurrence of Henslow's sparrow (Ammodramus henslowii) was positively associated with 5 variables, including percent cover by litter and grass. Blackbirds, dickcissels, and yellowthroats did not differ in abundance between grass- and forb-dominated sites, whereas Henslow's and grasshopper sparrows and meadowlarks were more common on the former. Thus, obligate grassland birds benefited from the present dominance of non-native grasses over forbs on reclaimed mines. Despite a lack of native vegetation and their artificial nature, mine grasslands supported a typical array of midwestern grassland bird species that differ in specific vegetation preferences, showing patterns similar to those observed in natural and agricultural grasslands.

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545. **Grassland vegetation and bird communities in the southern Great Plains of North America.**
Chapman, R. N.; Engle, D. M.; Masters, R. E.; and Leslie, D. M.
Agriculture, Ecosystems and Environment 104(3): 577-585. (2004)
NAL Call #: S601.A34; ISSN: 01678809.
Notes: doi: 10.1016/j.agee.2004.01.026.
Descriptors: grassland/ grassland birds/ grazing/ habitat management/ plant species composition/ abundance/ breeding population/ conservation/ grassland/ vegetation structure/ Great Plains/ North America/ Aves/ Bothriochloa
Abstract: Structure and composition of vegetation and abundance of breeding birds in grasslands seeded to Old World bluestem (Bothriochloa ischmaeum) were compared to native mixed prairie in the southern Great Plains of North America. Abundance of birds was determined using fixed-radius point counts. Detrended correspondence analysis was used to compare plant community composition and canonical correspondence analysis was used to examine the relationships between plant species composition and vegetation structure with the bird community. Plant species composition differed distinctly between seeded grassland and native mixed prairie, but the differences were not reflected in habitat structure, bird community composition, or abundance of bird species. Seeded grassland was inferior to native mixed prairie in terms of diversity of plant species, but that difference did not translate into meaningful differences in structure that drove habitat selection by breeding birds. Conservation programs that promote establishment of seeded grassland and do not allow for suitable disturbance regimes will selectively benefit a narrow suite of birds regardless of plant species composition.
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546. **Grazing and burning impacts on deer diets on Louisiana pine-bluestem range.**
Thill, R. E.; Martin, A.; Morris, H. F.; and Mccune, E. D.
Journal of Wildlife Management 51(4): 873-880. (1987)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Odocoileus virginianus/ plant composition/ diet quality/ foraging selectivity/ feeding efficiency/ seasonality/ management/ protein/ phosphorus/ calcium
Abstract: Diets of 3-5 tame white-tailed deer (Odocoileus virginianus) on adjacent ungrazed and continuously grazed (35% herbage removal by late Oct) forested pastures were compared for forage-class use, botanical similarities, foraging selectivity and efficiency, and diet quality. Both pastures were divided into 3 burning subunits and burned in late February on a 3-year rotation. Botanical composition of diets differed between and within pastures, but forage-class use was similar except during winter, when deer selected more browse on ungrazed subunits. Grazing had no effect on dietary protein, phosphorus (P), or calcium (Ca) levels, but diets from ungrazed subunits wree higher in digestibility (except during summer), and contained more uncommon plant taxa. Deer foraged more efficiently on grazed than on ungrazed subunits but were less efficient on recent than on older burns. Diets from 1st-year burns were higher in protein during spring and summer and higher in P during spring.
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547. **Grazing and passerine breeding birds in a Great Basin low-shrub desert.**
Medin, D. E.
Great Basin Naturalist 46(3): 567-572. (1986)
NAL Call #: 410 G79; ISSN: 0017-3614
Descriptors: habitat modification/ ecology/ population dynamics/ terrestrial habitat/ land and freshwater zones/ Passeriformes: agricultural activity/ sheep grazing/ biomass/ community structure/ breeding community/ population density/ breeding populations/ desert habitat/ low shrub/ Utah/ Millard County/ Desert Experimental Range/ Aves/ birds/ chordates/ vertebrates
© Thomson Reuters Scientific

548. **Grazing effects on nutritional quality of bluebunch wheatgrass for elk.**
Wambolt, Carl L.; Frisina, Michael R.; Douglass, Kristin S.; and Sherwood, Harrie W.
Journal of Range Management 50(5): 503-506. (1997)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume50/Number5/azu_jrm_v50_n5_503_506_m.pdf
Descriptors: Cervus elaphus nelsoni/ Cervus canadensis/ Bos taurus/ behavior/ ecosystem/ foods-feeding/ grazing/ mammals/ nutrients/ overwintering/ rangeland/ wildlife-habitat relationships/ wapiti/ cattle/ interspecies relations/ nutrition physio./ biochem/ elk/ Montana
Abstract: The authors studied the nutrient content of bluebunch wheatgrass in a three-pasture rest-rotation grazing system and in an exclosure on the elk winter range in southwestern Montana. The wheatgrass was cattle-grazed in the spring, ungrazed by cattle for a year, or given a long-term rest. Nitrogen and phosphorus were greater in the spring-grazed pasture, but regrowth of wheatgrass in this plot did not improve the nutrient content for wildlife over the non-grazed plots. Elk were not likely to eat enough bluebunch wheatgrass to meet their protein maintenance requirements during winter.
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549. **Grazing in the Sierra Nevada: Home range and space use patterns of mule deer as influenced by cattle.**
Loft, Eric R.; Kie, John G.; and Menke, John W.
California Fish and Game 79(4): 145-166. (1993)
NAL Call #: 410 C12; ISSN: 0008-1078
Descriptors: Odocoileus hemionus/ Bos taurus/ behavior/ grazing/ habitat use/ mammals/ home range-territory/ wildlife-livestock relationships/ mule deer/ cattle/ home-range/ food/ competition/ cover/ dispersion/ habitat/ California: Sierra Nevada
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550. **Grazing management impacts on quail during drought in the northern Rio Grande Plain, Texas.**
Campbell Kissock, L.; Blankenship, L. H.; and White, L. D.
Journal of Range Management 37(5): 442-446. (1984)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume37/Number5/azu_jrm_v37_n5_442_446_m.pdf
Descriptors: Colinus virginianus/ Callipepla squamata/ grass
Abstract: Relationships between the abundance of 2 quail species [Colinus virginianus, Callipepla squamata] and range site and grazing management during drought were

evaluated in the northern Rio Grande Plain of Texas. Clay loam range sites provided better nesting cover and greater abundance of forbs for quail than sandy loam and shallow ridge range sites. Foliar cover and aboveground standing crop of grass were greater on the 3 range sites within the short duration and deferred rotation systems as compared with the yearlong system. During drought, grazing systems provided better nesting and protective cover for quail than yearlong grazing.
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551. **Grazing management in Texas and its impact on selected wildlife.**
Bryant, F. C.; Guthery, F. S.; and Webb, W. M.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 94-112; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: Texas/ grazing/ wildlife/ grazing management
This citation is from AGRICOLA.

552. **Grazing pressure impacts on potential foraging competition between angora goats and white-tailed deer.**
Ekblad, R. L.; Stuth, J. W.; and Owens, M. K.
Small Ruminant Research 11(3): 195-208. (1993)
NAL Call #: SF380.I52; ISSN: 0921-4488
Descriptors: Capra hircus/ Odocoileus virginianus/ grazing/ foods-feeding/ habitat alterations/ habitat use/ wildlife-livestock relationships/ white-tailed deer/ domestic goat/ experiment/ food/ Texas: Zavala County
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553. **Greater sage-grouse nesting habitat selection and success in Wyoming.**
Holloran, M. J.; Heath, B. J.; Lyon, A. G.; Slater, S. J.; Kuipers, J. L.; and Anderson, S. H.
Journal of Wildlife Management 69(2): 638-649. (2005)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2005)069 [0638:GSNHSA]2.0.CO;2.
Descriptors: Centrocercus urophasianus/ habitat/ nest/ residual grass/ sage-grouse/ sagebrush/ Wyoming/ habitat management/ habitat selection/ nest site/ nesting success/ Wyoming/ Artemisia tridentata/ Centrocercus urophasianus
Abstract: Nesting habitat degradation and its negative effect on nesting success might contribute to the recent population and distributional declines of greater sage-grouse (Centrocercus urophasianus) throughout North America. We used radiotelemetry to locate greater sage-grouse nests in 7 different areas of central and southwestern Wyoming between 1994 and 2002; we studied each area for 2 to 4 years. Using binary logistic regression, we compared microsite vegetal data collected at nests (n = 457) and random (n = 563) sites and successful (n = 211) and unsuccessful (n = 238) nests to test hypotheses concerning greater sage-grouse nesting habitat selection and vegetal conditions associated with nesting success. We used Akaike's Information Criterion (AICc and model averaging to make inference about the weighted support for the importance of individual habitat variables through the comparison of sets of competing models. Selected nest sites were located in areas with increased total shrub canopy cover (relative importance [RI] = 1.00), residual grass cover (RI = 0.47), and residual grass height (RI = 0.77) compared to random sites. Successful nests had increased residual grass cover (RI = 0.43) and height (RI = 0.48) relative to unsuccessful nests. Additionally, annual nest success rates (i.e., above vs. below our study's average) were related to the preceding year's spring (Apr-May; RI = 0.44) and winter-early spring (Jan-Jun) precipitation (RI = 0.32). Correct classification rates for weighted average models that we derived through the 3 comparisons were between 60 and 70%, suggesting the variables adequately differentiated between plot types. However, high model selection uncertainty (i.e., the total number of models included in the sets of AICc-selected models) suggested that nest site selection and nesting success may be influenced by factors not considered in the modeling process. Management strategies that protect dense sagebrush stands and enhance residual grass cover and height within those stands should be used to maintain nesting habitat and increase nesting success of greater sage-grouse.
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554. **Greater sage-grouse response to sagebrush management in Utah.**
Dahlgren, D. K.; Chi, R.; and Messmer, T. A.
Wildlife Society Bulletin 34(4): 975-985. (2006)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2006)34 [975:GSRTSM]2.0.CO;2.
Descriptors: 2002 Farm Bill/ Artemisia spp./ brood-rearing/ Centrocercus urophasianus/ Dixie harrow/ greater sage-grouse/ habitat management/ Lawson aerator/ sagebrush/ Tebuthiuron/ Utah
Abstract: Greater sage-grouse (Centrocercus urophasianus) populations throughout much of their range have been declining. These declines have largely been attributed to the loss or deterioration of sagebrush (Artemisia spp.) habitat. In response government agencies such as the United States Department of Agriculture, Natural Resources Conservation Service are cost-sharing on management practices designed to improve habitat conditions for sage-grouse. Little is known regarding sage-grouse response to various sagebrush management techniques. We studied the effects of reducing sagebrush canopy cover using 2 mechanical (Dixie harrow and Lawson aerator) treatments and 1 chemical (Tebuthiuron) treatment on greater sage-grouse use of brood-rearing habitats on Parker Mountain, Utah, USA. To conduct this experiment, we identified 19 40.5-ha plots that exhibited >40% mountain big sagebrush (A. tridentata vaseyana) canopy cover and randomly assigned 16 as treatment or controls (4 replicates each). Tebuthiuron and Dixie-harrow-treated plots had more forb cover than did control plots (P = 0.01 and 0.02, respectively) in post-treatment periods. Greater sage-grouse brood use was higher in Tebuthiuron than control plots (P = 0.01). We believe this was attributed to increased herbaceous cover, particularly forb cover. However, in all plots, sage-grouse use was greatest within 10 m of the edge of the treatments where adjacent sagebrush cover was still available. Although the treatments we studied resulted in the plots achieving sage-grouse brooding-rearing habitat guidelines, caution should be exercised in applying these observations at lower elevations, on sites with less annual precipitation, or on a

different subspecies of big sagebrush. Prior to using these techniques to implement large-scale sagebrush treatments, the specific rationale for conducting them should be clearly identified. Large-scale projects using the techniques we studied would not be appropriate within sage-grouse wintering or nesting habitat.
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555. **Green-tailed towhee response to prescribed fire in montane shrubland.**
Jehle, Gretchen; Savidge, Julie A.; and Kotliar, Natasha B.
Condor 108(3): 634-646. (2006)
NAL Call #: QL671.C6; ISSN: 0010-5422
Descriptors: Emberizidae/ Passeriformes/ Pipilo chlorurus/ Fringillidae/ common juniper/ green-tailed towhee/ Juniperus communis/ environmental factors/ biogeography/ breeding season/ Colorado/ conservation/ wildlife management/ habitat use/ fires-burns/ fire management/ ecosystems/ habitat availability/ habitat management/ habitat quality/ habitat suitability/ land zones/ montane shrubland/ montane habitat/ nest survival rate/ nest-site selection/ population ecology/ reproduction/ Rocky Mountain National Park/ shrub grasslands/ nest success/ nest survival
Abstract: Fire alters the structure and composition of shrublands and affects habitat quality for the associated avifauna. Because shrubland ecosystems have been greatly reduced from their original extent in western North America and fire is increasingly being used to manage these landscapes, a better understanding of how fire affects the associated vegetation and wildlife is imperative. We evaluated the response of Green-tailed Towhees (Pipilo chlorurus) to prescribed fire in the montane shrublands of Rocky Mountain National Park, Colorado during 2002 and 2003. Three to five years following prescribed burning, Green-tailed Towhee density and shrub cover were generally higher in unburned areas. Nests (n = 179) were located in unburned vegetation; within burned sites, all nests were in remnant patches. Green-tailed Towhee nest survival was 57% (95% CI = 49%-65%) across the two years of the study. More than half of the nests were in common juniper (Juniperus communis) shrubs, and nest survival was higher for nests in junipers than those in other shrub species. Daily nest survival rates were lower at the site with the highest density of towhees and declined over the breeding season. With regard to shrub cover, opposite trends were observed for nest-site selection and nest survival: nest plots had greater shrub cover than non-nest plots, but nest survival decreased with increasing shrub cover. Because shrub cover affects towhee density and nest survival in conflicting ways, fire management at Rocky Mountain National Park alters both habitat availability and suitability for Green-tailed Towhees.
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556. **Guidelines for managing lesser prairie-chicken populations and their habitats.**
Hagen, Christian A.; Jamison, Brent E.; Giesen, Kenneth M.; and Riley, Terry Z.
Wildlife Society Bulletin 32(1): 69-82. (2004)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: conservation measures/ terrestrial habitat/ land zones/ Tympanuchus pallidicinctus: conservation measures/ habitat management/ grassland/ United States/ Aves, Galliformes, Phasianidae/ birds/ chordates/ vertebrates
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557. **Guidelines to manage sage grouse populations and their habitats.**
Connelly, J. W.; Schroeder, M. A.; Sands, A. R.; and Braun, C. E.
Wildlife Society Bulletin 28(4): 967-985. (2000)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Artemisia/ Centrocercus urophasianus/ guidelines/ habitat/ management/ populations/ sage grouse/ sagebrush/ gamebird/ population decline/ wildlife management/ Artemisia/ Centrocercus urophasianus
Abstract: The status of sage grouse populations and habitats has been a concern to sportsmen and biologists for >80 years. Despite management and research efforts that date to the 1930s, breeding populations of this species have declined throughout much of its range. In May 1999, the western sage grouse (C. urophasianus phaios) in Washington was petitioned for listing under the Endangered Species Act because of population and habitat declines (C. Warren, United States Fish and Wildlife Service, personal communication). Sage grouse populations are allied closely with sagebrush (Artemisia spp.). Despite the well-known importance of this habitat to sage grouse and other sagebrush obligates, the quality and quantity of sagebrush habitats have declined for at least the last 50 years. Braun et al. (1977) provided guidelines for maintenance of sage grouse habitats. Since publication of those guidelines, much more information has been obtained on sage grouse. Because of continued concern about sage grouse and their habitats and a significant amount of new information, the Western States Sage and Columbian Sharp-tailed Grouse Technical Committee, under the direction of the Western Association of Fish and Wildlife Agencies, requested a revision and expansion of the guidelines originally published by Braun et al. (1977). This paper summarizes the current knowledge of the ecology of sage grouse and, based on this information, provides guidelines to manage sage grouse populations and their habitats.
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558. **Guild structure of a riparian avifauna relative to seasonal cattle grazing.**
Knopf, F. L.; Sedgwick, J. A.; and Cannon, R. W.
Journal of Wildlife Management 52(2): 280-290. (1988)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Salix spp./ Dendroica petechia/ Passerculus sandwichensis/ Melospiza melodia/ Melospiza lincolnii/ Empidonax traillii/ Zonotrichia leucophrys/ Turdus migratorius/ Agelaius phoeniceus/ Molothrus ater/ habitat/ generalist/ specialist/ population density/ community structure/ vegetation structure/ Arapaho National Wildlife Refuge/ Colorado, USA
Abstract: The avifauna within the willow (Salix spp.) community on the Arapaho National Wildlife Refuge [Colorado, USA] (NWR) was dominated (96% of all observations each year) by 11 species of passerine birds during the summers of 1980-81. Using 28 vegetation variables measured or calculated for randomly selected points and points where birds were sighted, we assigned the species to 3 distinct response guilds relative to historical patterns of seasonal grazing. A eurytopic

response guild (habitat generalists) included yellow warblers (Dendroica petechia) (YEWA), savannah sparrows (Passerculus sandwichensis) (SASP), and song sparrows (Melospiza melodia) (SOSP). A stenotopic response guild (habitat specialists) included willow flycatchers (Empidonax traillii) (WIFL). Lincoln's sparrows (Melospiza lincolnii) (LISP), and white- crowned sparrows (Zonotrichia leucophrys) (WCSP). The intermediate, mesotopic response guild included American robins (Turdus migratorius) (AMRO), red-winged blackbirds (Agelaius phoeniceus) (RWBL), and brown-headed cowbirds (Molothrus ater) (BHCO). Population densities of the eurytopic response guild differed little between healthy (historically winter-grazed) and decadent (historically summer-grazed) willow communities within a year. Densities of species in the mesotopic response guild differed more dramatically, and stenotopic response-guild species were absent or accidental in decadent willows. Information on habitat use patterns of the individual species between years supported the definition of response guilds; vegetation structure was most variable in habitats of eurytopic species and least variable in habitats of stenotopic species. Comparisons between used and available vegetation features indicated that species in the stenotopic response guild used locations that differed from random on the basis of bush spacing. We hypothesize that the response-guild structure primarily reflects the impact of cattle upon the horizontal patterning of the vegetative community.
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559. **Habitat acquisition strategies for grassland birds in an urbanizing landscape.**
Snyder, S. A.; Miller, J. R.; Skibbe, A. M.; and Haight, R. G.
Environmental Management 40(6): 981-992. (2007)
NAL Call #: HC79.E5E5 ; ISSN: 0364152X.
Notes: doi: 10.1007/s00267-007-9025-y.
Descriptors: open space/ optimization/ reserve design/ site selection/ urbanization
Abstract: Habitat protection for grassland birds is an important component of open space land acquisition in suburban Chicago. We use optimization decision models to develop recommendations for land protection and analyze tradeoffs between alternative goals. One goal is to acquire (and restore if necessary) as much grassland habitat as possible for a given budget. Because a viable habitat for grassland birds consists of a relatively large core area with additional parcels of grassland habitat nearby, the second goal is to minimize total pairwise distance between newly protected parcels and large existing reserves. We also use the concept of an effective grassland habitat area, which considers influences that neighboring land covers have on grassland habitat suitability. We analyze how the parcels selected for protection change as total protected effective area is traded off against total distance. As area is weighted more heavily, the selected parcels are scattered and unconnected. As total distance is weighted more heavily, the selected parcels coalesce around core reserves but protect less area. The differences in selected parcels as we change the objective function weights are caused by the differences in price per unit of effective habitat area across parcels. Parcels located in close proximity to the existing cores have relatively high prices per hectare of effective grassland area as a consequence of high restoration costs and adverse influences from roads, urban areas and/or forestland. As a result, these parcels have lower priority for selection when the area objective is weighted more heavily for a given budget. © 2007 Springer Science+Business Media, LLC.
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560. **Habitat and avifaunal recovery from livestock grazing in a riparian meadow system of the northwestern Great Basin.**
Dobkin, David S.; Rich, Adam C.; and Pyle, William H.
Conservation Biology 12(1): 209-221. (1998)
NAL Call #: QH75.A1C5 ; ISSN: 0888-8892
Descriptors: avifaunal composition/ avifaunal recovery/ habitat recovery/ livestock grazing/ riparian meadow system/ species abundance/ species richness
Abstract: Riparian habitats are centers of biological diversity in arid and semiarid portions of western North America, but despite widespread loss and degradation of these habitats there is little quantitative information concerning restoration of native riparian biota. We examined the recovery of a riparian meadow system in the context of long-term versus short-term release from livestock grazing. We compared the structure and dynamics of plant and avian communities on 1.5-ha plots inside a long-term (>30 years) livestock enclosure ("exclosure plots"), with adjacent plots outside the enclosure ("open plots") for 4 years following removal of livestock from open plots. Throughout the study, sedge cover, forb cover, and foliage height diversity of herbs were greater on exclosure plots, bare ground, litter cover, shrub cover, and shrub foliage height diversity were greater on open plots. Forb, rush, and cryptogamic cover increased on open plots but not on enclosure plots. Grass cover increased, whereas litter and bare ground decreased on all plots in conjunction with increased availability of moisture. Sedge cover did not change. Avian species richness and relative abundances were greater on enclosure plots, species composition differed markedly between exclosure and open plots (Jaccard Coefficient = 0.23-0.46), with exclosure plots dominated by wetland and riparian birds and open plots dominated by upland species. The appearance of key species of wet-meadow birds on open plots in the third and fourth years following livestock removal signaled the beginning of restoration of the riparian avifauna. We interpret the recovery of riparian vegetation and avifaunal composition inside the exclosure as a consequence of livestock removal, which led to a rise in the water table and an expansion of the byporheic zone laterally from the stream channel. The lack of change in sedge and shrub cover on open plots suggests that restoration to a sedge-dominated meadow will not happen quickly.
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561. **Habitat edge, land management, and rates of brood parasitism in tallgrass prairie.**
Patten, M. A.; Shochat, E.; Reinking, D. L.; Wolfe, D. H.; and Sherrod, S. K.
Ecological Applications 16(2): 687-695. (2006)
NAL Call #: QH540.E23 ; ISSN: 10510761
Descriptors: brood parasitism/ brown-headed cowbird/ burning/ edge effects/ grazing/ land management/ Molothrus ater/ Oklahoma, USA/ regression trees/ tallgrass prairie
Abstract: Bird populations in North America's grasslands have declined sharply in recent decades. These declines

are traceable, in large part, to habitat loss, but management of tallgrass prairie also has an impact. An indirect source of decline potentially associated with management is brood parasitism by the Brown-headed Cowbird (Molothrus ater), which has had substantial negative impacts on many passerine hosts. Using a novel application of regression trees, we analyzed an extensive five-year set of nest data to test how management of tallgrass prairie affected rates of brood parasitism. We examined seven landscape features that may have been associated with parasitism: presence of edge, burning, or grazing, and distance of the nest from woody vegetation, water, roads, or fences. All five grassland passerines that we included in the analyses exhibited evidence of an edge effect: the Grasshopper Sparrow (Ammodramus savannarum), Henslow's Sparrow (A. henslowii), Dickcissel (Spiza americana), Red-winged Blackbird (Agelaius phoeniceus), and Eastern Meadowlark (Sturnella magna). The edge was represented by narrow strips of woody vegetation occurring along roadsides cut through tallgrass prairie. The sparrows avoided nesting along these woody edges, whereas the other three species experienced significantly higher (1.9-5.3x) rates of parasitism along edges than in prairie. The edge effect could be related directly to increase in parasitism rate with decreased distance from woody vegetation. After accounting for edge effect in these three species, we found evidence for significantly higher (2.5-10.5x) rates of parasitism in grazed plots, particularly those burned in spring to increase forage, than in undisturbed prairie. Regression tree analysis proved to be an important tool for hierarchically parsing various landscape features that affect parasitism rates. We conclude that, on the Great Plains, rates of brood parasitism are strongly associated with relatively recent road cuts, in that edge effects manifest themselves through the presence of trees, a novel habitat component in much of the tallgrass prairie. Grazing is also a key associate of increased parasitism. Areas managed with prescribed fire, used frequently to increase forage for grazing cattle, may experience higher rates of brood parasitism. Regardless, removing trees and shrubs along roadsides and refraining from planting them along new roads may benefit grassland birds. © 2006 by the Ecological Society of America.
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562. **Habitat management for the endangered Stephens' kangaroo rat: The effect of mowing and grazing.**
Kelt, D. A.; Konno, E. S.; and Wilson, J. A.
Journal of Wildlife Management 69: 424-429. (Jan. 2005)
NAL Call #: 410 J827
Descriptors: Dipodomys/ rodents/ endangered species/ threatened species/ wildlife habitats/ grasslands/ wildlife management/ mowing/ grazing/ population size/ population density/ California/ Dipodomys stephensi/ natural resources, environment, general ecology, and wildlife conservation/ animal ecology and behavior
This citation is from AGRICOLA.

563. **Habitat relationships of birds overwintering in a managed coastal prairie.**
Baldwin, Heather Q.; Grace, James B.; Barrow, Wylie C.; and Rohwer, Frank C.
Wilson Journal of Ornithology 119(2): 189-197. (2007)
NAL Call #: QL671.W55; ISSN: 15594491
Descriptors: Certhiidae/ Fringillidae/ Passeriformes/ Ammodramus leconteii/ Cistothorus platensis/ Le Conte's sparrow/ Melospiza georgiana/ Passerculus sandwichensis/ Savannah sparrow/ sedge wren/ swamp sparrow
Abstract: Grassland birds are considered to be rapidly declining in North America. Management approaches for grassland birds frequently rely on prescribed burning to maintain habitat in suitable condition. We evaluated the relationships among years since burn, vegetation structure, and overwintering grassland bird abundance in Coastal prairie. Le Conte's Sparrows (Ammodramus leconteii) were most common in areas that had: (1) been burned within the previous 2 years. (2) medium density herbaceous vegetation, and (3) sparse shrub densities. Savannah Sparrows (Passerculus sandwichensis) were associated with areas: (1) burned within 1 year. (1) with sparse herbaceous vegetation, and (3) with sparse shrub densities. Sedge Wrens (Cistothorus platensis) were most common in areas that bad: (1) burned greater than 2 years prior and (2) dense herbaceous vegetation. Swamp Sparrows (Melospiza georgiana): (1) were most common in areas of dense shrubs. (2) not related to time since burnings, and (3) demonstrated no relationship to herbaceous vegetation densities. The relationships to fire histories for all four bird species could be explained by the associated vegetation characteristics indicating the need for a mosaic of burn rotations and modest levels of woody vegetation.
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564. **Habitat selection by the Texas tortoise in a managed thornscrub ecosystem.**
Kazmaier, Richard T.; Hellgren, Eric C.; and Ruthven, Donald C.
Journal of Wildlife Management 65(4): 653-660. (2001)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: radiotelemetry: monitoring method/ Tamaulipan Biotic Province/ brush invasion [brush encroachment]/ canopy cover/ community ecology/ conservation biology/ grazing pastures/ habitat change/ habitat management/ habitat selection/ land use/ old field pastures/ riparian habitats/ semiarid shrublands: habitat/ thornscrub ecosystems/ vegetation types
Abstract: Brush encroachment on semiarid shrublands resulting from livestock grazing has created global concern. Southern Texas is dominated by Prosopis-Acacia mixed brush communities typical of the Tamaulipan Biotic Province, and the geographic range of the state-threatened Texas tortoise (Gopherus berlandieri) is nearly identical to the boundaries of this biotic province in Texas. In light of the perceived threat to Texas tortoises because of habitat change caused by brush encroachment, we monitored 36 Texas tortoises by radiotelemetry during 1994-1996 to assess habitat selection on a site containing grazed and ungrazed pastures. Tortoises did not exhibit habitat selection at the level of locations within home ranges. Differential habitat selection at the level of home ranges within study areas was not apparent for sex, but was evident for treatment (grazed or ungrazed). Analysis of pooled data indicated that tortoises exhibited broad-scale selection for home ranges within study areas. Selection was expressed as preferential avoidance of old-field and riparian habitats, which represented vegetational extremes of canopy cover. However, tortoises tolerated the broad continuum of other brush communities on the study site. Apparent treatment differences may be an artifact of our

inability to adequately pair study areas given the scale of tortoise movement. Our data indicate that increases in the extent of woody canopy cover resulting from grazing-induced brush encroachment will not be detrimental to Texas tortoises. Furthermore, large-scale range improvement practices, such as root-plowing, create unsuitable habitats for this species.
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565. **Habitat shifts by mule deer the influence of cattle grazing.**
Loft, E. R.; Menke, J. W.; and Kie, J. G.
Journal of Wildlife Management 55(1): 16-26. (1991)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Odocoileus hemionus/ Populus tremuloides/ riparian habitat/ competition
Abstract: We studied the effects of cattle on selection of home ranges and habitats by female mule deer (Odocoileus hemionus) on summer range in the Sierra Nevada, California. Three grazing levels (no grazing, moderate grazing, and heavy grazing) were imposed on 3 fenced range units over 3 years. Habitat selection by 13 radio-collared female mule deer was estimated each summer; habitat selection by radio-collared cattle was estimated at the 2 grazing levels. In the absence of grazing, meadow-riparian habitat comprised a greater proportion of deer home ranges than during grazing. During moderate and heavy grazing, a greater proportion of montane shrub habitat was included within deer home ranges than when ungrazed. Within home ranges, deer preferred meadow-riparian habitat at all grazing levels, whereas aspen (Populus tremuloides) habitat was preferred only during no grazing. Deer preference for meadow-ripairan habitat declined over the summer, more so with cattle grazing. Cattle also preferred meadow-riparin and aspen habitat. The greatest effect of cattle on habitat selection by female mule deer occurred during late summer with heavy grazing when forage and cover were at a minimum in preferred habitats. Female mule deer shifted habitat use by reducing their use of habitats preferred by cattle and increasing their use of habitats avoided by cattle. These results were consistent with expectations of competition and habitat selection theory.
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566. **Habitat-suitability bounds for nesting cover of northern bobwhites on semiarid rangelands.**
Arredondo, Juan A.; Hernandez, Fidel; Bryant, Fred C.; Bingham, Ralph L.; and Howard, Ronnie
Journal of Wildlife Management 71(8): 2592-2599. (Nov. 2007)
NAL Call #: 410 J827
Descriptors: Colinus virginianus/ habitat selection/ nesting habitat/ northern bobwhite/ radiotelemetry/ Texas
Abstract: Northern bobwhite (Colinus virginianus) is a species for which extensive knowledge exists regarding its ecology, life history, and habitat. Although the qualitative aspects of bobwhite habitat have been described and known for many decades, researchers have neglected to characterize bobwhite habitat quantitatively (i.e., habitat selection). Thus, biologists have been capable of identifying components that compose bobwhite habitat but have only been able to speculate on how much of each component was necessary. We documented selection–avoidance behavior of nesting bobwhites in Brooks County, Texas, USA, during May–August, 2004–2005. We measured 5 vegetation features (i.e., nesting-substrate ht and width, suitable nest clump density, herbaceous canopy coverage, and radius of complete visual obstruction) at nest sites (n = 105) and at random points (n = 204). We used continuous selection functions to assess habitat use and identify bounds of suitability. Selection domains for nesting-substrate height and radius of complete visual obstruction were 16.9–31.2 cm and 1.05–4.35 m, respectively. Across all measurements, bobwhites selected for nest sites with a nesting-substrate width ≥Ą22.4 cm, suitable nest-clump density ≥Ą730 nest clumps/ha, and herbaceous canopy coverage ≥Ą36.7%. This knowledge will provide an important foundation for managers to evaluate current nesting conditions on semiarid rangelands and provide a basis for habitat management aimed at creating suitable nesting habitat for bobwhites.
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567. **Habitat type conservation and restoration for the Karner blue butterfly. A case study from Wisconsin.**
Kleintjes, Paula K.; Sporrong, Jill M.; Raebel, Christopher A.; and Thon, Stephen F.
Ecological Restoration 21(2): 107-115. (2003); ISSN: 1522-4740
Descriptors: conservation measures/ terrestrial habitat/ land zones/ Lycaeides melissa samuelis: habitat management/ sand prairie habitat mitigation and management case study/ grassland/ sand prairie/ Wisconsin/ Fairchild/ Insecta, Lepidoptera, Glossata, Heteroneura, Papilionoidea, Lycaenidae/ arthropods/ insects/ invertebrates/ Lepidopterans
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568. **Habitat use by loggerhead shrikes (Lanius ludovicianus) at Midewin National Tallgrass Prairie, Illinois: An application of Brooks and Temple's habitat suitability index.**
Fornes, G. L.
American Midland Naturalist 151(2): 338-345. (2004)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: bird/ ecological modeling/ habitat quality/ habitat use/ index method/ Illinois/ Midewin National Tallgrass Prairie/ Lanius ludovicianus
Abstract: Declines in loggerhead shrike populations have been attributed to pesticide use and habitat loss on the breeding grounds and factors outside the breeding range. To determine the role of breeding habitat limitation, Brooks and Temple (1990) designed a habitat suitability index for shrikes based on data from Minnesota. This paper describes an application of their model to a site in Illinois. Like Brooks and Temple, I found that breeding habitat does not appear to limit shrike populations and shrikes seem to be making settlement choices based on discernable habitat criteria. I suggest changes to the model for adaptation to Illinois shrike populations, including an adjustment of the cutoff for "suitable" habitat, an adjustment of the conversions of variables leading to the calculation of the index (V4 to SI4), the use of GIS to measure variables (usable foraging habitat) and the addition of variables (length of fence) used in the model.
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569. **Habitat use, nest success, and management recommendations for grassland birds of the Canaan Valley National Wildlife Refuge, West Virginia.**
Warren, Kelly Ann. West Virginia University, 2002.
Notes: Degree: MS; Advisor: Anderson, James T.
Descriptors: birds/ grasslands/ mowing/ habitat management/ grazing/ pasture/ prairie/ meadows/ breeding/ survival/ urbanization/ wind/ Canaan Valley National Wildlife Refuge/ West Virginia
Abstract: Grassland bird populations have been declining due to increased habitat fragmentation, urbanization, and conversion of farmlands to other uses throughout the United States. However, idle hayfields and pastures in the eastern United States may provide adequate nesting habitat for grassland species displaced from their native habitat. The objectives of this study were to: (1) compare grassland bird abundance, diversity, and richness of species between 3 idle hayfields and 3 pastures and between mowed and unmowed treatments, and (2) compare grassland bird nest success between hayfields and pastures, and between mowed and unmowed treatments on the Canaan Valley National Wildlife Refuge, West Virginia during the summers of 1999-2000. A total of 27 species was found on the refuge. The predominant grassland species were bobolinks Dolichonyz oryzivorus, savannah sparrows Passerculus sandwichensis , and eastern meadowlarks Sturnella magna. Overall bird abundance differed between mowed (x- = 0.61; SE = 0.09) and unmowed (x- = 0.32; SE = 0.06) treatments in pastures P = 0.033). Grassland bird diversity differed between mowed plots of hayfields (x- = 0.85; SE = 0.21) and pastures (x- = 1.57; SE = 0.26) P = 0.026). Mayfield nest survival did not differ between nests found in hayfields and pastures, and mowed and unmowed treatments. While nest success did not differ between mowed and unmowed treatments, mowing these fields at the conclusion of the breeding season will provide long team advantages to grassland birds nesting on the refuge. Additionally, grassland birds appeared to be responding to the vegetative structure and vertical diversity within fields rather than field size. Management should focus on removal of internal edges (i.e., remnant fencelines, hedgerows, and wind breaks) found throughout the grasslands on the refuge.
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570. **Habitat use of western spotted skunks and striped skunks in Texas.**
Neiswenter, Sean A. and Dowler, Robert C.
Journal of Wildlife Management 71(2): 583-586. (2007)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Carnivora/ Mustelidae/ Mephitis mephitis/ Spilogale gracilis/ wildlife management/ habitat use/ foraging habitat use in fragmented habitat/ mixed open pasture and mesquite stands/ ecosystems/ Texas/ Tom Green County, San Angelo/ land zones
Abstract: Little information on foraging habitats of sympatric species of skunks in Texas, USA, is available. We compared 11 western spotted skunks (Spilogale gracilis) and 10 striped skunks (Mephitis mephitis) using radiotelemetry data to assess habitat use during foraging at broad levels of selection in a fragmented habitat. Western spotted skunks used areas with more large mesquite (Prosopis glandulosa) trees than did striped skunks and randomly selected points. Striped skunk habitat use was not different from randomly chosen locations. Contrary to previous research, both species appear to avoid agricultural habitat. A habitat management plan may be difficult to implement for striped skunks in Texas because they did not favor any available habitat. Conservation of western spotted skunks in west-central Texas should focus on areas with older mesquite trees, areas that are now often brush controlled for management of livestock.
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571. **Hayfield management and wildlife conservation: Can the needs of the farmer fit with habitat needs of wildlife?**
Parsons, G.; Nocera, J. J.; Milton, G. R.; and Fredeen, A. H.
Canadian Journal of Plant Science 87(3): 529. (2007)
NAL Call #: 450 C16; ISSN: 0008-4220.
Notes: Annual Conference of the Canadian-Society-of-Agronomy/Canadian-Society-for-Horticultural-Science/Canadian-Society-of-Animal-Science, Halifax, Canada; August 01 -04, 2006.
http://nsac.ca/pas/instind/pasturec/Conferences/Symposium_2003/Grasslands/Schedule_Abstracts.htm
Descriptors: terrestrial ecology: ecology, environmental sciences/ wildlife management: conservation/ wildlife conservation/ agro ecosystem/ grassland habitat/ hayfield management/ management scheme/ bird breeding/ habitat needs/ ecologically productive area/ habitat conservationist/ delayed hay cutting
© Thomson Reuters Scientific

572. **A home on the range.**
Peabody, E. and McGinnis, L.
Agricultural Research 54(11-12): 10-13. (Nov. 2006-Dec. 2006)
NAL Call #: 1.98 Ag84
Descriptors: range management/ rangelands/ Centrocercus urophasianus/ wildlife habitats/ habitat conservation/ Artemisia/ prescribed burning/ plant production range and pasture grasses/ natural resources, environment, general ecology, and wildlife conservation
This citation is from AGRICOLA.

573. **Home range and dispersal of Texas tortoises, gopherus berlandieri, in a managed thornscrub ecosystem.**
Kazmaier, Richard T.; Hellgren, Eric C.; and Ruthven, Donald C.
Chelonian Conservation and Biology 4(2): 488-496. (2002); ISSN: 1071-8443
Descriptors: conservation measures/ behavior/ ecology/ terrestrial habitat/ land zones/ Gopherus berlandieri: habitat management/ home range/ patterns and influences/ distribution within habitat/ Dispersal/ scrub/ managed thornscrub ecosystem/ Texas/ Chaparral Wildlife Management Area/ Reptilia, Anapsida, Testudines, Cryptodira, Testudinidae/ chordates/ reptiles/ vertebrates
Abstract: Southern Texas is dominated by Prosopis-Acacia mixed brush communities typical of the Tamaulipan Biotic Province, and the geographic range of the state-threatened Texas tortoise (Gopherus berlandieri) is nearly identical to the boundaries of this biotic province in Texas. In light of habitat fragmentation throughout southern Texas, we assessed home range use, movements, and natal dispersal of Texas tortoises at a managed site in the western Rio

Grande Plains. Home ranges were larger for males (7-46 ha) than females (3-9 ha) regardless of method of home range calculation. Home range sizes determined by minimum convex polygon and bivariate normal methods were larger for individuals in ungrazed pastures (4-46 ha) relative to grazed pastures (3-15 ha), but home ranges derived from fixed and adaptive kernel estimators did not differ by treatment. Apparent treatment differences may be an artifact of an inability to adequately pair study areas given the scale of tortoise movement. Average distance between relocations indicated that males (74-153 m) moved more than females (31-41 m), but we did not detect differences in movement distances associated with grazing by cattle. Based on recapture distances of juveniles and adults, Texas tortoises appeared to exhibit male-biased natal dispersal. Our data suggest that Texas tortoises are highly mobile and may be capable of recolonizing across long distances following disturbance. Large home ranges suggest tortoises require large blocks of habitat to maintain stable populations. Populations of tortoises inhabiting small thornscrub fragments in the Lower Rio Grande Valley maybe constrained by patch size of available habitat and have reduced recruitment because of dispersal losses.
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574. **Home-range size, response to fire, and habitat preferences of wintering Henslow's sparrows.**
Bechtoldt, C. L. and Stouffer, P. C.
Wilson Bulletin 117(3): 211-225. (2005)
NAL Call #: 413.8 W692; ISSN: 00435643
Descriptors: burning/ habitat selection/ home range/ movement/ overwintering/ passerines/ range size/ relative abundance/ Louisiana/ Ammodramus henslowii/ Andropogon/ Aves/ Passeridae/ Pinus palustris
Abstract: Henslow's Sparrow (Ammodramus henslowii) is a declining, disturbance-dependent grassland bird that winters in the longleaf pine (Pinus palustris) ecosystem of the southeastern United States. During two winters (2001, 2002), we estimated the relative abundances, movement patterns, and habitat associations of Henslow's Sparrows wintering in habitat patches differing in time since last burn (burn treatment). We conducted our study in southeastern Louisiana in Andropogon spp.-dominated longleaf pine savanna habitat. Henslow's Sparrows were most abundant in savannas burned the previous growing season, with a mean relative abundance of 2.6 individuals/ha. The most dramatic decline occurred between burn year 0 and year 1 (first and second winters after burning), when mean relative abundance dropped to 1.0 individual/ha. Home-range size of radio-tagged birds was not correlated with burn treatment. All radio-tagged individuals maintained stable home ranges, with a mean size of 0.30 ha. Vegetation characteristics differed significantly among burn treatments. Sites burned the previous growing season had low vegetation density near the ground, vegetation taller than 1.0 m, and high seed abundance. These variables were all highly correlated with Henslow's Sparrow relative abundance, but seed density best predicted Henslow's Sparrow numbers. We recommend a biennial, rotational burn regime to maintain habitat characteristics correlated with Henslow's Sparrow abundance.
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575. **The impact of buffer strips and stream-side grazing on small mammals in southwestern Wisconsin.**
Chapman, E. W. and Ribic, C. A.
Agriculture, Ecosystems and Environment 88(1): 49-59. (2002)
NAL Call #: S601.A34; ISSN: 0167-8809
Descriptors: pastures/ habitats/ cattle/ small mammals/ ecosystems/ streams/ animal husbandry/ rotational grazing/ species diversity/ farm management/ riparian buffers/ plant litter/ intensive livestock farming
Abstract: The practice of continuously grazing cattle along streams has caused extensive degradation of riparian habitats. Buffer strips and managed intensive rotational grazing (MIRG) have been proposed to protect and restore stream ecosystems in Wisconsin. However, the ecological implications of a switch from traditional livestock management to MIRG or buffer strip establishment have not been investigated. Differences in small mammal communities associated with riparian areas on continuously grazed and MIRG pastures, as well as vegetative buffer strips adjacent to row crops, were investigated in southwestern Wisconsin during May-September 1997 and 1998. More species (mean of 6-7) were found on the buffer sites than on the pasture sites (mean of 2-5). Total small mammal abundance on buffer sites was greater than on the pastures as well; there were 3-5 times as many animals on the buffer sites compared to the pasture sites, depending on year. There were no differences in species richness or total abundance between MIRG and continuously grazed pastures in either year. Total small mammal abundance was greater near the stream than away from the stream, regardless of farm management practice but there were no differences in species richness. Buffer strips appear to support a particularly rich and abundant small mammal community. Although results did not detect a difference in small mammal use between pasture types, farm-wide implications of a conversion from continuous to MIRG styles of grazing may benefit small mammals indirectly by causing an increase in the prevalence of pasture in the agricultural landscape.
This citation is from AGRICOLA.

576. **Impact of grazing management on biodiversity of grasslands.**
Tallowin, J. R. B.; Rook, A. J.; and Rutter, S. M.
Animal Science 81(2): 193-198. (2005)
NAL Call #: SF1.A56; ISSN: 1357-7298
Descriptors: biodiversity/ biological indicators/ botanical composition/ fauna/ grassland management/ grasslands/ grazing/ lowland areas/ nature conservation/ plant succession/ species diversity/ species richness/ stand structure/ weeds
Abstract: This paper reviews recent work carried out by the Institute of Grassland and Environmental Research and collaborating organizations that addresses some of the impacts of grazing management on both species-rich and species-poor lowland neutral grassland. Results indicate that for species-rich grassland, lenient grazing pressure maintained botanical diversity and the abundance of positive indicator species of nature conservation value over a 5-year period and also enhanced faunal diversity and abundance reflecting improvements in spatial, architectural and temporal structure. However, there was no enhancement in positive indicator species and there was also an increase in pernicious weeds suggesting that

grazing alone may not suffice to deliver all the biodiversity goals for these grasslands and that additional management interventions may be required. For species-poor grassland, results indicate that distinctive differences in structure can lead to differences in faunal diversity. There is also some tentative evidence that livestock breed may affect invertebrate species assemblages.
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577. **Impact of herbivores on nitrogen cycling: Contrasting effects of small and large species.**
Bakker, E. S.; Olff, H.; Boekhoff, M.; Gleichman, J. M.; and Berendse, F.
Oecologia (Berlin) 138(1): 91-101. (2004)
NAL Call #: QL750.O3; ISSN: 0029-8549
Descriptors: biomass/ body size/ exclosure experiments/ floodplain grasslands: habitat/ grazing behavior/ herbivory/ laboratory conditions/ litter accumulation/ microclimates/ nitrogen cycling/ plant animal interactions/ soil parameters/ vegetation
Abstract: Herbivores are reported to slow down as well as enhance nutrient cycling in grasslands. These conflicting results may be explained by differences in herbivore type. In this study we focus on herbivore body size as a factor that causes differences in herbivore effects on N cycling. We used an exclosure set-up in a floodplain grassland grazed by cattle, rabbits and common voles, where we subsequently excluded cattle and rabbits. Exclusion of cattle lead to an increase in vole numbers and a 1.5-fold increase in net annual N mineralization at similar herbivore densities (corrected to metabolic weight). Timing and height of the mineralization peak in spring was the same in all treatments, but mineralization in the vole-grazed treatment showed a peak in autumn, when mineralization had already declined under cattle grazing. This mineralization peak in autumn coincides with a peak in vole density and high levels of N input through vole faeces at a fine-scale distribution, whereas under cattle grazing only a few patches receive all N and most experience net nutrient removal. The other parameters that we measured, which include potential N mineralization rates measured under standardized laboratory conditions and soil parameters, plant biomass and plant nutrient content measured in the field, were the same for all three grazing treatments and could therefore not cause the observed difference. When cows were excluded, more litter accumulated in the vegetation. The formation of this litter layer may have added to the higher mineralization rates under vole grazing, through enhanced nutrient return through litter or through modification of microclimate. We conclude that different-sized herbivores have different effects on N cycling within the same habitat. Exclusion of large herbivores resulted in increased N annual mineralization under small herbivore grazing.
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578. **The impact of land-use practices on native earthworm populations in California grasslands.**
Winsome, Thais; Hendrix, Paul F.; and Epstein, Lynn E.
In: 86th Annual Meeting of the Ecological Society of America. Madison, Wisconsin; 2001.
Notes: Meeting abstract (poster session).
http://abstracts.co.allenpress.com/pweb/esa2001/document/?ID=28775
Descriptors: terrestrial ecology: ecology, environmental sciences/ wildlife management: conservation/ disturbance intensity/ grasslands: land use practices, native earthworm populations
Abstract: California's grasslands and oak woodlands support a unique, indigenous earthworm fauna that may be vulnerable to displacement by exotic earthworm species, especially in areas impacted by human activity. As part of an ongoing conservation effort, we conducted a 3-year study in a northern California grassland to identify land-use factors that facilitate the displacement of native species. Populations were sampled within habitats ranging from unmanaged grassland-woodland reserve areas to intensively managed pastures, vineyards, and orchards. Spatial analysis of the data revealed that at the landscape scale, disturbance intensity was the best predictor of native earthworm abundance. Probabilities for the occurrence of native species ranged from 0 in croplands to 1 in undisturbed chaparral and grassland-oak woodland reserves. Probabilities for exotic species were almost exactly the opposite and ranged from <0.1 in wildland reserves to 1 in the intensively managed pastures and croplands. In pastures supporting a mixture of native and exotic species, the abundance of native species was significantly lower (P<0.001) in clover-amended, fertilized pastures (0-15 m^{-2}) compared with unmanaged pastures (78-201 m^{-2}). Our results suggest that complete displacement of native by exotic species is likely to occur only in heavily disturbed areas or where environmental conditions (e.g. resource quality) are optimal. Thus, critical strategies for the conservation of native earthworm species are those that focus on limiting habitat loss and alteration
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579. **The impact of livestock on lapwing Vanellus vanellus breeding densities and performance on coastal grazing marsh.**
Hart, J. D.; Milsom, T. P.; Baxter, A.; Kelly, P. F.; and Parkin, W. K.
Bird Study 49(1): 67-78. (2002); ISSN: 0006-3657
Descriptors: grazing/ livestock/ marshes/ population density/ breeding sites/ breeding success/ agriculture/ environmental impact/ nature conservation/ population dynamics/ Vanellus vanellus/ northern lapwing/ livestock grazing/ aquatic birds
Abstract: Even at very low stocking densities, livestock reduce breeding densities of adult Lapwings and increase the risk of nest loss due to predation. To assess the effects of livestock on Lapwings breeding on coastal grazing marshes. Densities of breeding adults, clutch sizes, laying dates, incubation schedules, clutch and chick survival were compared between marshes grazed at low stocking densities (0.2-0.51 livestock units/ha) and marshes where livestock had been excluded. Repeated measurements of sward heights were also made. Breeding densities in 1995 and 1997, but not 1996, were negatively correlated with the presence of livestock. Though few nests were trampled, livestock disrupted incubation schedules and increased the risk of nest predation. Clutches were smaller on grazed marshes than on ungrazed marshes, while more clutches were also laid later on grazed marshes. Grazed swards remained shorter, and more suitable for nesting, longer than ungrazed swards but clutches laid later in the season were more likely to be predated. The exclusion of livestock from selected areas to increase the nesting success of

lapwings is a desirable option on coastal grazing marshes where the rate of grass growth is slow in spring. Grazing regimes are suggested that would maintain relatively short swards, provide refuge to Lapwings from livestock during the peak nesting period, and allow grazers to exploit all of their marshes.
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580. **Impact of precipitation and grazing on the water vole in the Beartooth Mountains of Montana and Wyoming, U.S.A.**
Klaus, M.; Moore, R. E.; and Vyse, E.
Arctic Antarctic and Alpine Research 31(3): 278-282. (1999)
NAL Call #: GB395.A73; ISSN: 1523-0430
Descriptors: grazing/ mountain grasslands/ precipitation/ indicators/ survival/ watersheds/ nature conservation/ Microtus richardsoni
Abstract: The influence of increased precipitation levels and grazing on the demographics of Microtus richardsoni was examined. Water voles were trapped and marked during the summers of 1990, 1991 and 1992 along four headwater watersheds of the Clark's Fork of the Yellowstone River in Wyoming and Montana. The summer of 1992 had more than double the precipitation of either 1990 or 1991. During the wet summer of 1992, capture success was significantly greater, as was the proportion of young voles captured. In 1992, several factors contributed to increased water vole populations. There were significantly more indications of male reproductive activity. Class I water voles (13-49 g) of both sexes showed signs of reproductive activity indicating they were reaching sexual maturity at smaller body mass. Significantly more embryos/trap-killed female were found. In 1995, the water vole was listed as a sensitive species because it is rare and requires specific alpine riparian habitat that is declining and may be damaged by poor grazing practices. Capture success was significantly greater, and there were significantly more young water voles in ungrazed drainages. Measured indicators of reproductive activity did not vary significantly between grazed and ungrazed drainages. It is concluded that grazing might affect survival of young water voles and should be studied further.
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581. **Impact of prescribed burning on endophytic insect communities of prairie perennials (Asteraceae: Silphium spp.).**
Tooker, John F. and Hanks, Lawrence M.
Biodiversity and Conservation 13(10): 1875-1888. (2004)
NAL Call #: QH75.A1B562; ISSN: 0960-3115
Descriptors: conservation measures/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Insecta: habitat management/ prescribed burning/ Impact on endophytic community of prairie perennials/ community structure/ Endophytic taxa of prairie perennials/ impact of prescribed burning/ grassland/ prairie perennials/ Endophytic community/ fire/ Illinois/ Central/ Endophytic communities of prairie perennials/ Insecta/ arthropods/ insects/ invertebrates
Abstract: Prescribed burning currently is used to preserve endemicity of plant communities in remnant tallgrass prairies. Although some types of arthropods benefit from changes in plant communities brought about by burning, other species that are endemic to prairies may be threatened. Because they inhabit the 'fuel layer' of prairies, endophytic insects would seem particularly susceptible to this management tactic. In this paper, we assess the impact of prescribed burning on endophytic insect communities inhabiting stems of Silphium laciniatum L. and S. terebinthinaceum Jacquin (Asteraceae), endemic prairie plants. Populations of these insects were decimated by burning, with mortality approaching 100% in most cases. Their populations nevertheless began to rebound within a single growing season, with densities moderately but significantly reduced 1 year after the burn. Even when a prairie remnant was completely incinerated, plant stems were recolonized by insects within one growing season. Our findings suggest that sufficient numbers of endophytic insects survive burns in remains of Silphium to recolonize burned areas the following year.
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582. **The impact of recreational trails and grazing on small mammals in the Colorado piedmont.**
Meaney, Carron A.; Ruggles, Anne K.; Clippinger, Norman W.; and Lubow, Bruce C.
Prairie Naturalist 34(3-4): 115-136. (2002)
NAL Call #: QH540.P7; ISSN: 0091-0376
Descriptors: Akaiki's information criteria: mathematical and computer techniques/ analysis of variance: mathematical and computer techniques/ grazing/ recreational trails/ relative abundance/ species diversity/ species richness
Abstract: We conducted a three-year study of the impact of recreational trails and grazing on species richness, relative abundance, and species diversity of small mammals at six paired sites with and without trails along South Boulder Creek, Boulder, Colorado. In our analysis, we used a set of alternative models, which we evaluated using Akaiki's Information Criteria (AIC) to compute strength of evidence supporting each alternative and then made all inferences based on weighted averages of these model results. Our data provided strong evidence for an increase (2.0 individuals per 100 trap nights ± 0.51 SE) of deer mice (Peromyscus maniculatus) on the grazed sites, but little evidence for effects on relative abundance of other species or on species richness or diversity. Repeated measures ANOVA results for paired trail and non-trail sites showed only weak evidence for a negative effect of trails on species richness, species diversity, and relative abundance. In addition to small mammal trapping, we employed mark-recapture techniques on Preble's meadow jumping mouse (Zapus hudsonius preblei), a federally listed threatened subspecies of the meadow jumping mouse, to determine linear population density estimates of this subspecies on the trail and non-trail sides of the creek. Repeated measures ANOVA for these density estimates provided weak evidence for a possible negative trail effect (-11.6 individuals/km ± 9.5 SE) that was greater in males than females. Although the low precision of these estimates makes the results inconclusive, the magnitude of the estimated effect (a 31% lower population density of Preble's meadow jumping mice on sites with trails) highlights the need for careful management and additional research. Our data revealed large natural temporal and spatial variation in these populations that resulted in poor precision of estimated effects of interest.
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583. **Impact of soybean conservation systems on bobwhite quail habitat and mortality.**
Eggert, D.; Frederick, J. R.; Robinson, S. J.; and Bowerman, W.
In: Proceedings of the 26th Southern Conservation Tillage-Conference for Sustainable Agriculture. Raleigh, NC.; pp. 237-245; 2004.
Descriptors: beneficial organisms/ conservation tillage/ habitats/ mortality/ no tillage/ soyabeans/ tillage/ Colinus virginianus/ Glycine Fabaceae/ Glycine max
Abstract: Conservation-tillage systems on the Southeastern Coastal Plain now utilize practices such as minimum surface tillage, narrow row widths, and planting of herbicide-tolerant varieties. These systems can result in many economical, environmental, and ecological benefits, including providing a more suitable habitat for wildlife such as the northern bobwhite quail (Colinus virginianus). Our research objectives were to assess the possible ecological impacts of both an innovative soybean (Glycine max L. Merr) tillage system (no-till) and traditional soybean system (tilled) on quail habitat and preference. Variables measured were insect abundance, canopy closure and pen-raised quail habitat use. No-till soybean fields were found to have the greatest abundance of orthopteran (crickets/grasshoppers), arachnid (spiders), and coleopteran/hemipteran (centipedes/beetles) insects. Insect numbers were higher in the no-till system than in the tilled system, field borders, and forested areas. The tilled system generally had the second highest number of insects, followed by field borders and forested areas. Canopy closure as estimated by light transmittance through the canopy, was faster and more complete in the no-till system than the tilled system due to the narrower row width used with the no-till system. Pen-raised quail were found more frequently in the no-till system than the tilled system a majority of the time. Greater quail use of the tilled system only occurred at one field. Field borders and forested areas were used less than either tillage systems. Averaged over treatments and release days, the greatest cause of mortality was due to mammals. These results indicate that no-till systems are more beneficial to quail than traditional systems in terms of habitat quality.
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584. **Impact on rodents of mowing strips in old fields of eastern Kansas.**
Slade, Norman A. and Crain, Shelley
Journal of Mammalogy 87(1): 97-101. (2006)
NAL Call #: 410 J823; ISSN: 0022-2372
Descriptors: Muridae/ Rodentia/ Microtus ochrogaster/ Peromyscus leucopus/ Peromyscus maniculatus/ Reithrodontomys megalotis/ Sigmodon hispidus/ deer mice/ harvest mice/ hispid cotton rat/ Microtus ochrogaster/ Peromyscus leucopus/ prairie vole/ white-footed mice/ biogeography/ conservation/ wildlife management/ habitat use/ grasslands/ ecosystems/ grassland habitat management/ Jefferson County/ Nelson Environmental Study Area/ Kansas/ land zones/ old field habitat/ population ecology/ strip mowing/ woody vegetation invasion/ abundance/ disturbance/ habitat fragmentation/ microtus/ movements/ landscape management/ prairie/ dispersion/ field technique
Abstract: To minimize impact on small mammals while preventing invasion of woody vegetation, we mowed alternating 15-m strips Oil Our area. We their compared numbers and movements of 5 species of rodents on mowed and unmowed strips. Numbers of hispid cotton rats (Sigmodon hispidus) and prairie voles (Microtus ochrogaster) were reduced temporarily in the mowed strips, whereas numbers of white-footed mice (Peromyscus leucopus), deer mice (P. maniculatus), and western harvest mice (Reithrodontomys megalotis) did not change significantly. Movements of cotton rats, prairie voles, and harvest mice across mowed strips were reduced, whereas movements within unmowed strips were relatively unaffected, decreasing only for white-footed and harvest mice in I of 2 temporal replicates. Changes in numbers and movements were of short duration, and hence mowing narrow strips when vegetation Could recover rapidly had little sustained impact on this rodent community.
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585. **Impacts of a late season grazing scheme on nongame wildlife in a Wallowa Mountain riparian ecosystem.**
Kauffman, J. B.; Kreuger, W. C.; and Vavra, M.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 208-220; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: Oregon/ grazing/ livestock/ wildlife/ riparian areas

586. **Impacts of domestic livestock grazing on small mammals of forest grazing allotments in southeastern Idaho.**
Johnson, S. J.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 242-250; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: Idaho/ livestock/ grazing/ small mammals/ wildlife
This citation is from AGRICOLA.

587. **Impacts of rotational grazing and riparian buffers on physicochemical and biological characteristics of southeastern Minnesota, USA, streams.**
Sovell, Laurie A.; Vondracek, Bruce; Frost, Julia A.; and Mumford, Karen G.
Environmental Management 26(6): 629-641. (2000)
NAL Call #: HC79.E5E5 ; ISSN: 0364-152X
Descriptors: principal component analysis: pca, mathematical method/ canopy cover/ grass buffers/ pastures: continuously grazed, rotationally grazed/ percent fines: streambed/ physical habitat: stream quality parameter/ riparian buffer management/ riparian management/ stream quality/ stream restoration/ turbidity/ water chemistry: stream quality parameter/ watershed/ wood buffer
Abstract: We assessed the relationship between riparian management and stream quality along five southeastern Minnesota streams in 1995 and 1996. Specifically, we examined the effect of rotationally and continuously grazed pastures and different types of riparian buffer strips on water chemistry, physical habitat, benthic

macroinvertebrates, and fish as indicators of stream quality. We collected data at 17 sites under different combinations of grazing and riparian management, using a longitudinal design on three streams and a paired watershed design on two others. Continuous and rotational grazing were compared along one longitudinal study stream and at the paired watershed. Riparian buffer management, fenced trees (wood buffer), fenced grass, and unfenced rotationally grazed areas were the focus along the two remaining longitudinal streams. Principal components analysis (PCA) of water chemistry, physical habitat, and biotic data indicated a local management effect. The ordinations separated continuous grazing from sites with rotational grazing and sites with wood buffers from those with grass buffers or rotationally grazed areas. Fecal coliform and turbidity were consistently higher at continuously grazed than rotationally grazed sites. Percent fines in the streambed were significantly higher at sites with wood buffers than grass and rotationally grazed areas, and canopy cover was similar at sites with wood and grass buffers. Benthic macroinvertebrate metrics were significant but were not consistent across grazing and riparian buffer management types. Fish density and abundance were related to riparian buffer type, rather than grazing practices. Our study has potentially important implications for stream restoration programs in the midwestern United States. Our comparisons suggest further consideration and study of a combination of grass and wood riparian buffer strips as midwestern stream management options, rather than universally installing wood buffers in every instance.
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588. **The implications of grassland and heathland management for the conservation of spider communities: A review.**
Bell, J. R.; Wheater, C. P.; and Cullen, W. R.
Journal of Zoology 255(3): 377-387. (2001)
NAL Call #: QL1.J68; ISSN: 0952-8369
Descriptors: grassland management/ grasslands/ grazing/ habitats/ wildlife conservation
Abstract: Both intensity and type of habitat management in grasslands and heathlands affect spider communities. With high intensity management, spider communities often lack diversity and are dominated by a few r-selected species affiliated with bare ground. Low intensity management produces more complex communities introducing more niches for aerial web spinners and climbing spiders. The preferred management will be site-dependent and may not be appropriate for all spiders in all situations, particularly for some rare or threatened species. Providing natural cover is recommended when using extreme forms of management or intensive grazing (particularly by sheep). In extreme cases, or where trampling is heavy, the litter layer should be conserved. We advocate research and survey before and after major management implementation. Habitat management for spiders should not be considered alone, but integrated into a holistic plan. Management for spiders may conflict with rare plant conservation and small reserves should examine the viability of providing two contrasting regimes.
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589. **The importance and future condition of western riparian ecosystems as migratory bird habitat.**
Skagen, Susan K.; Hazlewood, Rob; and Scott, Michael L.
In: Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference, General Technical Report-PSW 191/ Ralph, C. J. and Rich, T. D.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2005. pp. 525-527.
Notes: 0196-2094 (ISSN).
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ habitat management/ riparian ecosystems/ migratory species/ habitat utilization/ riparian habitat/ United States, western region/ Aves/ birds/ chordates/ vertebrates
Abstract: Riparian forests have long been considered important habitats for breeding western landbirds, and growing evidence reinforces their importance during the migratory period as well. Extensive modification of natural flow regimes, grazing, and forest clearing along many rivers in the western U.S. have led to loss and simplification of native riparian forests and to declines and endangerment of riparian- dependent birds species. Efforts to conserve, restore, and manage the distinctive biological diversity of riparian ecosystems must rest upon a clear understanding of the primary physical and biological process that structure and maintain that diversity on a landscape scale.
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590. **Importance of in situ survival, recolonization, and habitat gaps in the postfire recovery of fire-sensitive prairie insect species.**
Panzer, R.
Natural Areas Journal 23(1): 14-21. (2003)
NAL Call #: QH76.N37; ISSN: 08858608
Descriptors: Homoptera/ Lepidoptera/ prairie insects/ prescribed burning/ tallgrass prairie/ community dynamics/ habitat management/ insect/ prairie/ prescribed burning/ recolonization/ survival/ United States/ Aflexia rubranura/ Cicadellidae/ Homoptera/ Lepidoptera/ Noctuidae/ Papaipema eryngii
Abstract: I investigated the roles of in situ survival and recolonization in the postfire recovery of fire-sensitive insect species within isolated tallgrass prairie remnants in Illinois, northwest Indiana, and southeast Wisconsin, USA. I examined the extent to which commonly encountered habitat gaps suppress recovery among several taxa and tested the pivotal assumption that small populations are readily extirpated when their requisite habitats are completely burned. Both in situ survival and recolonization were found to contribute appreciably to postfire recovery within the spatial and temporal scales examined. Combined recovery times for 22 species separated from unburned units by roads or other barriers were not greater than those for populations in burn units abutting unburned tracts. The flightless leafhopper Aflexia rubranura (DeLong) and the sedentary moth Papaipema eryngii Bird readily crossed habitat gaps as large as 36 m and 25 m, respectively. When 6-m gaps were covered with tar paper in the Aflexia experiment, colonization of outlying patches was reduced, but not stopped. I conclude that burn unit designs that provide adjacent or nearby refugia, coupled with procedures that promote patchiness within burned units, can be expected to contribute appreciably to the rapid recovery of fire-sensitive species.
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591. **Importance of riparian habitats for small mammal and herpetofaunal communities in agricultural landscapes of southern Quebec.**
Maisonneuve, C. and Rioux, S.
Agriculture, Ecosystems and Environment 83(1-2): 165-175. (2001)
NAL Call #: S601.A34; ISSN: 01678809.
Notes: doi: 10.1016/S0167-8809(00)00259-0.
Descriptors: agricultural landscapes/ herpetofauna/ Quebec/ riparian strips/ small mammals/ agricultural ecosystem/ community structure/ herpetofauna/ riparian zone/ Amphibia/ Anura/ Blarina brevicauda/ Bufo americanus/ Clethrionomys gapperi/ Cricetinae/ Mammalia/ Peromyscus maniculatus/ Rana pipiens/ Rana sylvatica/ Reptilia/ Riparia/ Sorex cinereus/ Sorex fumeus/ Zapus hudsonius
Abstract: The presence of adequate riparian strips in agricultural landscapes is generally recognized to contribute to the reduction of the impacts of agricultural practices on the water quality of streams, to regularize water temperature and to help in the creation of important wildlife habitats. This study aimed at determining the importance of riparian strips in agricultural landscapes of southern Quebec for small mammal and herpetofaunal communities, and verifying farmers' general belief that these habitats become shelters for species considered as agricultural pests. Abundance, composition and diversity of communities were compared between three types of riparian strips: herbaceous, shrubby and wooded. A total of 1460 small mammals belonging to 14 species and 329 amphibians and reptiles belonging to 11 species were captured with line trapping and drift fences. The generalist species Sorex cinereus, Zapus hudsonius, Blarina brevicauda, and Bufo americanus were abundant in all three types of riparian strips. Peromyscus maniculatus, Sorex fumeus, Clethrionomys gapperi, and Rana pipiens were associated more closely to wooded strips, whereas Rana sylvatica was captured mostly in shrubby strips. The abundance of small mammals and herpetofauna increased with complexity of vegetation structure. Small mammal diversity was higher in herbaceous and wooded riparian strips, whereas the herpetofaunal community was more diverse in shrubby strips. Proportion and abundance of pest species diminished with complexity of vegetation structure, whereas insectivores increased in abundance. Maintaining woody vegetation in riparian strips should increase abundance and diversity of wildlife within agricultural landscapes where increasing development pressure is presently contributing to the conversion of such habitats to herbaceous strips. Such a management approach should also help reducing the risk of riparian strips becoming shelters for pest species.
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592. **Improvement of Great Basin deer winter range with livestock grazing.**
Neal, D. L.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 61-73; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: deer/ livestock/ grazing/ Great Basin

593. **Improving northern bobwhite habitat by converting tall fescue fields to native warm-season grasses.**
Washburn, B. E.; Barnes, T. G.; and Sole, J. D.
Wildlife Society Bulletin 28(1): 97-104. (2000)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Festuca arundinacea/ glyphosate/ herbicides/ Imazapic/ native warm-season grasses/ northern bobwhite/ burning/ habitat management/ methodology/ species conservation/ wildlife management/ Colinus virginianus/ Festuca arundinacea/ Neotyphodium coenophialum
Abstract: Tall fescue (Festuca arundinacea) grasslands infected with an endophyte (Neotyphodium coenophialum) are poor wildlife habitat, and birds and mammals feeding thereon experience nutritional and reproductive problems. Converting tall fescue fields to native warm-season grasses (NWSG) is an accepted method to improve this habitat. The objective of our study was to evaluate the efficacy of techniques to kill tall fescue and establish NWSG to improve habitat for the northern bobwhite (Colinus virginianus). We tested combinations of prescribed burns and spring or fall pre-emergence applications of glyphosate (N-[phosphonomethyl]glycine) or imazapic ([±]-2-[4,5-dihydro-4-methyl-4(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-5-meth yl-3-pyridinecarboxylic acid) herbicide with and without a post-emergence imazapic application. Prescribed burns, herbicide applications, and NWSG plantings were implemented in 0.1-ha treatment plots in spring and fall 1997 on 9 tall fescue fields in Kentucky. Resulting plant communities were described in fall 1998. Spring imazapic and glyphosate applications reduced ($P < 0.05$) tall fescue cover compared to the untreated controls. Among the spring treatments, imazapic applications resulted in greater ($P < 0.05$) coverage of NWSG than glyphosate applications. The best treatment to kill tall fescue and establish NWSG was a spring burn followed by a pre-emergence imazapic application and seeding NWSG. Regardless of treatment, tall fescue conversion improved the habitat characteristics of grasslands for northern bobwhites.
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594. **Improving wildlife habitat on the prairies: An evaluation of the habitat conservation partnership agreement in southwestern Manitoba.**
Ramsey, D. and Walberg, B.
Environments 29(2): 43-58. (2001); ISSN: 07116780
Descriptors: agriculture/ incentives/ partnerships/ stewardship/ wildlife habitat preservation/ habitat conservation/ partnership approach/ prairie/ wildlife management/ Canada/ Anas
Abstract: Southern Manitoba's landscape, vastly altered through a century of agricultural settlement, has become further transformed with the industrialization of agriculture in recent years. One of the impacts of these changes has been the further loss of wildlife habitat. The Habitat Conservation Partnership Agreement (HCPA), financed by Ducks Unlimited Canada and coordinated through six of Manitoba's Conservation Districts in southwestern Manitoba, was a three year program (1998-2000) that offered assistance to land owners on a range of habitat initiatives. In evaluating the HCPA, this paper argues that each of the programs is innovative in attempting to maintain and improve habitat for wildlife in one of the most intensively farmed regions of Canada. Following a

description of the partnership agreement, the benefits and constraints of the initiatives within the HCPA are examined by analysing the results of a survey administered to program participants (n=123) in February 2000. The paper concludes by suggesting that because the economic conditions facing prairie farmers ultimately hinder altruistic concerns about wildlife habitat, partnership programs such as the HCPA provide important contributions to reducing the impacts of farming on such habitat.
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595. **In my opinion: Grousing and grazing on national grasslands.**
Sidle, John G.
Wildlife Society Bulletin 33(3): 1139-1144. (2005)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Galliformes/ Phasianidae/ sharp-tailed grouse/ Tympanuchus cupido/ Tympanuchus cupido Pinnatus/ Tympanuchus phasianellus/ Tympanuchus phasianellus Jamesi/ livestock/ wildlife habitat/ habitat management/ grasslands/ South Dakota
Abstract: The article presents the author's opinion regarding livestock adjustments for wildlife habitat management on federal lands. The author's observations and opinion center around plains sharp-tailed grouse, Tympanuchus phasianellus jamesii, and greater prairie chicken, Tympanuchus cupido pinnatus, habitat on Fort Pierre National Grassland, South Dakota. These species need substantial vegetation cover and the author recognizes the role of grazing, even heavy grazing, on national grasslands. The grassland of Fort Pierre includes about 47,000 ha of mixed-grass vegetation on a rolling hill landscape just west of the Missouri River near Pierre, South Dakota. The most prevalent grass species of this island is Western wheat grass. It is an important area on the northern plains for the conservation of prairie grouse. After receiving complaints about inadequate levels of vegetation cover after livestock grazing, Fort Pierre began to develop and implement grazing management strategies to improve prairie grouse habitat conditions.
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596. **Influence of cattle stocking rate on the structural profile of deer hiding cover.**
Loft, E. R.; Menke, J. W.; Kie, J. G.; and Bertram, R. C.
Journal of Wildlife Management 51(3): 655-664. (1987)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Odocoileus hemionus californicus/ Odocoileus hemionus hemionus/ Populus tremuloides/ Salix spp./ Veratrum californicum/ fawn/ meadow/ riparian habitat/ grazing habitat deterioration/ Sierra Nevada/ California
Abstract: Hiding cover available for California (Odocoileus hemionus californicus) and Rocky Mountain (O. h. hemionus) mule deer was monitored during summer under no, moderate, and heavy cattle stocking rates in quaking aspen (Populus tremuloides) and meadow-riparian habitats in the central Sierra Nevada, California [USA]. Use of willow (Salix spp.) and herbaceous vegetation in meadow-riparian habitat was also measured using exclosure plots. Hiding cover in aspen and corn lily (Veratrum californicum) vegetation types was not reduced through mid-season in ungrazed treatments but was significantly (P < 0.05) reduced under moderate and heavy grazing. Increases in cover of aspen understory were detected after 2 years of cattle exclusion. Willow vegetation was resilient to the impacts of cattle under moderate grazing, but hiding cover was significantly (P < 0.05) reduced with heavy stocking rates. Browsing of willows by deer was light in ungrazed treatments but increased as the season progressed in cattle-grazed areas and as stocking rate increased. Natural weathering was partly responsible for overall hiding cover lost during the summer but reductions prior to mid-summer were attributed to cattle. The high proportion of hiding cover lost early in the season coincided with the 1st 2 months of life for fawns.
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597. **Influence of fire and juniper encroachment on birds in high-elevation sagebrush steppe.**
Noson, Anna C.; Schmitz, Richard A.; and Miller, Richard F.
Western North American Naturalist 66(3): 343-353. (2006)
NAL Call #: QH1.G7; ISSN: 1527-0904
Descriptors: habitat/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Oreoscoptes montanus/ Pipilo chlorurus/ Pooecetes gramineus/ Spizella breweri: disturbance by man/ fire suppression/ Influence on habitat vegetation structure/ breeding distributions/ forest and woodland/ sagebrush steppe/ grassland/ scrub/ fire/ decreased fire frequency/ Oregon/ Steens Mountain/ Aves, Passeriformes, Emberizidae/ birds/ chordates/ vertebrates
Abstract: We examined relationships between high-elevation sagebrush (Artemisia spp.) steppe habitats altered by prescribed fire and western juniper (Juniperus occidentalis) encroachment on breeding distributions of Brewer's Sparrows (Spizella breweri), Vesper Sparrows (Pooecetes gramineus), Green-tailed Towhees (Pipilo chlorurus), and Sage Thrashers (Oreoscoptes montanus) on Steens Mountain in Southeastern Oregon. In 2000 we conducted fixed-radius point count surveys at 172 sites encompassing burned and unburned sagebrush habitat and a range of juniper densities. For each bird species we developed habitat models using local variables measured in the field and landscape variables derived from remotely sensed data. Akaike's Information Criterion (AICc) was used to select the best-approximating model from a suite of a priori candidate models. Brewer's Sparrows, Sage Thrashers, and Green-tailed Towhees were positively related to increasing local sagebrush cover or percent sagebrush in the landscape, whereas Vesper Sparrows were negatively associated with sagebrush cover and positively related to increases in sagebrush fragmentation at local and landscape scales. Including a measure of juniper encroachment Substantially improved models for all species in the analysis. Green-tailed Towhees showed a curvilinear response to the amount of juniper in the landscape. All other species showed a strong negative relationship with juniper. Our results indicate that, although changes in sagebrush habitat associated with fire had a negative influence on sagebrush birds, juniper encroachment due to fire suppression also impacted this high-elevation sagebrush bird community.
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598. **Influence of fire and other anthropogenic practices on grassland and shrubland birds in New England.**
Vickery, Peter D.; Zuckerberg, Benjamin; Jones, Andrea L.; Gregory Shrjver, W.; and Weik, Andrew P.
Studies in Avian Biology (30): 139-146. (2005)
NAL Call #: QL671.S8; ISSN: 0197-9922
Descriptors: upland sandpiper/ upland sandpipers/ vesper sparrow/ vesper sparrows/ blueberry barrens/ farmland/ grassland birds/ New England/ prescribed fire/ shrubland birds
Abstract: The extent of grassland and shrubland habitat in New England has changed dramatically over the past 400 yr. as a result of changing land uses. Presently, grasslands and shrublands in New England have been created and maintained primarily as a result of four types of habitat management: mowing, livestock grazing, clearcutting, and prescribed burning. Hayfields and pastures comprise the largest proportion of open land, approximately 718,500 ha. Clearcutting has created extensive shrubland patches in northern Maine, where 3.5% (243,000 ha) of the commercial forestland has been harvested in the past 20 yr. creating ephemeral, early successional shrublands used by a wide variety of warblers, sparrows, and other birds. The most widespread use of prescribed fire is agricultural and takes place on commercial lowbush blueberry (Vaccinium angustjfolium) barrens in Maine, where approximately 3,000 ha are burned annually. These barrens are especially important habitats for Upland Sandpipers (Bartramia longicauda) and Vesper Sparrows (Pooecetes gramineus). The scale of ecological prescribed burns in New England for habitat management of endangered ecosystems has been small; in recent years fewer than 300 ha have been burned annually. The effects of burning differ in grasslands versus shrublands. In native grasslands, burning has a strong effect on vegetation structure, which, in turn, has clear effects on most grassland specialist birds. Shrubland fires have less impact on shrubland birds because most of the woody structure remains intact.
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599. **Influence of grazing by bison and cattle on deer mice in burned tallgrass prairie.**
Matlack, Raymond S.; Kaufman, Donald W.; and Kaufman, Glennis A.
American Midland Naturalist 146(2): 361-368. (2001)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: commercial activities/ nutrition/ diet/ ecology/ population dynamics/ terrestrial habitat/ abiotic factors/ physical factors/ land and freshwater zones/ Bos bison (Bovidae): food plants/ impact on habitat/ grassland/ Kansas/ Flint Hills/ Konza Prairie Biological Station/ grazing impact on small mammalian population size/ tallgrass prairie habitat/ Bovidae/ Artiodactyla/ Mammalia/ chordates/ mammals/ vertebrates
Abstract: We studied the influence of grazing by bison (Bos bison) and by cattle (B. taurus) on deer mice (Peromyscus maniculatus) in tallgrass prairie at the Konza Prairie Biological Station in 1997 and 1998. Small mammals were sampled by one 10-station trapline in each of four bison-grazed enclosures, four cattle-grazed enclosures and four ungrazed sites. Enclosures were 4.9 ha and the biomass of grazers in each was similar. All sites were burned annually. We sampled small mammals for 4 consecutive nights in spring before fire, in spring after fire and in autumn. Deer mice were the most abundant species (n=285; 83% of all small mammals) captured in all treatments and in each trapping period. Deer mice were significantly more abundant in bison-grazed and cattle-grazed sites than in ungrazed sites in spring before fire (P<0.01 and P<0.05, respectively), but were similar in abundance in grazed and ungrazed sites following fire. Abundance of deer mice was significantly higher in bison-grazed sites than in cattle-grazed and ungrazed sites in autumn (P<0.05 and P<0.001, respectively). Bison and cattle differ in grazing and nongrazing behaviors (e.g., wallowing by bison) that result in differences in vegetation structure. It is likely that differences in deer mouse abundance between bison-grazed and cattle-grazed treatments were due to differences in vegetation structure caused by the two types of grazers.
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600. **Influence of grazing treatments on nongame birds and vegetation structure in south central North Dakota.**
Messmer, Terry Allan. North Dakota State University, 1991.
Descriptors: behavior/ breeding/ birds/ habitat use/ habitat alterations/ grazing/ livestock/ habitat disturbance/ habitat changes/ Ammodrmus savannarum/ food supply/ North Dakota
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601. **The influence of habitat diversity and structure on bird use of riparian buffer strips in coastal forests of British Columbia, Canada.**
Shirley, S.
Canadian Journal of Forest Research 34(7): 1499-1510. (2004)
NAL Call #: SD13.C35; ISSN: 00455067.
Notes: doi: 10.1139/X04-038.
Descriptors: forestry/ vegetation/ coastal forests/ habitat structures/ riparian habitats/ biodiversity/ abundance/ avifauna/ buffer zone/ community structure/ coniferous forest/ habitat structure/ riparian forest/ species richness/ biodiversity/ birds/ plants/ British Columbia/ Canada/ North America/ Vancouver Island/ Aves/ Riparia
Abstract: I investigated the role of habitat structure in explaining bird species richness and abundance in riparian buffer strips of old-growth coniferous forest on western Vancouver Island, British Columbia. Using buffer strips of varying widths and a control from undisturbed riparian forest, I tested the hypothesis that vegetation differs in buffer strips of varying width. I selected 10 summary variables to represent broad-scale vegetation attributes of riparian habitat. Deciduous tree density was higher, and shrub richness was lower in wide buffers compared with narrow buffers. I then used Akaike information criterion to examine whether vegetation structure or buffer width best explained patterns of bird richness and abundance in riparian habitats. Species richness and abundance in several foraging guilds were explained better by buffer width than by vegetation. Abundances of three bird habitat guilds: riparian specialists, forest-interior, and open-edge species, and 6 of 10 species were best explained by specific vegetation features. Differences in vegetation, particularly deciduous tree density and shrub cover, explained part of the variation in abundance of several riparian forest-dwelling species

and may be useful in evaluating specific forest management practices. Because deciduous tree density is also positively correlated with buffer width, wide buffers (>100 m) may benefit not only those species associated with coniferous upland forests and forest generalists sensitive to buffer width, but also those species whose abundance is associated with deciduous trees.
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602. **Influence of precipitation on demographics of northern bobwhites in southern Texas.**
Hernandez, F.; Hernandez, F.; Arredondo, J. A.; Bryant, F. C.; Brennan, L. A.; and Bingham, R. L.
Wildlife Society Bulletin 33(3): 1071-1079. (2005)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2005)33 [1071:IOPODO]2.0.CO;2.
Descriptors: Colinus virginianus/ drought/ northern bobwhites/ population dynamics/ Texas/ weather/ birds/ drought/ precipitation intensity/ rangelands
Abstract: Northern bobwhite (Colinus virginianus) populations in southwestern rangelands are influenced by precipitation; populations increase during relatively wet periods and decrease during drought. Understanding the demographic responses of bobwhites to fluctuations in precipitation might provide a basis for identifying mechanisms responsible for the phenomenon. We compared 10 population variables (bobwhite survival, nesting-season length, nest success, hen success, percent hens nesting and renesting, nesting rate, percent juveniles in fall harvest sample (Nov-Feb), clutch size, and egg hatchability) between a dry (Sep 2000-Aug 2001; 51 cm precipitation) and wet period (Sep 2002-Aug 2003; 93 cm precipitation) in Brooks County, Texas. We monitored radiomarked bobwhites on 3 sites during the dry (n=263 bobwhites) and wet period (n=191 bobwhites) to obtain estimates of survival and reproductive effort. Bobwhite survival curves differed between the dry period (0.30±0.04; S' ±SE, n=102 bobwhites) and wet period (0.60± 0.06; n=71 bobwhites; P≤0.001) during fall-winter (Sep-Feb). A lower proportion of hens nested during the dry period (95% CI: 52.6±22.5 %; n=19 hens) compared to the wet period (100%; n=15 hens). Of hens that nested, the dry period exhibited a lower nesting rate (95% CI: 1.2±0.3 nests/hen) compared to the wet period (95% CI: 2.3±0.5 nests/hen). The dry period also experienced a shorter nesting season (69 days) compared to wet period (159 days). Lastly, percent juveniles (Nov-Feb) was lower during the dry period (95% CI: 69.3±0.3 %; n=740 harvested bobwhites) compared to wet period (95% CI: 78.3±2.1%; n=1,415 harvested bobwhites). Our field study highlights 4 demographic variables (i.e., survival, percentage of hens nesting, nesting rate, and nesting-season length) that warrant further research to identify causal factors responsible for the boom-and-bust phenomenon in bobwhites. Further, our data suggest that drought negatively impacts bobwhite reproductive effort such that harvest should be reduced or ceased during drought (e.g., <50 cm annual precipitation).
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603. **Influence of prescribed fire on lesser prairie-chicken habitat in shinnery oak communities in western Oklahoma.**
Boyd, Chad S. and Bidwell, Terrence G.
Wildlife Society Bulletin 29(3): 938-947. (2001)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: conservation measures/ nutrition/ reproduction/ reproductive behavior/ terrestrial habitat/ abiotic factors/ physical factors/ land and freshwater zones/ Tympanuchus pallidicinctus (Phasianidae): habitat management/ food availability/ breeding site/ nest site/ scrub/ shinnery oak habitat/ fire/ Oklahoma/ Roger Mills County/ Black Kettle National Grassland/ prescribed fire/ habitat quality/ Phasianidae/ Galliformes, Aves/ birds/ chordates/ vertebrates
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604. **Influence of rest-rotation cattle grazing on mule deer and elk habitat use in east-central Idaho.**
Yeo, J. J.; Peek, J. M.; Wittinger, W. T.; and Kvale, C. T.
Journal of Range Management 46(3): 245-250. (1993)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume46/Number3/azu_jrm_v46_n3_245_250_m.pdf
Descriptors: grazing systems/ selective grazing/ wild animals/ rest rotation grazing/ grazing behavior
Abstract: Elk (Cervus elaphus), mule deer (Odocoileus hemionus) and cattle (Bos taurus) distributions were determined year round from 1975 to 1979 on a rest-rotation grazing system established in steep mountainous terrain. Following implementation of the grazing system, cattle progressively used higher altitudes and steeper slopes in each succeeding year. Elk preferred rested pastures during the grazing season (June-Oct.) and avoided habitat frequented by cattle by using higher altitudes and steeper slopes. Few mule deer used the allotment during summer, but during the winter, deer selected habitats grazed previously by cattle. Elk appeared to adjust to the grazing system by making greater use of pastures with cattle present, although preference for pastures without cattle continued.
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605. **Influence of thorns and tannins on white-tailed deer browsing after mowing.**
Schindler, Jason R.; Fulbright, Timothy E.; and Forbes, T. D. A.
Journal of Arid Environments 55(2): 361-377. (2003)
NAL Call #: QH541.5.D4J6; ISSN: 0140-1963
Descriptors: Artiodactyla/ Cervidae/ Odocoileus virginianus/ Acacia/ Celtis/ Prosopis/ browsing/ foods-feeding/ San Patricio County/ Texas/ diets/ land zones/ nutrition/ white-tailed deer/ vegetation/ strategy/ forest damage/ disturbance/ food/ plant secondary metabolites/ experiment/ fence/ honey mesquite
Abstract: We used caged and uncaged plants to compare shoot growth, biomass, spinescence, nutrient, and tannin content of blackbrush acacia (Acacia rigidula Benth.), honey mesquite (Prosopis glandulosa Torr.), and spiny hackberry (Celtis pallida Torr.) 6 and 12 weeks after mowing, and estimated white-tailed deer (Odocoileus virginianus Raf.) use of sprouts of each species stripped of spines and unstripped. Blackbrush acacia grew slowly and had more thorns, protein-precipitating tannins, and fiber than honey mesquite or spiny hackberry. Spiny hackberry,

a shrub adapted to fertile sites, grew slower and was more physically defended than honey mesquite but lower in tannins than blackbrush acacia, and was the most palatable to deer of the three species. Thorn removal did not alter palatability of the three species to deer.
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606. **Influence of topography on density of grassland passerines in pastures.**
Renfrew, R. B. and Ribic, C. A.
American Midland Naturalist 147(2): 315-325. (2002)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: grassland/ habitat management/ passerines/ population density/ topographic effect/ vegetation structure/ United States/ Ammodramus savannarum/ Cistothorus platensis/ Dolichonyx oryzivorus/ Passerculus sandwichensis/ Sturnella magna/ Sturnella neglecta
Abstract: Pastures provide substantial habitat for grassland birds of management concern in the Driftless Area of southwestern Wisconsin. The rolling topography in this region is characterized by lowland valleys surrounded by relatively steep and often wooded slopes which are set apart from more expansive treeless uplands. We hypothesized that there would be lower densities of area sensitive grassland passerines in lowland grasslands compared to upland grasslands because of their preference for larger more open grasslands. To test this hypothesis and assess how well pasture area and vegetation structure predicted grassland passerine density compared to upland/lowland status, we conducted point counts of birds in 60 pastures in May-June 1997 and 1998. Upland pastures generally supported greater densities of grassland passerines than lowland pastures. Densities of Savannah sparrow (Passerculus sandwichensis) and bobolink (Dolichonyx oryzivorus) were significantly higher in upland pastures than in lowland pastures. Grasshopper sparrow (Ammodramus savannarum) density was significantly higher on uplands in one of the study years. The density of eastern meadowlark (Sturnella magna), western meadowlark (S. neglecta) and sedge wren (Cistothorus platensis) did not differ significandy between uplands and lowlands. Grassland passerine density was also predicted by pasture size and vegetation structure. Densities of bobolink and grasshopper sparrow were higher in larger pastures. Bobolink and Savannah sparrow occurred on pastures with greater vegetation height-density and less bare ground; bobolink also preferred shallower litter depths. Lowland pastures supported grassland bird species of management concern and should not be neglected. However, we recommend that pasture management for grassland passerines in areas of variable topography favor relatively large upland pastures that will contain higher densities of species of management concern.
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607. **Influences of livestock grazing on sage grouse habitat.**
Beck, Jeffrey L. and Mitchell, Dean L.
Wildlife Society Bulletin 28(4): 993-1002. (2000)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: habitat/ livestock grazing/ sage grouse/ sagebrush rangelands
Abstract: Livestock grazing has been identified as one factor associated with the widespread decline and degradation of sage grouse (Centrocercus urophasianus) habitat. We identified n = 17 positive and negative impacts of livestock on sage grouse and habitat. Little information is currently available concerning the directs impacts of livestock grazing on sage grouse habitat. Indirect impacts are better understood than direct impacts. Chemical and mechanical treatments intended to provide increased quantities of grass forage for livestock have indirectly reduced the acceptability of sagebrush (Artemisia spp.) rangelands for sage grouse. Our paper examines: 1) potential mechanisms whereby livestock grazing in big sagebrush (A. tridentata) communities can modify sage grouse habitat and 2) the indirect influences of livestock production on sage grouse habitat. Overall, livestock grazing appears to most affect productivity of sage grouse populations. Residual grass cover following grazing is essential to conceal sage grouse nests from predators. Future research needs are identified and management implications related to livestock grazing in sage grouse habitats are included.
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608. **Influences of management regimes on breeding bird densities and habitat in mixed-grass prairie: An example from North Dakota.**
Lueders, Andrea S.; Kennedy, Patricia L.; and Johnson, Douglas H.
Journal of Wildlife Management 70(2): 600-606. (2006)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: commercial activities/ ecology/ population dynamics/ terrestrial habitat/ land zones/ Aves: farming and agriculture/ grazing management regimes/ habitat structure/ prairie/ population density/ breeding populations/ grassland/ mixed grass prairie/ North Dakota/ birds/ chordates/ vertebrates
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609. **Initial effects of prescribed fire on morphology, abundance, and phenology of forbs in big sagebrush communities in southeastern Oregon.**
Wrobleski, D. W. and Kauffman, J. B.
Restoration Ecology 11(1): 82-90. (2003)
NAL Call #: QH541.15.R45R515; ISSN: 10612971
Descriptors: Antennaria dimorpha/ Astragalus malachus/ Astragalus purshii/ Centrocercus urophasianus/ Crepis modocensis/ fire-enhanced flowering/ Hart mountain National Antelope Refuge/ Lomatium canbyi/ Lomatium nevadense/ Lomatium watsonii/ morphology/ Phenology/ Phlox gracilis/ Phlox longifolia/ prescribed fire/ restoration/ sage grouse/ sagebrush/ abundance/ herb/ morphology/ phenology/ prescribed burning/ restoration ecology/ shrubland/ United States/ Antennaria dimorpha/ Artemisia tridentata/ Astragalus malachus/ Centrocercus urophasianus/ Crepis modocensis/ Lomatium nevadense/ Phlox gracilis/ Phlox longifolia
Abstract: Historic fire return intervals in Artemesia tridentata (big sagebrush) ecosystems have been altered by livestock grazing, fire suppression, and other land management techniques resulting in ecological changes in these areas. Increases in abundance of woody vegetation may be causing declines in native herbaceous understory species. We examined the effects of prescribed fire on the morphology, abundance, and phenology of nine abundant forb (herbaceous dicot) species used selectively by Centrocercus urophasianus (Sage Grouse). In September 1997 prescribed fire was applied to four of eight randomly

assigned 400-ha A.t. wyomingensis (Wyoming big sagebrush) study plots at Hart Mountain National Antelope Refuge, Oregon. Livestock had not grazed experimental plots since 1991. Burning caused morphological changes such as significantly greater numbers of racemes and flowers per raceme in Astragalus malachus (shaggy milkvetch-Legumoideae) (9 in burn vs. 6 in control; 23 in burn vs. 21 in control, respectively). Also, prescribed burning caused greater numbers of flowers in Phlox gracilis (microsteris Polemoniaceae) (57 vs. 13), greater numbers of umbels and umbelletts in Lomatium nevadense (Nevada desert parsley-Umbellifereae) (4 vs. 2 and 59 vs. 31, respectively), greater numbers of flower heads in Crepis modocensis (Modoc hawksbeard-Compositae) (32 vs. 21), and greater number of flowers/cm3 in Phlox longifolia (longleaf phlox-Polemoniaceae) (0.11 vs. 0.06). Crown volume of Crepis modocensis (7,085 vs. 4,179 cm3) and Astragalus malachus (2,854 vs. 1,761 cm3) plants was greater in burned plots than control plots. However, burning resulted in a smaller crown area of Antennaria dimorpha (low pussytoes-Compositae) (20 vs. 37 cm^2). Phenology and time of flowering were also affected by fire. The period of active growth for each species was extended later into the summer in burned plots ($p < 0.01$). In addition, Crepis modocensis and Lomatium nevadense flowered 12 to 14 days earlier in burned plots. Fire had no effect on frequency, density, and relative abundance of seven of the nine studied species. Fire reduced the frequency and relative abundance of A. dimorpha and Phlox longifolia and reduced the density of A. dimorpha.
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610. **Initial results of experimental studies of prairie dogs in arid grasslands: Implications for landscape conservation and the importance of scale.**
Curtin, Charles
Grasslands Ecosystems, Endangered Species, and Sustainable Ranching in the Mexico-U.S. Borderlands: Conference Proceedings RMRS-P 40: 57-61. (2006).
Notes: U.S. Forest Service Rocky Mountain Research Station Proceedings (RMRS-P) no. 40.
http://www.fs.fed.us/rm/pubs/rmrs_p040.pdf
Descriptors: conservation/ ecology/ terrestrial habitat/ land zones/ Cynomys ludovicanus: conservation/ habitat management/ land management/ arid grasslands/ New Mexico/ Mammalia, Rodentia, Sciuridae/ chordates/ mammals/ rodents/ vertebrates
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611. **Insect diversity in two burned and grazed grasslands.**
Fay, Philip A.
Environmental Entomology 32(5): 1099-1104. (2003)
NAL Call #: QL461.E532; ISSN: 0046-225X
Descriptors: Sorensen's similarity index: mathematical and computer techniques/ sweep sampling: applied and field techniques/ burning/ grazing/ species diversity/ species richness/ tallgrass prairie
Abstract: This study examined insect diversity in two native grassland ecosystems undergoing burning and grazing by bison and cattle, the Niobrara Valley Preserve (Nebraska) and the Tallgrass Prairie Preserve (Oklahoma). Sweep-sampling for insects was conducted during July 1994 and 1995 along transects in management units that were grazed by bison and partially burned, grazed by cattle and either burned (Tallgrass) or unburned (Niobrara), or ungrazed and unburned. At both sites, species richness (S) and diversity (log series alpha) were higher and similarity (Sorensen's index) lower for bison than for cattle or ungrazed management units. High bison management unit diversity was associated with significantly higher S and alpha in burned (Tallgrass) and unburned (Niobrara) portions of bison units compared with their respective cattle units, suggesting that habitat heterogeneity in terms of plant productivity, composition, and structure were higher in bison versus cattle and ungrazed management units. Replicated factorial experiments and sampling of additional taxa and time points are needed to verify how fire and grazing management impacts insect diversity in these grasslands.
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612. **Integrating economic costs into the analysis of flexible conservation management strategies.**
Drechsler, M.; Johst, K.; Watzold, F.; and Westphal, M. I.
Ecological Applications 16(5): 1959-1966. (Oct. 2006)
NAL Call #: QH540.E23
Descriptors: wildlife management/ economic analysis/ cost analysis/ stochastic processes/ dynamic programming/ endangered species/ Lycaenidae/ habitats/ grasslands/ mowing/ ecological economic model/ stochastic dynamic programming/ flexible conservation management/ Maculinea teleius/ natural resources, environment, general ecology, and wildlife conservation/ animal ecology and behavior/ entomology related
This citation is from AGRICOLA.

613. **Interacting effects of landownership, land use, and endangered species on conservation of southwestern U.S. rangelands.**
Sayre, N. F.
Conservation Biology 19(3): 783-792. (2005)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1111/j.1523-1739.2005.00192.x.
Descriptors: collaborative management/ Endangered Species Act/ fire/ livestock grazing/ riparian areas/ threatened species/ conservation management/ grazing/ habitat conservation/ land tenure/ land use/ prescribed burning/ rangeland/ Arizona/ New Mexico/ Riparia
Abstract: The contemporary southwestern United States is characterized by fire-adapted ecosystems; large numbers of federally listed threatened and endangered species; a patchwork of federal, state, and private landownership; and a long history of livestock grazing as the predominant land use. I compared eight sites in southern Arizona and New Mexico to assess the interacting effects of these characteristics on conservation practices and outcomes. There was widespread interest and private-sector leadership in restoring fire to southwestern rangelands, and there is a shortage of predictive scientific knowledge about the effects of fire and livestock grazing on threatened and endangered species. It was easier to restore fire to lands that were either privately owned or not grazed, in part because of obstacles created by threatened and endangered species on grazed public lands. Collaborative management facilitated conservation practices and

outcomes and periodic removal of livestock may be necessary for conservation, but permanent livestock exclusion may be counterproductive because of interactions with land-use and landownership patterns.
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614. **Invertebrate availability for upland game birds in tall fescue and native warm-season grass fields.**
Fettinger, Jennifer L.; Harper, Craig A.; and Dixon, Charles E.
Tennessee Academy of Science. Journal 77(4): 83-87. (2002); ISSN: 0040-313X
Descriptors: Galliformes/ wildlife-invertebrate relationships/ upland habitat/ invertebrates/ habitat management/ grasslands/ foods-feeding/ food supply/ ecosystems/ broods/ brooding/ birds/ behavior/ Tennessee
Abstract: This study is about the availability of invertebrates for upland game birds in tall fescue and native warm-season grass fields across Tennessee, U.S.A. Native warm-season grasses are recommended for converting fields from non-native perennial grasses to enhance the structure of wildlife habitat. Big bluestem, little bluestem, broomsedge bluestem, Indian grass, and switchgrass are some warm-season bunchgrasses native to Tennessee. These grasses with associated forbs are used to restore wildlife habitat. The diet of young upland game birds mainly consists of invertebrates, which provide protein and calcium essential for chick development. Populations of gallinaceous birds are affected by changes in invertebrate availability, arising from changes in vegetation. Invertebrate samples were collected from ten fields of tall fescue and ten fields of native warm-season grass located across Tennessee. There was no difference in overall invertebrate density in the fields of tall fescue and native warm-season grass fields. Density and biomass of Hemiptera was greater in tall fescue fields, while density of Orthoptera was higher in native grass fields. This study suggests that other parameters such as vegetation structure and presence of forbs, have a greater influence on the use of fields by young gallinaceous birds.
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615. **Invertebrate biomass: Associations with lesser prairie-chicken habitat use and sand sagebrush density in southwestern Kansas.**
Jamison, B. E.; Robel, R. J.; Pontius, J. S.; and Applegate, R. D.
Wildlife Society Bulletin 30(2): 517-526. (2002)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Artemisia filifolia/ invertebrate biomass/ Kansas/ lesser prairie-chicken/ sand sagebrush/ Tympanuchus pallidicinctus/ biomass/ food availability/ gamebird/ habitat management/ habitat use/ invertebrate/ prairie/ predator-prey interaction/ wildlife management/ United States/ Artemisia filifolia/ Tympanuchus pallidicinctus
Abstract: Invertebrates are important food sources for lesser prairie-chicken (Tympanuchus pallidicinctus) adults and broods. We compared invertebrate biomass in areas used and not used by lesser prairie-chicken adults and broods. We used radiotelemetry to determine use and non-use areas in sand sagebrush (Artemisia filifolia) prairie in southwestern Kansas and sampled invertebrate populations during summer 1998 and 1999. Sweepnet-collected biomass of short-horned grasshoppers (Acrididae) and total invertebrate biomass generally were greater in habitats used by lesser prairie-chickens than in paired non-use areas. We detected no differences in pitfall-collected biomass of Acrididae (P=0.81) or total invertebrate biomass (P=0.93) among sampling areas with sand sagebrush canopy cover of 0 to 10%, 11 to 30%, and >30%. Results of multivariate analysis and regression model selection suggested that forbs were more strongly associated with invertebrate biomass than shrubs, grasses, or bare ground. We could not separate lesser prairie-chicken selection for areas of forb cover from selection of areas with greater invertebrate biomass associated with forb cover. Regardless of whether the effects of forbs were direct or indirect, their importance in sand sagebrush habitat has management implications. Practices that maintain or increase forb cover likely will increase invertebrate biomass and habitat quality in southwestern Kansas.
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616. **Invertebrate conservation and agricultural ecosystems.**
New, T. R.
New York: Cambridge Univ Press. (2005); ISBN: 0521825032.
Descriptors: ecology: environmental sciences/ agriculture/ wildlife management: conservation/ biological control/ applied and field techniques/ pest management/ applied and field techniques/ pasture management/ applied and field techniques/ agricultural ecosystem/ biodiversity/ landscape ecology/ field margin/ invertebrate diversity/ invertebrate conservation/ agricultural disturbance/ cropping area extension
Abstract: This 368-page book, entitled "Invertebrate Conservation and Agricultural Ecosystems", is part of the series "Ecology, Biodiversity and Conservation", and this volume provides an introduction to invertebrate conservation biology for agriculturalists and to crop protection for conservation biologists, demonstrating how these two disparate fields may draw on each other for greater collective benefit. This volume makes use of recent literature to show how invertebrate conservation in highly altered landscapes may be promoted and enhanced. The book deals with problems of, and approaches to invertebrate conservation in highly managed agricultural ecosystems, and examines how biodiversity may be promoted without compromising agricultural production. This volume is structured into 10 chapters. The first chapter provides an introduction, and the second chapter discusses the place of invertebrates in agriculture and biodiversity. Chapters 3 and 4 respectively discuss the effects of agriculture on invertebrate diversity and conservation, and agricultural disturbance in terms of diversity and effects on invertebrates. Other chapter topics include: biological control and invertebrate conservation; cultural aspects of pest management; extension beyond cropping areas; field margins and landscape ecology; pasture management and conservation; and towards a more holistic management for invertebrates. The text is written in English. Each chapter is divided into specific sections within the chapter scope. The final chapter is followed by a list of references and an index. The book is illustrated with 68 line drawings and 54 tables. This book was written for pest managers, agriculturalists, ecologists and conservationists.
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617. **Land use and vegetation associated with greater prairie-chicken leks in an agricultural landscape.**
Niemuth, N. D.
Journal of Wildlife Management 64(1): 278-286. (2000)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: agriculture/ GIS/ grassland birds/ grazing/ greater prairie-chicken/ habitat selection/ land use/ landscape/ lek/ scale/ Wisconsin/ agricultural development/ gamebird/ habitat loss/ land use/ population decline/ United States/ Tympanuchus cupido
Abstract: Greater prairie-chickens (Tympanuchus cupido pinnatus) have declined dramatically across their range because of habitat loss, primarily agricultural development. In Wisconsin, most prairie-chicken populations are found in grassland reserves managed primarily for prairie-chickens. However a few remnant populations persist in an agricultural landscape with little or no management for prairie-chickens. I compared land use within 2.4 km of 29 prairie-chicken leks and 25 random points in an agricultural landscape to determine habitat associated with presence of prairie-chickens in central Wisconsin. Areas around leks had higher proportions of grasslands, wetlands, and shrubs than around random points, and lower proportions of forests, row crops, and hay fields. Differences between leks and random points varied with scale of sampling. Leks were unevenly distributed in the landscape, with mean distance to nearest lek shorter for leks than random points (P < 0.001). Leks were positively correlated with proportion of grass, shrub, and pasture, and negatively correlated with distance to nearest lek. Number of displaying males was negatively correlated with proportion of row crops and positively correlated with proportion of grassland in the landscape. Correlates of number of males also varied with scale of sampling.
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618. **Landscape composition, patch size, and distance to edges: Interactions affecting duck reproductive success.**
Horn, D. J.; Phillips, M. L.; Koford, R. R.; Clark, W. R.; Sovada, M. A.; and Greenwood, R. J.
Ecological Applications 15(4): 1367-1376. (2005)
NAL Call #: QH540.E23; ISSN: 10510761
Descriptors: ducks/ edge effects/ field size/ habitat fragmentation/ landscape composition/ nest success/ North Dakota/ patch size/ Prairie Pothole Region/ edge effect/ landscape structure/ patch size/ reproductive success/ waterfowl/ Anas/ Aves
Abstract: Prairies and other North American grasslands, although highly fragmented, provide breeding habitat for a diverse array of species, including species of tremendous economic and ecological importance. Conservation and management of these species requires some understanding of how reproductive success is affected by edge effects, patch size, and characteristics of the landscape. We examined how differences in the percentage Of grassland in the landscape influenced the relationships between the success of nests of upland-nesting ducks and (1) field size and (2) distance to nearest field and wetland edges. We collected data on study areas composed of 15-20% grassland and areas composed of 45-55% grassland in central North Dakota, USA during the 1996 and 1997 nesting seasons. Daily survival rates (DSRs) of duck nests were greater in study areas with 45-55% grassland than with 15-20% grassland. Within study areas, we detected a curvilinear relationship between DSR and field size: DSRs were highest in small and large fields and lowest in moderately sized fields. In study areas with 15-20% grassland, there was no relationship between probability of hatching and distance to nearest field edge, whereas in study areas with 45-55% grassland, there was a positive relationship between these two variables. Results of this study support the conclusion that both landscape composition and configuration affect reproductive success of ground-nesting birds. We are prompted to question conservation strategies that favor clustering moderately sized patches of nesting habitat within agricultural landscapes because our results show that such patches would have low nest success, most likely caused by predation. Understanding the pattern of nest success, and the predator-prey mechanisms that produce the pattern, will enable design of patch configurations that are most conducive to meeting conservation goals. © 2005 by the Ecological Society of America.
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619. **Landscape fragmentation and grassland patch size effects on non-game grassland birds in xeric mixed-grass prairies of western South Dakota.**
DeJong, J. R. 2001.
Notes: Project Number: SD W-107-R/Study No. 1011; Wildlife Coop. Unit Report - Thesis
Descriptors: animals, non-game/ birds/ cultivated farmland/ grassland/ habitat changes/ habitat management for wildlife/ nests and nesting/ prairie/ predation/ sampling/ surveys/ vegetation/ wildlife-habitat relationships/ South Dakota, western region
Abstract: Purpose was to inventory non-game birds on xeric mixed-grass prairies of various sizes in fragmented and non-fragmented landscapes of western South Dakota to determine what effects landscape fragmentation and grassland patch size have on avian communities.
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620. **Landscape requirements of prairie sharp-tailed grouse Tympanuchus phasianellus Campestris in Minnesota, USA.**
Hanowski, J. M; Christian, D. P; and Niemi, G. J
Wildlife Biology 6(4): 257-263. (2000)
NAL Call #: SK351.W663; ISSN: 0909-6396
Descriptors: animal behavior/ natural grasslands/ prairies/ grasslands/ forests/ mountain forests/ wetlands/ mathematical models/ nature conservation/ wild birds/ birds
Abstract: The prairie sharp-tailed grouse Tympanuchus phasianellus campestris occurs throughout the north central region of North America. It is of management concern because it has decreased in the southeast portion of its range over the past three decades, including marked declines in Minnesota and the Great Lakes region, USA. Although there is general knowledge about the habitat requirements for this species, no quantitative lek site or landscape information has been documented. We quantified landscape composition around active and inactive sharp-tailed grouse lek sites and random points in brush landscapes in northeast Minnesota at multiple scales (200-3,000 m radii circles). Our objective was to compare landscape composition among these sites. We also developed a model to predict the probability of grouse lek site occurrence in the study area. Landscape composition around active and inactive lek sites differed from each other

primarily at the 500 m and 1,000 m radii scales. Inactive sites had higher proportions of upland forest and brush cover types and active sites had a higher percentage of native grass than inactive sites. No differences were found in landscape composition between site types at the 200 m radius scale and only one landscape variable (number of cover types) was different at the 3,000 m radius scale. We found non-random distributions of this grouse species at four different scales. Random brush land sites differed from both active and inactive sites having higher percentages of forest and brush cover. In contrast, lek sites had more bare ground, emergent aquatic vegetation, bog brush and roads than the random points. A regression model for the grouse at the 3,000 m scale was used to predict the probability of grouse occurrence in the landscape. The model resulted in a spatial map with about 8% of the area having a probability of grouse occurrence of >80%. This information can be used to locate new lek sites and to guide management activities for this species.
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621. **Landscape vs. local habitat scale influences to insect communities from tallgrass prairie remnants.**
Stoner, K. J. L. and Joern, A.
Ecological Applications 14(5): 1306-1320. (2004)
NAL Call #: QH540.E23 ; ISSN: 10510761
Descriptors: arthropod conservation/ Coccinellidae/ Curculionidae/ fragmentation/ Insect communities/ landscapes/ Lepidoptera/ LISREL algorithm/ Orthoptera/ structural equation modeling/ tallgrass prairie/ community composition/ conservation management/ guild structure/ habitat fragmentation/ insect/ landscape ecology/ prairie/ scale effect/ North America/ Arthropoda/ Coccinellidae/ Coleoptera/ Curculionidae/ Hexapoda/ Insecta/ Lepidoptera/ Orthoptera/ Ungulata
Abstract: Habitat loss and fragmentation currently threaten ecosystems worldwide, yet remain difficult to quantify because within-fragment habitat and landscape-scale influences often, interact in unique ways. Although individual species respond to fragmentation differently, large-scale conservation planning must unavoidably target multiple species. Although information on a population's response to fragmentation is critical, and measurements of species richness provide useful insights, exclusive reliance on these responses may mask important information about the taxonomic composition of assemblages in response to fragmentation. The North American tallgrass prairie ecosystem is one of the most threatened and fragmented ecosystems in the world, and insects are significant contributors to its biodiversity. In remaining grassland fragments, we evaluated within-fragment influences in conjunction with landscape-scale responses of representative insect communities from four feeding guilds: generalists, specialists, multiple life stage habitat use, and predators. Fragment-specific attributes capable of influencing insect diversity include plant species composition, plant biomass, abundance of blooming flowers, and vertical habitat heterogeneity created by the vegetation. Landscape-scale factors expected to influence patterns of insect species diversity include fragment size and shape as well as the spatial configuration of fragments. Ordination techniques were used to summarize composition of each feeding guild assemblage of each fragment, and structural equation modeling was used to examine the direct and indirect effects of fragmentation with influences from local habitats. Generalists (Orthoptera), mixed-modality feeding that changes with life stage (Lepidoptera), and specialist herbivores (Curculionidae) all responded directly to within-site characterizations of the plant community. Site management from large ungulate grazing or mowing for hay production consistently had an indirect effect on the insect community through influences on plant community composition. The predator assemblage (Coccinellidae) was influenced directly by fragment shape. To maintain insect biodiversity in tallgrass prairie fragments, these results indicate that conservation practices should focus on communities in order to maintain insect biodiversity in tallgrass prairie fragments. Landscape-scale factors must also be considered when making conservation decisions, primarily because predators (top trophic level organisms) are more likely to respond to regional changes.
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622. **Lark sparrow (Chondestes grammacus) nest-site selection and success in a mixed-grass prairie.**
Lusk, J. J.; Wells, K. S.; Guthery, F. S.; and Fuhlendorf, S. D.
Auk 120(1): 120-129. (2003)
NAL Call #: 413.8 AU4 ; ISSN: 00048038
Descriptors: ecological modeling/ habitat structure/ nest site/ nesting success/ prairie/ site selection/ United States/ Chondestes grammacus
Abstract: Lark Sparrows (Chondestes grammacus) are declining throughout most of their range. Effective management for this species is hampered because relatively little is known about nesting ecology. We studied habitat characteristics affecting Lark Sparrow nest-site selection and nest success at nine study pastures in a southern mixed-grass prairie in Oklahoma. We used a neural-network technique to discriminate between nest and random locations, and bootstrapping with 95% confidence intervals to compare habitat features of successful and unsuccessful nests. We quantified habitat features at the nest and random points during the breeding seasons of 1999 and 2000 among three grazing treatments (control, moderate, and heavy). We located 40 nests during two years of the study, for which crude nest-success was 26.3%. Most nests were located in either moderately grazed pasture (55%) or heavily grazed pasture (40%). The neural model correctly identified nest and random points 91% of the time. Percentage of structural cover, distance to nearest structural element, bare-ground exposure, and percentage of litter cover were the most important nest-site selection criteria according to the model. Simulation analysis indicated points were classified as nest sites if they were <270 cm from structural elements, <87% bare-ground exposure, <74% litter cover, and >9% structural cover. Successful nests had less bare-ground exposure ($\bar{x}$ = 6.2 ± 1.9% [SE]) and more litter cover ($\bar{x}$ = 18.0 ± 4.6%) compared to unsuccessful nests ($\bar{x}$ = 17.5 ± 3.8% and 10.1 ± 1.6%, respectively). These results suggest that habitat management for Lark Sparrows in mixed-grass prairie should focus on creating abundant structural cover with moderate levels of litter accumulation and bare ground.
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623. **Leaf miner assemblies effects of plant succession and grazing management.**
Sterling, P. H.; Gibson, C. W. D.; and Brown, V. K.
Ecological Entomology 17(2): 167-178. (1992)
NAL Call #: QL461.E4; ISSN: 0307-6946
Descriptors: insect/ secondary succession/ calcareous grassland
Abstract: 1. Changes in leaf-miner assemblies during 4 years of secondary succession, under different controlled sheep-grazing treatments, are described and compared to the miner fauna of older grazed grassland nearby. 2. Multivariate analyses were used in conjunction with examination of individual common species to assess the independent effects of time, grazing treatment, plant species composition and architecture on the leaf-miner assemblies. 3. Leaf-miner species composition was strongly related to plant species composition, but was modified by plant structure under different grazing treatments. There was a strong successional trend in miner assemblies, even when the effects of changes in plant composition had been taken into account. Conversely, local variation in miner species composition generally reflected foodplant distribution alone. 4. Grazed treatments had fewer mines than controls, but there were also species specializing in grazed areas, despite the abundance of their foodplants elsewhere. There was a weak indication that miner species in grazed treatments were more likely to fluctuate in abundance than those in controls. 5. The results are discussed in relation to the assembly of grassland insect communities during succession, and the use of 'indicator groups' in management for nature conservation.
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624. **The legacy of bobwhite research in south Texas.**
Hernandez, F.; Guthery, F. S.; and Kuvlesky, W. P.
Journal of Wildlife Management 66(1): 1-18. (2002)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: boom-bust population dynamics/ Colinus virginianus/ grazing/ heat stress/ northern bobwhite/ phosphorus deficiency/ population dynamics/ Texas/ Vitamin A/ water deprivation/ autecology/ gamebird/ habitat management/ population dynamics/ semiarid region/ wildlife management/ United States/ Colinus virginianus
Abstract: More than a half century of research on northern bobwhites (Colinus virginianus) in south Texas has provided a legacy of information for ecologists and managers. South Texas is a semiarid and subtropical environment with highly variable weather, a land base consisting of large private ranches devoted to livestock production, a perennial problem of brush encroachment on rangelands, and a strong tradition of fee-lease hunting. These physical, biotic, and social conditions focused research efforts on descriptive natural history (ca. 1930-1980) and evaluation of grazing and brush management practices (ca. 1980-1990). By natural evolution of knowledge, these efforts led to the development of unified theory that synthesized descriptive anti applied information about bobwhite management (ca. 1990-2000). In the context of grazing on rangeland subject to encroachment by woody plants, descriptive studies focused on bobwhite home ranges, mobility, flight behavior, nesting cover, resting cover, and whistling posts, among other aspects of habitat use and behavior. The purpose of these studies was to determine how different plant structures and communities should be dispersed in space and time to maximize their value as bobwhite habitat. South Texas studies revealed that the dogmatic principle, "bobwhites are early successional species," holds poorly in semiarid, subtropical environments. Research in south Texas led to formalization of the usable-space-in-time hypothesis on bobwhite density. The hypothesis states that, within ordinary limits, mean abundance of bobwhites on an area is correlated more strongly with the quantity of permanent cover to which they are adapted and less strongly with (human) perceptions of habitat quality (foods, interspersion, edge, diversity). Space-time seems to be an omnibus variable that can be assessed in a variety of management and ecological settings. In association with highly variable rainfall patterns anti amounts in south Texas, bobwhite populations exhibit boom-bust population behavior. Research on the cause-effect process governing booms anti busts has led to rejection of hypotheses on phosphorus, calcium, phytoestrogens, vitamin A, macronutrition, water, and stress-related hormones as causally involved in the phenomenon. Heat-mediated variation in productivity remains a viable hypothesis that is, of course, open to challenge. The information legacy from research on bobwhites in south Texas has led to revision of knowledge emanating from the southeastern United States; the revised knowledge better fits bobwhites and other quails that inhabit semiarid environments.
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625. **Lesser prairie-chicken brood habitat in sand sagebrush: Invertebrate biomass and vegetation.**
Hagen, C. A.; Salter, G. C.; Pitman, J. C.; Robel, R. J.; and Applegate, R. D.
Wildlife Society Bulletin 33(3): 1080-1091. (2005)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2005)33 [1080:LPBHIS]2.0.CO;2.
Descriptors: Acrididae/ Artemisia filifolia/ habitat use/ invertebrate biomass/ Kansas/ lesser prairie-chicken/ sand sagebrush/ Tympanuchus pallidicinctus/ food availability/ gamebird/ habitat management/ habitat use/ Invertebrata/ Phasianidae
Abstract: Invertebrates are an important food source for grouse chicks, especially within the first 2 weeks of life. Invertebrate abundance is highly patchy and dependent upon herbaceous cover and vegetation structure. We examined the relationship between invertebrate biomass (from sweepnet samples) and habitat structure at lesser prairie-chicken (Tympanuchus pallidicinctus) brood-use and non-use areas during 2001 and 2002 in a sand sagebrush (Artemisia filifolia) prairie vegetation community of southwestern Kansas. We delineated use and non-use areas from paired sampling points within and outside 95% utilization distributions of radiomarked brood females, respectively, during the first 60 days post-hatch. We measured vegetation cover and invertebrate biomass (Acrididae and "other" invertebrates) at 71 paired points on 2 study sites (Site I=4 broods, Site II= 12 broods). Both Acrididae and other invertebrate biomasses were greater at brood areas than non-use areas on both study sites, suggesting this food source likely had a greater influence on brood habitat use than vegetation type. Vegetation structure described brood-use areas better than vegetation type because brood-use areas had greater visual obstruction readings (VORs) than non-use areas regardless of dominant cover type. We also examined the predictive

relationship between vegetation type and invertebrate biomass. Sand sagebrush density was the best linear predictor of Acrididae biomass, with lower densities having the greatest Acrididae biomass. We propose experiments to determine best management practices that produce abundant invertebrate biomasses for lesser prairie-chicken brood habitat, using our study as a baseline.
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626. **Linking landscape management with the conservation of grassland birds in Wisconsin.**
Sample, David W.; Ribic, Christine A.; and Renfrew, Rosalind B.
In: Landscape Ecology and Resource Management./ Bissonette, J. A. and Storch, I.
Washington, DC: Island Press, 2003.
Notes: Literature review; 1559639733 (ISBN).
Descriptors: conservation measures/ terrestrial habitat/ land zones/ Aves: habitat management/ grassland habitats/ Grassland/ Wisconsin/ Grassland habitat management/ Aves/ birds/ chordates/ vertebrates
© Thomson Reuters Scientific

627. **Linking occurrence and fitness to persistence: Habitat-based approach for endangered greater sage-grouse.**
Aldridge, C. L. and Boyce, M. S.
Ecological Applications 17(2): 508-526. (2007)
NAL Call #: QH540.E23 ; ISSN: 10510761
Descriptors: Alberta, Canada/ Centrocercus urophasianus/ Cox proportional hazard/ fitness/ greater sage-grouse/ habitat/ logistic regression/ occurrence/ persistence/ population viability/ sagebrush
Abstract: Detailed empirical models predicting both species occurrence and fitness across a landscape are necessary to understand processes related to population persistence. Failure to consider both occurrence and fitness may result in incorrect assessments of habitat importance leading to inappropriate management strategies. We took a two-stage approach to identifying critical nesting and brood-rearing habitat for the endangered Greater Sage-Grouse (Centrocercus urophasianus) in Alberta at a landscape scale. First, we used logistic regression to develop spatial models predicting the relative probability of use (occurrence) for Sage-Grouse nests and broods. Secondly, we used Cox proportional hazards survival models to identify the most risky habitats across the landscape. We combined these two approaches to identify Sage-Grouse habitats that pose minimal risk of failure (source habitats) and attractive sink habitats that pose increased risk (ecological traps). Our models showed that Sage-Grouse select for heterogeneous patches of moderate sagebrush cover (quadratic relationship) and avoid anthropogenic edge habitat for nesting. Nests were more successful in heterogeneous habitats, but nest success was independent of anthropogenic features. Similarly, broods selected heterogeneous high-productivity habitats with sagebrush while avoiding human developments, cultivated cropland, and high densities of oil wells. Chick mortalities tended to occur in proximity to oil and gas developments and along riparian habitats. For nests and broods, respectively, approximately 10% and 5% of the study area was considered source habitat, whereas 19% and 15% of habitat was attractive sink habitat. Limited source habitats appear to be the main reason for poor nest success (39%) and low chick survival (12%). Our habitat models identify areas of protection priority and areas that require immediate management attention to enhance recruitment to secure the viability of this population. This novel approach to habitat-based population viability modeling has merit for many species of concern. © 2007 by the Ecological Society of America.
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628. **A literature review of insect responses to fire, compared to other conservation managements of open habitat.**
Swengel, Ann B.
Biodiversity and Conservation 10(7): 1141-1169. (2001)
NAL Call #: QH75.A1B562; ISSN: 0960-3115
Descriptors: haying: management method/ mowing: management method/ conservation management/ ecological adaptations/ grasslands/ grazing intensity/ insect responses/ niche diversity/ open habitats: burning/ recolonization/ savannas/ vegetational composition/ vegetational structure/ wildfires
Abstract: This literature review concerns insect responses to fire, compared to other feasible and appropriate conservation managements of open habitats. Many insect groups decline markedly immediately after fire, with the magnitude of reduction related to the degree of exposure to the flames and mobility of the insect. Niche diversity is lower in recently burned habitat, and the rate of insect increase following fire also relates to the species' ability to gain access to the regrowing vegetation. Postburn flora can be quite attractive to some recolonizing insects, possibly to some degree a result of fire-caused insect mortality which provides plants with short-term release from insect herbivory. Insect declines may follow immediately after mowing, but usually of lesser degree and shorter duration than after a fire of comparable timing and size. Season and scale of cutting may affect how much and which species showed positive or negative responses. Cut areas offer the vegetational structure and composition preferred by some insects, but cutting-or cutting at certain scales, seasons, or frequencies-may also be unfavorable for some species. Heavy grazing results in niche and assemblage simplification. Nonetheless, some invertebrates prefer the short turfs and bare ground resulting from heavier grazing. Other species vary in whether they peak in abundance and diversity in intermediate, light, or no grazing. In comparisons of mowing/haying and grazing regimes of similar compatibility with maintenance of the same habitat types, responses of particular species and species groups varied as to whether they had a preference for one or the other. Characteristics associated with insect responses to fire related to the degree of exposure to lethal temperature and stress experienced in the post-fire environment, suitability of post-treatment vegetation as habitat, and ability to rebuild numbers in the site (from survivors and/or colonizers). These factors appear equally useful for explicating insect responses to other managements such as haying, mowing, and grazing. By contrast, the assumption that the most habitat-restricted species will be most adapted to ecological forces believed to be prevalent in that ecosystem appears less efficacious for predicting insect management preferences.
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629. **Live fences and landscape connectivity in a neotropical agricultural landscape.**
Leon, M. C. and Harvey, C. A.
Agroforestry Systems 68(1): 15-26. (2006)
NAL Call #: SD387.M8A3; ISSN: 01674366.
Notes: doi: 10.1007/s10457-005-5831-5.
Descriptors: agroecosystems/ cattle production systems/ Costa Rica/ fragmented landscapes/ landscape structure/ linear elements
Abstract: Live fences are common elements in neotropical agricultural landscapes and could play important roles in the conservation of biodiversity by enhancing landscape connectivity, however, little is known about their abundance and spatial arrangement. The objectives of this study were to characterize the abundance and spatial patterns of live fences in a fragmented landscape dominated by pastures in Río Frío, Costa Rica, to determine their contribution to landscape structure and connectivity and to examine their role as tools for landscape conservation planning. Live fences accounted for 45.4% of all fences in the landscape and occurred with a mean density of 50.5 linear meters per hectare. Although live fences covered only a small total area of the landscape (<2%), they had an important effect on landscape structure and connectivity, increasing total tree cover, dividing pastures into smaller areas, creating rectilinear networks that cross the landscape and providing direct physical connections to forest patches. Simulations showed that the conversion of all existing wooden fences to live fences would greatly enhance landscape connectivity by more than doubling the area, density and number of direct connections to forest habitats, and reducing the average distance between tree canopies. Our study demonstrates that live fences play key roles in defining the structure and composition of neotropical agricultural landscapes and merit consideration in both conservation efforts and agricultural policies designed to enhance landscape connectivity and promote biodiversity conservation. © Springer 2006.
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630. **Livestock as manipulators of mule deer winter habitats in northern Utah.**
Urness, P. J.
In: Can livestock be used as a tool to enhance wildlife habitat?, General Technical Report-RM 194/ Severson, Kieth E., ed.; Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1990. pp. 25-40.
Notes: 43rd Annual Meeting of the Society for Range Management, Reno, Nev., February 13, 1990.
NAL Call #: aSD11.A42 no. 194
Descriptors: commercial activities/ conservation measures/ nutrition/ diet/ terrestrial habitat/ land and freshwater zones/ Odocoileus hemionus (Cervidae): farming and agriculture/ livestock grazing/ conservation aspects/ habitat management/ food plants/ important species changes/ conservation role of livestock grazing/ grassland/ heathland/ Utah/ north/ winter habitat manipulation by livestock grazing/ Cervidae/ Artiodactyla/ Mammalia/ chordates/ mammals/ vertebrates
© Thomson Reuters Scientific

631. **Livestock as tools for managing big game winter range in the intermountain West.**
Urness, P. J.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 20-31; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: livestock/ wildlife/ game animals/ grazing/ rangelands

632. **Livestock exclusion: Consequences on nocturnal rodents in Baja California Sur.**
Ortega Rubio, Alfedo; Romero Schmidt, Heidi; Arguelles Mendez, Cerafina; Coria Benet, Rocio; and Solis Marin, Francisco
Revista de Biologia Tropical 41(3B): 907-909. (1994)
NAL Call #: 442.8 R328; ISSN: 0034-7744
Descriptors: commercial activities/ biometrics/ ecology/ population dynamics/ land and freshwater zones/ Perognathus spinatus (Heteromyidae)/ Neotoma lepida/ Peromyscus eva (Muridae): farming and agriculture/ livestock grazing exclusion/ size and weight relationships/ population density/ Mexico/ Baja California Sur/ La Sierra de la Laguna/ livestock grazing exclusion effects/ Heteromyidae/ Rodentia/ Mammalia/ chordates/ mammals/ vertebrates
© Thomson Reuters Scientific

633. **Livestock grazing: A tool to improve wildlife habitat.**
Severson, Kieth E. and Urness, Philip J.
In: Ecological implications of livestock herbivory in the West/ Vavra, Martin; Laycock, William A.; and Pieper, Rex D.
Denver, Colo.: Society for Range Management, 1994; pp. 232-249.
Notes: Literature review.
NAL Call #: SF85.35.A17E28 1994
Descriptors: commercial activities/ conservation measures/ land and freshwater zones/ comprehensive zoology: farming and agriculture/ habitat management/ United States, western region/ livestock grazing/ wildlife habitat
© Thomson Reuters Scientific

634. **Livestock grazing and wildlife: Developing compatibilities.**
Vavra, M.
Rangeland Ecology and Management 58(2): 128-134. (2005)
NAL Call #: SF85.J67; ISSN: 15507424.
Notes: doi: 10.2111/1551-5028(2005)58<128:LGAWDC>2.0.CO;2.
Descriptors: cattle/ deer/ elk/ facilitation/ herbivory/ facilitation/ grazing/ grazing management/ livestock/ Bos taurus/ Centrocercus urophasianus/ Cervidae/ Cervus elaphus/ Cervus elaphus nelsoni/ Phasianidae
Abstract: Livestock grazing has been considered detrimental to wildlife habitat. Managed grazing programs, however, have the potential to maintain habitat diversity and quality. In cases in which single-species management predominates (sage-grouse [Centrocercus urophasianus] or elk [Cervus elaphus nelsoni] winter range), grazing systems specific to species' needs can be implemented. Managed

livestock grazing can have 4 general impacts on vegetation: 1) alter the composition of the plant community, 2) increase the productivity of selected species, 3) increase the nutritive quality of the forage, and 4) increase the diversity of the habitat by altering its structure. Implementing a grazing management plan to enhance wildlife habitat requires an interdisciplinary approach. Knowledge of plant community dynamics, habitat requirements of affected wildlife species, and potential effects on the livestock used are basic to successful system design. However, any habitat change made for a featured species may create adverse, neutral, or beneficial changes for other species. Management actions, other than development of a grazing system, are often required for habitat manipulations to be successful. More research efforts are needed to understand complementary grazing systems on a landscape scale.
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635. **Livestock grazing: Animal and plant biodiversity of shortgrass steppe and the relationship to ecosystem function.**
Milchunas, D. G.; Lauenroth, W. K.; and Burke, I. C.
Oikos 83(1): 65-74. (1998)
NAL Call #: 410 OI4; ISSN: 0030-1299
Descriptors: behavior/ birds/ ecosystems/ grasslands/ species diversity/ habitat use/ mammals/ prairies/ trophic relationships/ wildlife-habitat relationships/ wildlife-livestock relationships/ Colorado
Abstract: The responses of plants, lagomorphs, rodents, birds, macroarthropods, microarthropods, and nematodes to long-term grazing on North American shortgrass prairies were studied. Diversity, abundance, dominance, and dissimilarity responses to long-term grazing were variable across classes of organisms.
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636. **Livestock grazing effects in western North America.**
Saab, Victoria A.; Bock, Carl E.; Rich, Terrell D.; and Dobkin, David S.
In: Ecology and management of neotropical migratory birds: A synthesis and review of critical issues/ Finch, Deborah M. and Martin, Thomas E.
New York: Oxford University, 1995; pp. 311-353.
Notes: ISBN: 0195084403.
NAL Call #: QL680.E28 1995
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ man-made habitat/ land and freshwater zones/ North America/ Aves: farming and agriculture/ habitat management/ migrants/ population dynamics/ abundance/ forest and woodland/ grasslands/ riparian habitat/ cultivated land habitat/ United States/ livestock/ grazing/ migrants/ birds/ chordates/ vertebrates
© Thomson Reuters Scientific

637. **Livestock grazing effects on ant communities in the eastern Mojave Desert, USA.**
Nash, Maliha S.; Bradford, David F.; Franson, Susan E.; Neale, Anne C.; Whitford, Walter G.; and Heggem, Daniel T.
Ecological Indicators 4(3): 199-213. (2004); ISSN: 1470-160X
Descriptors: commercial activities/ ecology/ terrestrial habitat/ land zones/ farming and agriculture/ livestock grazing/ community structure/ environmental indicators/ desert habitat/ United States/ Mojave Desert/ Formicidae/ Formicoidea/ Aculeata/ Apocrita/ Hymenoptera/ Insecta/ arthropods/ hymenopterans/ insects/ invertebrates
Abstract: The effects of livestock grazing on composition and structure of ant communities were examined in the eastern Mojave Desert, USA for the purpose of evaluating ant communities as potential indicators of rangeland condition. Metrics for ant communities, vegetation, and other ground-cover elements were evaluated as a function of distance from livestock water tanks, which represents a gradient in level of livestock activity in desert settings. Data were collected at six isolated water tanks used by cattle during early summer, with seven plots (90 m + 90 m; 100 pitfall traps) per tank. Thirty-eight species of ants were recorded, with an average of 14 ant species per plot. Ant species richness did not differ as a function of distance from the water tank. Also, overall species composition, as measured by a similarity index for species presence/absence for paired-comparisons of plots, did not show differences attributable to the gradient in grazing impact. In contrast, the relative abundance of several taxa and functional groups was significantly related to distance from the water tank. The predominant pattern was for the greatest abundance to occur at the water tank, with little difference in ant abundance among plots away from the water tank. This pattern was shown by the abundant ants species, Conomyrma bicolor and Pheidole tucsonica, and the groups Conomyrma spp., Pheidole spp., homopteran tenders, and plant foragers. However, two species, Aphaenogaster megommata and Monomorium wheelerorum showed the greatest relative abundance at a distance away from the water tank. A number of ant metrics were significantly related to ground-cover metrics (R^2 > 0.5). Organic debris was the variable most frequently related significantly to ant abundance metrics, always in a positive direction, followed by cover for perennial grasses, annual forbs, and shrubs, and bare patch size. Ant community metrics in the study region appear to have little potential to serve as indicators of rangeland condition because differences were evident primarily in severely degraded localized conditions rather than in intermediate widespread conditions.
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638. **Livestock grazing effects on forage quality of elk winter range.**
Clark, P. E.; Krueger, W. C.; Bryant, L. D.; and Thomas, D. R.
Journal of Range Management 53(1): 97-105. (2000)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume53/Number1/azu_jrm_v53_n1_97_105_m.pdf
Descriptors: sheep/ grazing/ Pseudoroegneria spicata/ Carex/ Festuca Idahoensis/ stocking rate/ Cervus elaphus/ rain/ stems/ in vitro digestibility/ crude protein/ biomass/ canopy/ savannas/ shrubs/ forage/ Oregon
Abstract: Carefully-managed livestock grazing has been offered as a tool to improve the forage quality of graminoids on big game winter range. Formal testing of this theory has thus far been done using hand clippers rather than livestock grazing. We report winter standing reproductive culm, crude protein, in vitro dry matter digestibility, and standing crop responses of bluebunch wheatgrass (Agropyron spicatum [Pursh] Scribn. & Smith), Idaho fescue (Festuca idahoensis Elmer), and elk sedge (Carex geyeri Boott) to late-spring

domestic sheep grazing. The study was conducted in 1993 and 1994 on a big game winter range in the Blue Mountains of northeastern Oregon. Sheep grazing and exclusion treatments were applied to 20-ha plots at 3 sites on the study area Targeted utilization for grazed plots was 50% graminoid standing crop removal during the boot stage of bluebunch wheatgrass. Grazing did not influence the number of standing reproductive culms per plant in bluebunch wheatgrass. Crude protein and in vitro dry matter digestibility of bluebunch wheatgrass in grazed plots increased by 1.0 and 4.3 percentage points, respectively over ungrazed plots. Grazing reduced the standing crop of bluebunch wheatgrass by 116.9 kg ha-1 DM. Standing Idaho fescue reproductive culms decreased by 0.7 culms plant-1 under grazing. Crude protein of Idaho fescue in grazed plots was 1.3 percentage points greater than in unglazed plots. Crude protein and in vitro dry matter digestibility responses of elk sedge were inconsistent between years and may be related to utilization or growth differences between years. The levels of forage quality improvement in bluebunch wheatgrass and Idaho fescue obtained in this study could benefit the nutritional status of wintering Rocky Mountain elk (Cervus elaphus nelsoni Bailey). More research is needed regarding the effects of grazing on the winter forage quality of elk sedge.
This citation is from AGRICOLA.

639. **Livestock grazing impacts on rangeland ecosystems.**
Holechek, J.
Journal of Soil and Water Conservation 35(4): 162-164. (1980)
NAL Call #: 56.8 J822 ; ISSN: 0022-4561.
Notes: Literature review.
Descriptors: grazing systems/ environmental impact/ rangelands/ grazing/ ecology/ livestock farming/ range management/ arid regions
Abstract: The impacts of livestock grazing, both controlled and uncontrolled on the rangeland ecosystem of the USA are discussed. Research provides strong evidence that controlled grazing by domestic livestock is compatible with other resources provided by rangelands and may be a valuable tool to enhance these resources. Research needs for the practice of multiple use of public lands are examined.
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640. **Livestock grazing interactions with sage grouse.**
Klebenow, D. A.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 113-123; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: Nevada/ sage grouse/ livestock/ grazing
This citation is from AGRICOLA.

641. **Livestock impacts on the herbaceous components of sage grouse habitat: A review.**
Hockett, Glenn A.
Intermountain Journal of Sciences 8(2): 105-114. (2002); ISSN: 1081-3519.
Notes: Literature review.
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ Centrocercus urophasianus (Phasianidae): farming and agriculture/ livestock impacts on herbaceous components of sagebrush habitat/ habitat management/ grassland/ scrub/ sagebrush habitat/ Phasianidae/ Galliformes/ Aves/ birds/ chordates/ vertebrates
Abstract: Sage grouse are a bird of climax vegetation. Productive sage grouse habitat is more than a "sea of sagebrush." The grass/forb understory supplies food and cover components seasonally. Within the sagebrush community, a dense, residual herbaceous understory increases the likelihood of sage grouse nest success. Forbs and insects are essential foods for sage grouse from early spring to early fall. Although riparian areas typically make up less than 2 percent of the sagebrush landscape, interspersed springs, streams, and meadows offer watering and feeding sites for sage grouse during summer and early fall. Livestock selectively remove grasses and forbs within the sagebrush landscape while showing a strong preference for riparian meadows once upland vegetation cures. Livestock use can impact the amount and composition of herbaceous understory depending on the class of livestock, season of use, and grazing intensity. I reviewed the literature regarding sage grouse habitat and livestock impacts to the herbaceous understory. Ungrazed comparison areas, based on the seasonal needs of sage grouse, are lacking. Controls are recommended to advance our understanding of grazing impacts.
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642. **Livestock management and productivity of willow flycatchers in the central Sierra Nevada.**
Valentine, B. E.; Roberts, T. A.; Boland, S. P.; and Woodman, A. P.
Transactions of the Western Section of the Wildlife Society 24: 105-114. (1988)
NAL Call #: SK351.W523; ISSN: 0893-214X
Descriptors: Passeriformes/ wildlife management/ animal husbandry/ wildlife-livestock relations/ grazing/ California
This citation is from AGRICOLA.

643. **Local gradients of cowbird abundance and parasitism relative to livestock grazing in a western landscape.**
Goguen, Christopher B. and Mathews, Nancy E.
Conservation Biology 14(6): 1862-1869. (2000)
NAL Call #: QH75.A1C5 ; ISSN: 0888-8892
Descriptors: livestock grazing/ mixed conifer forest: habitat/ parasitism rate/ pinyon juniper forest: habitat/ species abundance
Abstract: We studied local patterns of Brown-headed Cowbird (Molothrus ater) abundance, parasitism rates, and nest success of a common host, the Plumbeous Vireo (Vireo plumbeus), in relation to the distribution of livestock grazing in an undeveloped region of northeastern New Mexico, 1992-1997. We predicted that both cowbird abundance and parasitism rates of vireo nests would decrease with increasing distance from active livestock grazing, and that the nesting success of vireos would increase. We measured cowbird abundance and host density and located and monitored vireo nests in pinyon-juniper and mixed-conifer habitats that ranged from actively grazed to isolated from livestock grazing by up to 12 km. Cowbird abundance declined with distance from active livestock grazing and was not related to host density or

habitat type. Brood parasitism levels of vireo nests (n = 182) decreased from >80% in actively grazed habitats to 33% in habitats that were 8-12 km from active grazing but did not vary by habitat type or distance to forest edge. Vireo nesting success was higher in mixed-conifer habitat than in pinyon-juniper but was unrelated to distance from active livestock grazing. Nest losses due to parasitism declined with distance from active livestock grazing. Our results suggest that cowbird abundance and parasitism rates of hosts may be distributed as a declining gradient based on distance from cowbird feeding sites and that isolation from feeding sites can reduce the effects of parasitism on host populations. These findings provide support for management techniques that propose to reduce local cowbird numbers and parasitism levels by manipulating the distribution of cowbird feeding sites. The presence of parasitized nests >8 km from active livestock grazing suggests that, in some regions, management efforts may need to occur at larger scales than previously realized.
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644. **Location and success of lesser prairie-chicken nests in relation to vegetation and human disturbance.**
Pitman, J. C.; Hagen, C. A.; Robel, R. J.; Loughin, T. M.; and Applegate, R. D.
Journal of Wildlife Management 69: 1259-1269. (July 2005)
NAL Call #: 410 J827
Descriptors: wildlife management/ prairies/ game birds/ nesting/ vegetation/ anthropogenic activities/ Kansas/ habitat management for wildlife/ Tympanuchus pallidicinctus/ wildlife habitat relationships/ natural resources, environment, general ecology, and wildlife conservation/ animal ecology and behavior
This citation is from AGRICOLA.

645. **Long-term effects of vegetation treatments in the Chaparral transition zone.**
Fuhrmann, K. N. and Crews, T. E.
Rangelands 23(1): 13-16. (2001)
NAL Call #: SF85.A1R32; ISSN: 01900528
Descriptors: cattle/ herbicide/ vegetation cover/ wildfire/ United States
Abstract: Since European settlement, the impacts of cattle production and wood harvesting in the West have affected the structure and transformed the composition of juniper-pinyon and chaparral. In the past, wildfires were more common in the juniper-pinyon and chaparral communities of the Southwest where they burned at intervals of 10-30 years. The regular occurrence of fire appears to have restricted the establishment of woody species to more shallow, rocky soils on which grasses do not thrive. The canopy cover and density of juniper-pinyon and chaparral can have a direct impact on the production of grasses and herbaceous plants. The removal of this canopy by various means has been implemented in many woody plant communities in an attempt to increase the production of herbaceous forage for livestock and habitat improvement for wildlife. The main objective of the application of original herbicide, fire, and mechanical push vegetation treatments (applied in 1964-1981) sampled in this study was to encourage the growth of herbaceous vegetation for cattle production. The disturbances caused by the treatments were intended to, at a minimum, set succession back to a grass/forb community, or ideally to shift the community towards a stable more permanent herbaceous community. The three range treatment techniques were undertaken to improve the potential for herbaceous species to effectively compete with larger woody species in an ecosystem affected by climatic and edaphic constraints, and impacted by livestock grazing. Tree abundance, dominance, and cover were to be limited on chosen sites. In 1997, we compared the effectiveness of herbicide, fire and mechanical push range treatment techniques decades after they were implemented. Long-term assessment is critical for both economic and ecological reasons. Economically, it is important to know how long "woodland conversion" range treatments last given the expense that can be incurred to implement them. Ecologically, it is important to monitor species diversity and abundance in post-treatment communities to evaluate the effects that different treatment methods have on biodiversity.
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646. **Macroinvertebrates in North American tallgrass prairie soils: Effects of fire, mowing, and fertilization on density and biomass.**
Callaham, M. A.; Blair, J. M.; Todd, T. C.; Kitchen, D. J.; and Whiles, M. R.
Soil Biology and Biochemistry 35(8): 1079-1093. (2003)
NAL Call #: S592.7.A1S6; ISSN: 0038-0717
Descriptors: commercial activities/ conservation measures/ ecology/ community structure/ population dynamics/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Macroinvertebrata: farming and agriculture/ mowing and fertilization effects on tallgrass prairie soil communities/ habitat management/ biomass/ tallgrass prairie soil community responses to fire/ mowing and fertilization/ relative abundance/ population density/ grassland/ community responses to fire/ soil habitat/ tallgrass prairie soils/ fire/ effects on tallgrass prairie soil communities/ Kansas/ Flint Hills/ Konza Prairie Biological Station/ invertebrates
Abstract: The responses of tallgrass prairie plant communities and ecosystem processes to fire and grazing are well characterized. However, responses of invertebrate consumer groups, and particularly soil-dwelling organisms, to these disturbances are not well known. At Konza Prairie Biological Station, we sampled soil macroinvertebrates in 1994 and 1999 as part of a long-term experiment designed to examine the effects and interactions of annual fire, mowing, and fertilization (N and P) on prairie soil communities and processes. For nearly all taxa, in both years, responses were characterized by significant treatment interactions, but some general patterns were evident. Introduced European earthworms (Aporrectodea spp. and Octolasion spp.) were most abundant in plots where fire was excluded, and the proportion of the total earthworm community consisting of introduced earthworms was greater in unburned, unmowed, and fertilized plots. Nymphs of two Cicada genera were collected (Cicadetta spp. and Tibicen spp.). Cicadetta nymphs were more abundant in burned plots, but mowing reduced their abundance. Tibicen nymphs were collected almost exclusively from unburned plots. Treatment effects on herbivorous beetle larvae (Scarabaeidae, Elateridae, and Curculionidae) were variable, but nutrient additions (N or P) usually resulted in greater densities, whereas mowing usually resulted in lower densities. Our results suggest that departures from historical disturbance regimes (i.e. frequent fire and grazing) may render soils more susceptible to

increased numbers of European earthworms, and that interactions between fire, aboveground biomass removal, and vegetation responses affect the structure and composition of invertebrate communities in tallgrass prairie soils.
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647. **Management of conservation buffers for upland wildlife in Illinois.**
Mankin, P. C.; L.A. Kammin, L. A.; Hoffman, C. L.; Hubert, P. D.; Teisberg, J. E.; and Warner, R. E.
Springfield, IL. Illinois Department of Natural Resources, 2005. 72 pp.
Notes: Federal Aid in Wildlife Restoration Act Project P-R W-144-R.
Descriptors: filter strips/ conservation buffers/ grassland birds/ wildlife cover/ wildlife forage/ mowing

648. **Management of livestock to improve and maintain prairie chicken habitat on the Sheyenne National Grasslands.**
Eng, R. L.; Toepfer, J. E.; and Newell, J. A.
In: Prairie chickens on the Sheyenne National Grasslands, General Technical Report-RM 159/ Bjugstad, Ardell J., ed.; Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture (Series: General Technical Report RM 159), 1988. pp. 55-57.
Notes: 0277-5786 (ISSN); Paper presented at a "Symposium on Prairie Chickens on the Sheyenne National Grasslands," September 18, 1987, Crookston, Minnesota. Includes references.
NAL Call #: aSD11.A42
Descriptors: birds/ wildlife/ grasslands/ grazing/ range management/ North Dakota
This citation is from AGRICOLA.

649. **Managing bison to restore biodiversity.**
Truett, Joe C.; Phillips, Michael; Kunkel, Kyran; and Miller, Russell
Great Plains Research 11(1): 123-144. (2001)
NAL Call #: QH104.5.G73 G755; ISSN: 1052-5165
Descriptors: wildlife management: conservation/ biodiversity/ burrowing activities/ ecological restoration/ endangered species management/ grasslands/ grazing behavior/ pastoralism/ prairies/ trampling/ vegetation changes/ wallowing
Abstract: Prior to their demise in the late 1800s, bison coexisted with and helped sustain a diverse and spectacular assemblage of animals and plant communities on the Great Plains. Bison, in concert with fire, exerted strong control on the structure of the vegetation by grazing, trampling, and wallowing. The changes in the vegetation induced changes in many animal populations. These impacts, coupled with the bison's role as the major converter of grass to meat, so greatly affected other species that some have called bison a "keystone" species in the Great Plains ecosystem. The black-tailed prairie dog, dependent on bison grazing over a large part of the Great Plains, amplified the keystone influence of bison by its own grazing and burrowing activities and its utility as prey. Although modern bison-growing practices usually will preclude restoration of the large predators and scavengers that once were a part of the great faunal spectacle, other species can return, often even on small acreages. Maintenance of a habitat mosaic is the key to restoring some of the original biodiversity lost to the historic pursuit of single-species pastoralism.
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650. **Managing exotic grasses and conserving declining species.**
Germano, David J.; Rathbun, Galen B.; and Saslaw, Larry R.
Wildlife Society Bulletin 29(2): 551-559. (2001)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Dipodomys ingens/ Dipodomys nitratoides/ Ammospermophilus nelsoni/ Gambelia sila/ mammals/ amphibians and reptiles/ behavior/ habitat use/ habitat management/ exotic species/ ecosystems/ conservation/ endangered-threatened species/ wildlife-habitat relationships/ livestock/ grazing/ giant kangaroo rat/ San Joaquin kanagaroo rat/ San Joaquin antelope squirrel/ blunt-nosed leopard lizard/ reptiles/ Atriplex spp./ California: San Joaquin Valley/ San Joaquin River Valley
Abstract: California's southern San Joaquin Valley, as with much of western North America, has been invaded by exotic plant species during the past 100-200 years. The herbaceous cover of these introduced grasses and forbs often creates an impenetrable thicket for small ground-dwelling vertebrates. Contrary to some earlier descriptions of upland habitat of the southern and western San Joaquin Valley as perennial grasslands, recent evidence suggests that most of this area was a desert vegetated by saltbush scrub with sparse cover of native annual grasses and forbs. Many of the small vertebrates that evolved in these habitats, some of which are listed as threatened or endangered, are desert-adapted. These species evolved in sparsely vegetated habitats and rely on open ground to forage and avoid predation. Preliminary research indicates that populations of giant kangaroo rats (Dipodomys ingens), San Joaquin kangaroo rats (D. nitratoides), San Joaquin antelope squirrels (Ammospermophilus nelsoni), and blunt-nosed leopard lizards (Gambelia sila), all listed as threatened endangered, are affected negatively by thick herbaceous cover. This cover also may adversely effect several listed plant species. Removing anthropogenic disturbances does not reduce or eliminate these exotic plants. Fire is effective in reducing herbaceous cover but kills native saltbush and often is costly to implement or control. Although livestock may have contributed originally to habitat destruction and introduction of exotic plants, the authors believe that in some years, moderate to heavy grazing by livestock is the best way to decrease the dense cover created by these exotics. Recent decisions to decrease or eliminate livestock grazing on conservation lands without definitive studies of grazing in these habitats may lead to further declines of native species and possible local extinction of some listed plants and animals.
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651. **Managing for grassland diversity: A study on grazing-fire interactions in the Flint Hills (Kansas).**
Weigelt, M. L.
Ecological Restoration 24: 41-42. (Mar. 2006)
Descriptors: rangelands/ prairies/ range management/ ecosystem management/ wildlife habitats/ wild birds/ prescribed burning/ ecological restoration/ Kansas/ homestead range Renewal Initiative/ Sturnella magna/ Ammodramus savannarum/ Tympanuchus cupido/ Ammodramus henslowii/ plant production range and pasture grasses/ animal ecology and behavior/ land resources/ plant ecology/ animal nutrition
This citation is from AGRICOLA.

652. **Managing livestock grazing for grassland birds: A caution against extrapolating results from outside the Southwest.**
Zwartjes, P. W.; Stoleson, P. L. L.; Haussamen, W. C.; and Crane, T. E.
NMOS Bulletin 29(2): 24-25. (2001).
Notes: Published by the New Mexico Ornithological Soc.
Descriptors: Sturnella magna/ Aimophila cassinii/ birds/ wildlife-livestock relationships/ grazing/ grasslands/ semi-arid habitat/ habitat alterations/ agricultural practices/ habitat management/ wildlife-habitat relationships/ eastern meadowlark/ Cassin's sparrow/ Arizona/ New Mexico
Abstract: The U.S. Forest Service is currently engaged in a large-scale project to assess the impact of gazing on terrestrial vertebrate species in Arizona and New Mexico (hereafter, "the southwest"), including a variety of grassland bird species. Using the scientific literature to determine whether and under what conditions grazing can be compatible with native species of birds in the southwest is complicated by a variety of factors. These include a lack of standardized definitions of grazing regimes or intensities, and a lack of studies specific to the southwest that document the response of vegetation to various grazing regimes. These issues become especially important when making grazing management decisions that consider avian species whose breeding range includes areas (perhaps predominantly) outside of the desert southwest. Reliance on studies that (a) measure grazing intensities in terms of animals per hectare or general qualitative measures such as "heavy", "moderate", and "light"; (b) fail to use quantitative measures of vegetative responses to grazing (such as stubble height or residual vegetation); and (c) were conducted in grasslands with different precipitation patterns, species of grasses, soil composition, etc., can result in grazing practices that degrade the habitat required by these bird species in the southwest. The eastern meadowlark (Sturnella magna) and Cassin's sparrow (Aimophila cassinii) are examples of such species; grazing regimes which have been recommended for other areas would likely have an adverse impact on the habitat required by these species in southwestern grasslands. Managers who utilize the results of grazing-impact studies to develop grazing regimes that consider the habitat needs of grassland birds should critically assess both the locality of these studies and how grazing levels are quantified before extrapolating the results to southwestern grasslands. In addition, further research is needed to assess the response of geographically wide-ranging species of grassland birds specifically to grazing regimes in the southwest.
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653. **Managing livestock grazing for mule deer (Odocoileus hemionus) on winter range in the Great Basin.**
Austin, Dennis D.
Western North American Naturalist 60(2): 198-203. (2000)
NAL Call #: QH1.G7; ISSN: 1527-0904
Descriptors: environmental management/ livestock grazing effects/ winter range habitat
Abstract: History and technical literature describing potential effects of livestock grazing on mule deer (Odocoileus hemionus) populations and winter range habitat are reviewed. Recommendations for livestock grazing on winter ranges within the Great Basin are advanced.
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654. **Managing rangelands for wildlife.**
Bleich, Vernon C.; Kie, John G.; Loft, Eric R.; Stephenson, Thomas R.; Oehler, Michael W.; and Medina, Alvin L. In: Techniques for wildlife investigations and management/ Braun, C. E., 2005; pp. 873-897.
Notes: ISBN: 0933564155.
http://www.treesearch.fs.fed.us/pubs/24852
Descriptors: commercial activities/ conservation measures/ land zones/ comprehensive zoology: farming and agriculture/ grazing/ rangeland habitat/ habitat management/ wildlife/ terrestrial habitat/ United States
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655. **Managing rotationally grazed pastures for forage production and grassland birds.**
Paine, L. K.; Undersander, D. J.; Temple, S. A.; and Sample, D. W.
American Forage and Grassland Council Proceedings 6: 54-58. (1997)
NAL Call #: SB193.F59
Descriptors: range management/ rotational grazing/ birds/ nesting
This citation is from AGRICOLA.

656. **Managing tallgrass prairie remnants: The effects of different types of land stewardship on grassland bird habitat.**
Higgins, Jeremy J.; Larson, Gary E.; and Higgins, Kenneth F.
Ecological Restoration 20(1): 18-22. (2002); ISSN: 1522-4740
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ land zones/ Aves: farming and agriculture/ prairie management/ habitat management/ requirements/ land use practices/ habitat characteristics/ grassland/ tallgrass prairie remnants/ North Dakota/ Aves/ birds/ chordates/ vertebrates
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657. **Microclimate versus predation risk in roost and covert selection by bobwhites.**
Miller, T. L. and Guthery, F. S.
Journal of Wildlife Management 69(1): 140-149. (2005)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2005)069 <0140:MVPRIR>2.0.CO;2.
Descriptors: Blackbody temperature/ bobwhites/ Colinus virginianus/ covert/ energetics/ microclimate/ predation risk/ roost/ telemetry/ thermoregulation/ gamebird/ habitat

management/ habitat selection/ microclimate/ predation risk/ roost site/ thermoregulation/ Colinus/ Colinus virginianus

Abstract: Knowledge of factors that influence habitat selection by wildlife leads to better understanding of habitat ecology and management. Therefore, we compared microclimate and predation risk as factors influencing the selection of stopping points (mid-day coverts, nocturnal roosts) by northern bobwhites (Colinus virginianus). Stopping points were located using radiomarked bobwhites in the Texas Panhandle, USA, during 2002-2003. We obtained blackbody temperatures of microclimates and assessed predation risk (angles of obstruction for aerial predators, vegetation profiles for terrestrial predators) at stopping points and paired random points. Summer coverts showed fewer degree-minutes of hyperthermic exposure (blackbody temperatures >39°C; $\bar{x}$ = 655.0, SE = 4.1 for coverts, $\bar{x}$ = 2,255.5, SE = 4.9 for random; 1200-1600 hr) and a lower risk to predators (e.g., 95% confidence intervals [CIs] of angles of obstruction = 87.8-90.8° for coverts, 55.9-70.6° for random). Summer roost temperatures were similar to paired random sites ($\bar{x}$ = 13.9°C, SE = 0.6 for roost, $\bar{x}$ = 13.9°C, SE = 0.7 for random) as were winter roost temperatures ($\bar{x}$ = -1.3°C, SE = 0.7 for roosts, $\bar{x}$ = -1.4°C, SE = 0.8 for random). There were minor issues of habitat selection of winter or summer roosts based on predation risk (e.g., 95% CIs of vegetation profiles of summer roosts and random sites did not overlap at lower strata). We concluded other selection factors likely exist for winter roosts because microclimate and predation risk assessments between winter roosts and random sites showed no difference. Similarly, other selection factors may exist for summer roosts, as they showed only a weak difference in terrestrial predation risk and no difference in microclimate in comparison to random sites. We concluded microclimate was the primary selection factor for coverts because prevention of hyperthermia necessitated that bobwhites select cooler microclimates within the study area.

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658. **Microhabitat selection by Texas horned lizards in southern Texas.**

Burrow, Anna L.; Kazmaier, Richard T.; Hellgren, Eric C.; and Ruthven, Donald C.

Journal of Wildlife Management 65(4): 645-652. (2001)
NAL Call #: 410 J827; ISSN: 0022-541X

Descriptors: Phrynosoma cornutum/ horned lizards/ Texas horned lizard/ amphibians and reptiles/ microhabitat/ behavior/ habitat use/ conservation/ status/ habitat management/ fires-burns/ livestock/ grazing/ telemetry/ monitoring/ wildlife-habitat relationships/ diurnal rhythm/ seasonal activities/ Texas, Southern/ Texas: Dimmit County/ Texas: La Salle County

Abstract: The Texas horned lizard (Phrynosoma cornutum) has declined throughout its range. Understanding habitat selection by the Texas horned lizard is an important factor in its conservation. The authors examined daily and seasonal habitat requirements of Texas horned lizards and determined whether habitat selection differed among land management treatments in southern Texas. They used five study sites, each with a different burning and grazing treatment. Adult lizards caught in the study sites were fitted with backpacks carrying radiotransmitters and relocated daily. Habitat characteristics at radio locations and random points 10 m from the lizard were assessed using 50-X 20-cm quadrats. Relocations were made during three time intervals (morning, afternoon, evening) and two seasons (active, inactive). Horned lizards used bare ground and herbaceous vegetation similar to their availability in the morning and evening for thermoregulation and foraging purposes, but avoided bare ground in the afternoon. In the afternoons, lizards selected woody vegetation and litter as thermal refuges and cover from predators. Lizards also appeared less dependent on herbaceous vegetation and more dependent on woody vegetation and litter in the inactive season compared to the active season as a result of increased temperatures. The authors did not detect differences in habitat selection among land management treatments. Habitat management for Texas horned lizards should focus on creating a mosaic of bare ground, herbaceous vegetation, and woody vegetation in close proximity.

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659. **Modeled effects of sagebrush-steppe restoration on greater sage-grouse in the interior Columbia Basin, U.S.A.**

Wisdom, Michael J.; Rowland, Mary M.; Wales, Barbara C.; Hemstrom, Miles A.; Hann, Wendel J.; Raphael, Martin G.; Holthausen, Richard S.; Gravenmier, Rebecca A.; and Rich, Terrell D.

Conservation Biology 16(5): 1223-1231. (2002)
NAL Call #: QH75.A1C5; ISSN: 0888-8892

Descriptors: conservation measures/ nutrition/ diet/ ecology/ terrestrial habitat/ land and freshwater zones/ Centrocercus urophasianus (Phasianidae): habitat management/ sagebrush steppe restoration/ modeled effects and evaluation/ food plants/ Artemisia/ feeding behavior/ population dynamics/ grassland/ sagebrush steppe/ United States/ Interior Columbia Basin/ Phasianidae/ Galliformes, Aves/ birds/ chordates/ vertebrates

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660. **Models for guiding management of prairie bird habitat in northwestern North Dakota.**

Madden, E. M.; Murphy, R. K.; Hansen, A. J.; and Murray, L.

American Midland Naturalist 144(2): 377-392. (2000)
NAL Call #: 410 M58; ISSN: 00030031

Descriptors: avifauna/ habitat management/ habitat mosaic/ habitat use/ prairie/ wildlife management/ United States/ Ammodramus bairdii/ Ammodramus savannarum/ Anthus spragueii/ Dolichonyx oryzivorus/ Passerculus sandwichensis/ Spizella pallida

Abstract: With grassland bird populations in the Great Plains exhibiting steep declines, grassland managers require information on bird habitat needs to optimally manage lands dedicated to wildlife. During 1993-1994, we measured bird occurrence and corresponding vegetation attributes on mixed-grass prairie in northwestern North Dakota. Three hundred and ten point-count locations over a wide range of successional stages were sampled. Ten grassland passerine species occurred commonly (i.e., at >10% of point count locations), including two species endemic to the northern Great Plains [Baird's sparrow (Ammodramus bairdii) and Sprague's pipit (Anthus spragueii)], and several species of management concern [bobolink (Dolichonyx oryzivorus), grasshopper sparrow

(Ammodramus savannarum), clay-colored sparrow (Spizella pallida)]. Some species were ubiquitous and had generalized habitat associations [e.g., savannah sparrow (Passerculus sandwichensis)]. Others exhibited more finely tuned, closely overlapping use of relatively short, sparse to moderately dense, grassand forb-dominated habitat. We used logistic regression models to predict bird species' occurrence based on nine vegetation variables. Previously undefined limits of vegetation height and density were identified for Baird's sparrow and Sprague's pipit, and of shrub cover for Baird's sparrow. Our findings underscore the need for a mosaic of successional types to maximize diversity of prairie bird species. Managers may reduce confusion created by generic treatment prescriptions for grasslands by focusing on absolute rather than relative measures of vegetation, and by integrating standard data from multiple bird habitat studies across regions.
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661. **Mowing versus fire on expansion of black-tailed prairie dogs reintroduced into Chihuahuan Desert grasslands.**
Fredrickson, Ed L.; Andersen, Mark C.; Ford, Paulette L.; Truett, Joe C.; and Roemer, Gary.
In: 87th Annual Meeting of the Ecological Society of America and the 14th Annual International Conference of the Society for Ecological Restoration, Tucson, Arizona, USA; August 04-09, 2002.; Vol. 87.; pp. 352; 2002.
Descriptors: terrestrial ecology: ecology, environmental sciences/ wildlife management: conservation/ colony growth/ establishment/ grassland/ habitat/ keystone species distribution/ mowing versus fir/ range expansion/ reintroduction
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662. **Mule deer fawn survival on cattle-grazed and ungrazed desert ranges.**
Horejsi, R. G., 1982. 47 p. Arizona Game and Fish Department Wildlife Bulletin.
Notes: ISSN: 0518-5467.
Descriptors: cattle/ coyote/ deer, mule/ deserts/ female/ food habits/ grazing/ interspecies relationships/ population density/ predation/ production/ rodents/ shrubs/ survival/ trees/ vegetation/ Arizona, central region/ Tonto Basin
Abstract: Study areas were the Three Bar Wildlife Area (closed to grazing in 1947) and the Tonto Basin Study Area (under National Forest cattle grazing permit). Data were collected on: rodent and rabbit populations; cover, density and frequency of trees, shrubs, and half shrubs; fruit, nut, berry, and spring mean forage production; nutritional quality of key forage species; deer population densities; buck(doe)fawn ration in mid-winter; predator populations; coyote, deer, and cattle food habits; and vegetation mapping of TBWA.
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663. **Multi-resolution approach to wildlife habitat modeling using remotely sensed imagery.**
Smith, M. D. and Burger, L. W.
In: Proceedings of SPIE - The International Society for Optical Engineering. Gao W. and Shaw D.R. (eds.); Vol. 5153.
San Diego, CA; pp. 34-43 ; 2003.
Notes: 0277786X (ISSN).
Descriptors: habitat model/ habitat suitability/ IKONOS/ LANDSAT/ northern bobwhite/ wildlife/ conservation/ data reduction/ ecosystems/ environmental protection/ land use/ mathematical models/ modernization/ probability/ regression analysis/ remote sensing
Abstract: Remotely sensed imagery, coupled with wildlife habitat models provide a powerful tool for the implementation, assessment, and monitoring of wildlife conservation/restoration initiatives. Observed, empirical relationships between a species abundance metric and landscape structure/composition are used to structure models. Habitat suitability models always represent a trade off between breadth of applicability and specificity. Large-spatial extent, coarse spatial resolution data sets may be useful for characterizing potential animal distributions at regional or continental scales; however, habitat models developed at this spatial scale may have little applicability for predicting suitability at finer spatial resolutions. Whereas numerous issues related to multi-scale analysis have been acknowledged with respect to wildlife habitat models, only recently have sources of high-resolution imagery been readily available for site-specific analyses. We outline a multi-scale approach to habitat modeling and demonstrate this approach with northern bobwhite. We developed a coarse resolution model appropriate for identifying focal regions likely to support bobwhite using classified LandSat imagery and relative abundance measures from breeding season call counts. Then we developed a fine resolution model based on 4-m multispectral IKONOS imagery and animal space-use for planning and implementing conservation practices at the local scale. We discuss the application of this hierarchical approach to conservation planning.
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664. **Multi-scale effects of habitat loss and fragmentation on lesser prairie-chicken populations of the U. S. southern Great Plains.**
Fuhlendorf, S. D.; Woodward, A. J. W.; Leslie, D. M.; and Shackford, J. S.
Landscape Ecology 17(7): 617-628. (2002)
NAL Call #: QH541.15.L35 L36; ISSN: 09212973.
Notes: doi: 10.1023/A:1021592817039.
Descriptors: agriculture/ conservation ecology/ fragmentation/ grasslands/ hierarchy/ landscape change/ landscape dynamics/ landscape structure/ lesser prairie-chicken/ rangeland/ southern Great Plains/ Scale/ species conservation/ habitat fragmentation/ habitat loss/ landscape change/ population decline/ scale effect/ species conservation/ land use/ Juniperus virginiana/ Tympanuchus pallidicinctus
Abstract: Large-scale patterns of land use and fragmentation have been associated with the decline of many imperiled wildlife populations. Lesser prairie-chickens (Tympanuchus pallidicinctus) are restricted to the southern Great Plains of North America, and their population and range have declined by > 90% over the past 100 years. Our objective was to examine scale-dependent relationships between landscape structure and change and long-term population trends for lesser prairie-chicken populations in the southern Great Plains. We used a geographic information system (GIS) to quantify landscape composition, pattern and change at multiple scales (extents) for fragmented agricultural landscapes surrounding 10 lesser prairie-chicken leks. Trend analysis of long-term population data was used to classify each

population and landscape (declined, sustained). We analyzed metrics of landscape structure and change using a repeated measures analysis of variance to determine significant effects (α = 0.10) between declining and sustained landscapes across multiple scales. Four metrics of landscape structure and change (landscape change index, percent cropland, increases in tree-dominated cover types, and changes in edge density) contained significant interactions between population status and scale, indicating different scaling effects on landscapes with declining and stable populations. Any single spatial scale that was evaluated would not have given complete results of the influences of landscape structure and change on lesser prairie-chicken populations. The smallest spatial scales (452,905, and 1,810 ha) predicted that changes in edge density and largest patch size were the only important variables, while large-scale analysis (7,238 ha) suggested that the amount of cropland, increase in trees (mostly Juniperus virginiana), and general landscape changes were most important. Changes in landscape structure over the past several decades had stronger relationships with dynamics of lesser prairie-chicken populations than current landscape structure. Observed changes suggest that these local populations may be appropriately viewed from a metapopulation perspective and future conservation efforts should evaluate effects of fragmentation on dispersal, colonization, and extinction patterns.
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665. **A multi-scaled analysis of avian response to habitat amount and fragmentation in the Canadian dry mixed-grass prairie.**
Koper, N. and Schmiegelow, F. K. K.
Landscape Ecology 21(7): 1045-1059. (2006)
NAL Call #: QH541.15.L35 L36; ISSN: 09212973.
Notes: doi: 10.1007/s10980-006-0004-0.
Descriptors: Akaike's information criterion/ Canada/ habitat loss and fragmentation/ mixed-effects models/ mixed-grass prairie/ model selection/ nest success/ prairie birds/ spatial scale
Abstract: Previous research has suggested that ducks and songbirds may benefit from prairie landscapes that consist primarily of contiguous grasslands. However, the relative importance of landscape-level vs. local characteristics on mechanisms underlying observed patterns is unclear. We measured effects of grassland amount and fragmentation on upland and wetland songbird and duck density and nest success, and on some nest predators, across 16 landscapes in southern Alberta, Canada. We compared these landscape-level effects with local-scale responses, including distance to various edges and vegetation characteristics. We also evaluated several statistical approaches to comparing effects of habitat characteristics at multiple spatial scales. Few species were influenced by grassland amount or fragmentation. In contrast, distance to edge and local vegetation characteristics had significant effects on densities and nest success of many species. Previous studies that reported effects of landscape characteristics may have detected patterns driven by local mechanisms. As a corollary, results were very sensitive to statistical model structure; landscape level effects were much less apparent when local characteristics were included in the models. © 2006 Springer.
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666. **The Nature Conservancy's Prairie Wings Project: A conservation strategy for the grassland birds of the western Great Plains.**
McCready, Bob; Mehlman, David; Kwan, Danny; and Abel, Becky
In: Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference, General Technical Report-PSW 191/ Ralph, C. J. and Rich, T. D.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2005. pp. 1158-1161.
Notes: Volume 2; Responsibility: Pacific Southwest Research Station; U.S. Forest Service General Technical Report series; ISSN: 0196-2094; Bird Conservation Implementation and Integration in the Americas: Third International Partners in Flight conference held 2002 March 20-24 in Asilomar, California.
Descriptors: conservation measures/ terrestrial habitat/ land zones/ habitat management/ grassland/ Conservation strategy/ North America/ western Great Plains/ grassland management strategy/ Aves/ birds/ chordates/ vertebrates
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667. **Nest-site characteristics of burrowing owls (Athene cunicularia) in the Snake River birds of prey national conservation area, Idaho, and applications to artificial burrow installation.**
Belthoff, James R. and King, R. Andrew
Western North American Naturalist 62(1): 112-119. (2002)
NAL Call #: QH1.G7; ISSN: 1527-0904
Descriptors: conservation measures/ reproduction/ reproductive behavior/ ecology/ habitat utilization/ animal constructions/ land and freshwater zones/ Athene cunicularia (Strigidae): habitat management/ artificial burrow installation/ breeding site/ nesting site/ habitat preference/ burrows/ nests/ Idaho/ Snake River Birds of Prey National Conservation Area/ nest site characteristics/ Strigiformes, Aves/ birds/ chordates/ vertebrates
Abstract: Burrowing Owl (Athene cunicularia) populations are declining in many portions of their range, and research and management efforts into stemming declines are underway. One tool with promise is the artificial burrow, which can supplement nesting opportunities and play a role in research, mitigation, translocation, and reintroduction studies. However, few studies directly assess important burrow and surrounding topographic features upon which owls choose sites and then construct and install artificial burrows accordingly. In this study we (1) measure physical, vegetative, and topographic characteristics of Burrowing Owl nest sites in the Snake River Birds of Prey National Conservation Area (SRBPNCA); (2) compare used and unused burrows to determine features important in nest-site selection; and (3) use this information to help guide current and future construction and placement of artificial burrows in the SRBPNCA. Owls nested in abandoned American badger (Taxidea taxus) burrows in areas with more than one burrow, close to roads and irrigated agricultural fields, and characterized by sparse and low vegetation dominated by nonnative plant species. Only one feature studied, tunnel entrance angle, corresponded with choice by owls; odds of burrow use decreased 17% with each 1[degree] increase in slope of the tunnel entrance. Owls nesting near irrigated agricultural fields also had higher productivity. We

discuss applications of our results to construction and placement of artificial burrows in the SRBPNCA and similar shrub-steppe environs in western North America.
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668. **Nest success of ducks on rotational and season-long grazing systems in Saskatchewan.**
Ignatiuk, Jordan B. and Duncan, David C.
Wildlife Society Bulletin 29(1): 211-217. (2001)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: grazing system: rotational, season long/ nest success/ nest survival/ residual vegetation cover
Abstract: Rotational grazing systems have been implemented to increase duck production in the prairie pothole region, although evidence to support the contention of increased duck production is scant at best. We examined duck nest success on 12 once-over rotational grazing systems and 12 season-long pastures in southern Saskatchewan. Analysis of 617 nests from 23 pastures failed to reveal a difference in nest survival between rotational and season-long grazing systems (20.2% versus 25.1%), although there was a year X treatment effect interaction wherein nest success differed between years on rotational pastures but not on season-long pastures. Residual vegetation cover from randomly clipped plots did not differ between grazing treatments but did differ between years. Nest success on pastures within years was not related to vegetative carryover. Although we did not detect greater duck nest success on rotational grazing systems compared to season-long pastures, rotational systems could be beneficial if they preserve or improve grassland areas, attract more ducks from less productive habitats, or increase duckling survival. Our study provides strong additional evidence of the high nest success on pastures compared to most other habitat types, including small plots of planted cover. Converting cropland to pastures and retaining existing pastures are recommended to maintain and improve duck production in the prairie pothole region.
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669. **Nest survival of clay-colored and vesper sparrows in relation to woodland edge in mixed-grass prairies.**
Grant, Todd A.; Madden, Elizabeth M.; Shaffer, Terry L.; Pietz, Pamela J.; Berkey, Gordon B.; and Kadrmas, Neil J.
Journal of Wildlife Management 70(3): 691-701. (2006)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Rodentia/ Sciuridae/ Spermophilus tridecemlineatus/ Emberizidae/ Passeriformes/ Pooecetes gramineus/ Spizella pallida/ Fringillidae/ Bos bison/ clay-colored sparrow/ ground squirrels/ Poa pratensis/ Populus tremuloides/ Spermophilus tridecemlineatus/ thirteen-lined ground squirrel/ vesper sparrow/ vesper sparrows/ predation/ foods-feeding/ breeding grounds/ conservation/ wildlife management/ diets/ habitat use/ grasslands/ ecosystems/ habitat management/ land zones/ predators/ mammals/ McHenry County/ nest site/ nest survival/ nesting success/ North Dakota/ northern grassland/ nutrition/ Pooecetes gramineus/ Spizella pallida/ population ecology/ reproduction/ breeding/ productivity/ Spermophilus tridecemlineatus/ survival/ wildlife management/ woody vegetation/ aspen woodland/ clay-colored sparrow/ edge effects/ grassland birds/ mixed-grass prairie
Abstract: The quantity and quality of northern mixed-grass prairie continues to decline because of conversion to agriculture, invasion of woody and exotic plants, and disruption of important ecological processes that shape grasslands. Declines in grassland bird populations in North Dakota, USA, have coincided with these largely anthropogenic alterations to prairie habitat. In grasslands of north-central and northwestern North Dakota, woody plants have increased due primarily to fire suppression, extirpation of bison (Bos bison), and widescale planting of tree shelter belts. In northern grasslands, effects of woody vegetation on survival of grassland birds are poorly understood, and conclusions are based mainly on studies conducted outside the region. We examined nest survival of clay-colored sparrows (Spizella pallida) and vesper sparrows (Pooecetes gramineus) relative to the distance nests were located from aspen (Populus tremuloides) woodland edges and relative to other habitat features near the nest. Clay-colored and vesper sparrow nest survival was higher for nests located near woodland edges, nests with greater cover of Kentucky bluegrass (Poa pratensis), and nests more concealed by vegetation. Vesper sparrow nest survival increased as the percent cover of tall shrubs near the nest increased. Based on video-camera data, the 13-lined ground squirrel (Spermophilus tridecemlineatus) was the most common predator of sparrow eggs and young. Thirteen-lined ground squirrels were more common far from woodland edges than near and this pattern may, in part, explain clay-colored and vesper sparrow nest survival in relation to woodland edges. In contrast to our results, studies conducted in other grassland systems generally report lower nest survival for grassland birds nesting near trees and shrubs. This disparity in results demonstrates the need to identify specific nest predators and their distributions with respect to important habitat features because these data can be important in explaining-and perhaps predicting-patterns of nest predation.
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670. **Nesting birds and grazing cattle: Accommodating both on Midwestern pastures.**
Temple, Stanley A.; Fevold, Brick M.; Paine, Laura K.; Undersander, Daniel J.; and Sample, David W.
Studies in Avian Biology 19: 196-202. (1999)
NAL Call #: QL671.S8.
Notes: 0197-9922 (ISSN); Ecology and conservation of grassland birds of the Western Hemisphere.
Descriptors: commercial activities/ conservation measures/ reproduction/ ecology/ community structure/ population dynamics/ terrestrial habitat/ land and freshwater zones/ farming and agriculture/ habitat management/ pasture management/ ecology/ reproduction/ reproductive productivity/ species diversity/ population density/ pasture management/ grasslands/ Wisconsin/ Iowa and Lafayette Counties/ Aves/ birds/ chordates/ vertebrates
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671. **Nesting ecology of mixed-grass prairie songbirds in southern Saskatchewan.**
Davis, S. K.
Wilson Bulletin 115(2): 119-130. (2003)
NAL Call #: 413.8 W692; ISSN: 00435643
Descriptors: brood parasitism/ nest predation/ nesting behavior/ reproductive success/ songbird/ Canada/ North America/ Saskatchewan/ Ammodramus bairdii/ Anthus spragueii/ Calcarius ornatus/ Microtus pennsylvanicus/ Molothrus ater/ Passerculus sandwichensis/ Spizella pallida/ Sturnella neglecta

Abstract: During 1996-2000, I studied the nesting ecology of Sprague's Pipits (Anthus spragueii), Clay-colored Sparrows (Spizella pallida), Savannah Sparrows (Passerculus sandwichensis), Baird's Sparrows (Ammodramus bairdii), Chestnut-collared Longspurs (Calcarius ornatus), and Western Meadowlarks (Sturnella neglecta) on 47 native mixed-grass prairie pastures in southern Saskatchewan. Predation was the primary cause of nest failure and occurred at a similar frequency among the six species. Nest success and productivity varied among years and was lowest during 1997, the year of a substantial increase in meadow vole (Microtus pennsylvanicus) populations in southern Saskatchewan. Nest predation was most severe during the nestling stage with daily survival rates typically lower than those of the incubation period. Brown-headed Cowbirds (Molothrus ater) parasitized nests of all six species, with 5-29% of host nests containing cowbird eggs. Savannah Sparrows, Clay-colored Sparrows, and Western Meadowlarks incurred the highest frequency of brood parasitism. Parasitized hosts experienced lower productivity due to a combination of reductions in clutch size, hatching success, and fledging success. Overall, brood parasitism by cowbirds cost these birds between 1.3 and 2.2 young per successful nest. These results support the general contention that nest predation is the primary factor influencing grassland songbird reproductive success.
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672. **Nesting-season responses of three grassland sparrow species to previous-year mowing on reclaimed surface mines in Clarion County, Pennsylvania.**
Brauning, Daniel; Grishaver, Mary; and Grainer, Chris
Journal of the Pennsylvania Academy of Science 75(1): 23-26. (2001)
NAL Call #: Q11.J682; ISSN: 1044-6753
Descriptors: commercial activities/ reproduction/ reproductive behavior/ ecology/ terrestrial habitat/ land and freshwater zones/ Ammodramus henslowii/ Ammodramus savannarum/ Passerculus sandwichensis (Emberizidae): farming and agriculture/ mowing/ breeding season/ nesting season/ reclaimed surface mines/ previous year mowing/ distribution within habitat/ nesting season occupancy/ grassland/ prairie/ Pennsylvania/ Clarion County/ Emberizidae/ Passeriformes, Aves/ birds/ chordates/ vertebrates
Abstract: Declines in populations of grassland birds have been attributed to the intensive nature of modern agricultural practices, the loss of native prairie grasses across the continent, and loss of agricultural acreage in the Northeast. Using belt transects, we assessed numbers of three sparrow species during the nesting season in relation to hay-cutting during the previous year on three reclaimed surface mines in Clarion County, Pennsylvania. Grasshopper sparrow (Ammodramus savannarum) detection rates varied between 0.3 to 1.2 birds per 100 ms, and showed no consistent response to previous-year mowing. Savannah sparrows (Passerculus sandwichensis) occurred at twice the rate on mowed (0.58 birds/100 m) than on unmowed fields (0.22 birds/100 m). Henslow's sparrows (Ammodramus henslowii) were from six to 28 times more abundant on unmowed transects (0.6 to 1.2 birds per 100 m) than on mowed transects (0.04 to 0.09 birds per 100 m). Leaf litter depth, number of dead forbs, and the height of tallest green forbs differed significantly between mowed and unmowed areas. Leaf litter depth was the best predictor of the number of Henslow's sparrows ($r^2 = 0.63$, $p < 0.001$) in all areas combined. The presence of dead forbs was the best indicator of unmowed areas; no dead forbs were observed on transects mowed the previous year. Habitat features associated with mowing the previous year, i.e., elimination of dead forbs and reduction of leaf litter depth, have direct functional affects on Henslow's sparrows in the form of eliminating song perches and reducing cover for nests, respectively. Our results corroborate recommendations to manage only a portion of an area for Henslow's sparrow annually and to cut individual parcels at intervals of no more than bi- or tri-ennially.
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673. **Nesting success of upland nesting waterfowl and sharp-tailed grouse in specialized grazing systems in south-central North Dakota.**
Sedivec, K. K.; Messmer, T. A.; Barker, W. T.; Higgins, K. F.; and Hertel, D. R.
In: Can livestock be used as a tool to enhance wildlife habitat? General Technical Report-RM 194/ Severson, Kieth E., ed.; Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1990. pp. 71-92.
Notes: 43rd Annual Meeting of the Society for Range Management, Reno, Nev., February 13, 1990.
NAL Call #: aSD11.A42 no. 194
Descriptors: commercial activities/ conservation measures/ reproduction/ ecology/ population dynamics/ land and freshwater zones/ Anas/ Aythya (Anatidae)/ Tympanuchus phasianellus (Phasianidae): farming and agriculture/ habitat management/ reproductive productivity/ population density/ nesting density/ North Dakota/ nesting success/ livestock grazing systems/ Anatidae/ Anseriformes/ Aves/ birds/ chordates/ vertebrates
© Thomson Reuters Scientific

674. **Nongame wildlife communities in grazed and ungrazed montane riparian sites.**
Schulz, T. T. and Leininger, W. C.
Great Basin Naturalist 51(3): 286-292. (1991)
NAL Call #: 410 G79; ISSN: 0017-3614
Descriptors: Zapus princeps/ birds/ small mammal/ Wilson's warbler/ western jumping mouse/ cattle grazing/ wildlife management/ Rocky Mountains/ Colorado
© Thomson Reuters Scientific

675. **The northern bobwhite decline: Scaling our management for the twenty-first century.**
Williams, C. K.; Guthery, F. S.; Applegate, R. D.; and Peterson, M. J.
Wildlife Society Bulletin 32(3): 861-869. (2004)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2004)032<0861:TNBDSO>2.0.CO;2.
Descriptors: broad-scale/ Colinus virginianus/ fine-scale/ habitat/ harvest/ management/ northern bobwhite/ usable space/ gamebird/ habitat management/ harvesting/ population decline/ wildlife management/ North America
Abstract: Northern bobwhites (Colinus virginianus) are one of the most broadly researched and intensively managed species in North America. However, we argue that a disadvantage of this status is that traditional management

principles currently are incompatible with the spatial scale necessary to address the nationwide decline in bobwhite abundance. We maintain that halting or reversing this decline will entail 2 principal changes in the scale of management. Primarily we suggest that habitat oversight must switch from historical fine-scale management (promotion of edge habitat, weedy fencelines, disked strips, living hedges, and food plots) to regional management of usable space. Secondly, within these regional management areas, we should apply harvest management that employs risk-sensitive strategies that conservatively avoid undermining the primary goal. This entails narrowing the scale of harvest management from statewide to regional levels. If these ideological changes cannot be made and historical policies remain in force, we risk failing to stabilize, let alone increase, bobwhite populations.
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676. **Northern bobwhites and postfire succession.**
Ransom, Dean and Schulz, Gerral G.
Journal of Wildlife Management 71(2): 565-570. (2007)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Galliformes/ Phasianidae/ Colinus virginianus/ fires-burns/ habitat management/ density/ prescribed fire/ rangeland/ rolling plains/ ecosystems/ Texas/ environmental factors/ conservation/ wildlife management/ habitat use/ land zones/ population ecology/ wildlife management/ postfire succession
Abstract: Our study evaluated the effects of prescribed fire on northern bobwhites (Colinus virginianus) occupying native rangelands in Rolling Plains of Texas, USA, during 2002 and 2003. Prescribed fires were conducted during February of 1996, 1998, and 2000; pastures with no recent treatment history served as controls. We quantified bobwhite densities from line transects using distance sampling. We used a repeated-measures analysis of variance to test for treatment-year differences in bobwhite densities. We measured postfire herbaceous and woody vegetation attributes and evaluated vegetation relationships to bobwhite density using simple linear regression. We found significant between-year differences in fall bobwhite densities ($F = 13.05$, $df = 3$, $P = 0.036$) but no differences among treatments or controls. Fall bobwhite densities were inversely related to visual obstruction ($r^2 = 0.179$, $df = 15$, $P = 0.058$) and positively associated with increasing heterogeneity of grass cover ($r^2 = 0.416$, $df = 15$, $P = 0.004$). Our results suggest prescribed fire at large spatial scales may be a neutral practice for managing bobwhite habitat on semiarid rangelands.
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677. **Observations of pronghorn distribution in relation to sheep grazing on the Desert Experimental Range.**
Clary, W. P. and Holmgren, R. C.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 581-592; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: Utah/ sheep/ pronghorn/ Antilocapra americana/ grazing
This citation is from AGRICOLA.

678. **Observations of white-tailed deer and cattle diets in Mexico.**
Martinez, Alfonso; Molina, Victor; Gonzalez, Fernando; Marroquin, Jorge S.; and Navar, Jesus
Journal of Range Management 50(3): 253-257. (1997)
NAL Call #: 60.18 J82; ISSN: 0022-409X.
http://jrm.library.arizona.edu/data/1997/503/253-257_martinez.pdf
Descriptors: nutrition/ diet/ feeding behavior/ ecology/ competition/ terrestrial habitat/ man-made habitat/ land and freshwater zones/ Odocoileus virginianus texanus (Cervidae): food plants/ food preferences/ interspecific competition/ Bos indicus/ Bos taurus/ grazing resources/ dietary structure/ selectivity/ rangelands/ grasslands/ cultivated land habitat/ pasture/ Mexico/ Nuevo Leon/ anahuac/ dietary composition/ sympatric species overlap/ faecal analysis/ Cervidae/ Artiodactyla/ Mammalia/ chordates/ mammals/ vertebrates
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679. **Observations on white-tailed deer and habitat response to livestock grazing in south Texas.**
Cohen, W. E.; Drawe, D. L.; Bryant, F. C.; and Bradley, L. C.
Journal of Range Management 42(5): 361-365. (1989)
NAL Call #: 60.18 J82; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume42/Number5/azu_jrm_v42_n5_361_365_m.pdf
Descriptors: Odocoileus virginianus/ rotational grazing/ Texas/ white-tailed deer
Abstract: Since short duration grazing (SDG) was introduced to Texas, concern for white-tailed deer (Odocoileus virginianus) has magnified because they are a species of major economic importance to ranchers. The objective of this study was to observe the effects of SDG and continuous yearlong grazing (CG) on home ranges and movement indices of female deer, and on forage availability. The study was conducted on the Rob and Bessie Welder Wildlife Refuge, near Sinton, Texas. The study area included a 10-pasture SDG cell and a CG pasture, each stocked at 2.8 ha/auy. Cattle grazed each SDG paddock 2 to 8 days; paddocks were rested 32 to 47 days. A total of 3,961 radio-fixes from 11 does was collected over an 11-month study period in 1983. Monthly and annual home ranges of does were similar ($P > 0.05$) between SDG (207 ha) and CG (229 ha). However, white-tailed deer traveled 35% more ($P < 0.05$) between fixes in SDG (449 m) than in CG (332 m) from May to August, a time of greatest physiological and nutritional stress for female deer in south Texas. Also, does avoided ($P < 0.05$) cattle during 2 cycles of the SDG rotation. The primary trend observed was for the deer under SDG to avoid cattle concentrations by alternating between preferred habitats rather than a predictable paddock-to-paddock movement. In general, there were few differences in total grass and forb cover between SDG and CG. However, several forage species important to deer were less frequent ($P < 0.05$) under SDG than CG.
This citation is from AGRICOLA.

680. **Occupied and unoccupied sage grouse habitat in Strawberry Valley, Utah.**
Bunnell, K. D.; Flinders, J. T.; Mitchell, D. L.; and Warder, J. H.
Journal of Range Management 57(5): 524-531. (2004)
NAL Call #: 60.18 J82 ; ISSN: 0022409X
Descriptors: Centrocercus urophasianus/ logistic regression/ sage grouse/ sagebrush/ gamebird/ habitat use/ nest site/ regression/ vegetation/ North America/ Strawberry Valley/ United States/ Utah/ Bromus inermis/ Centrocercus urophasianus
Abstract: This study evaluated multiple aspects of spring/summer sage grouse (Centrocercus urophasianus) habitat in Strawberry Valley, Utah by measuring vegetation associated with nest, brood and adult use sites. In addition, 3 types of random habitats were measured including available habitat within core use areas, random sagebrush (Artemisia spp.)/grass habitat outside core use areas, and random sagebrush/grass habitat sites that had been converted to an understory of smooth brome (Bromus inermis Leyss) by past range management practices. Logistic regression was used to identify those habitat variables that discriminated between site types. Variables that discriminated adult habitat from brood rearing habitat included: 1) sagebrush height (P ≤ 0.01) and 2) forb diversity (P = 0.12) with sagebrush height being greater at adult sites and forb diversity greater at brood sites Variables that significantly discriminated occupied adult habitat from random habitat outside of core use areas included: 1) percent grass cover (P < 0.01) and 2) area of sagebrush canopy (P = 0.03) with both variables having grater values in adult habitat. Variables that significantly discriminated occupied adult habitat from random habitat with a smooth brome understory included: 1) percent forb cover (P ≤ 0.01), 2) shrub canopy cover (P = 0.02), and 3) area of sagebrush canopy (P = 0.08) with all variables being greater in adult habitat. In addition, this study identified sagebrush age, sagebrush canopy area, and forb diversity as potentially important aspects of sage grouse habitat that have not been previously reported.
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681. **Pastures for upland birds: Landowner incentive program restores native species in bermudagrass pastures (Texas).**
Wagner, M.; Smeins, F.; and Hays, B.
Ecological Restoration 23(3): 209-210. (2005); ISSN: 15434079
Descriptors: Aves/ Cynodon/ pastures/ birds/ uplands/ native habitat/ grasses/ Texas
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682. **Patch and landscape factors shape community assemblage of bumble bees, Bombus spp. (Hymenoptera: Apidae), in montane meadows.**
Hatfield, R. G. and LeBuhn, G.
Biological Conservation 139(1-2): 150-158. (2007)
NAL Call #: S900.B5; ISSN: 00063207.
Notes: doi: 10.1016/j.biocon.2007.06.019.
Descriptors: grazing/ landscape/ patch/ pollinator/ Scale/ Sierra Nevada
Abstract: Understanding the scale at which habitat influences species richness in terrestrial ecosystems is central to both ecology and conservation biology [Wettstein, W., Schmid, B., 1999. Conservation of arthropod diversity in montane wetlands: effect of altitude, habitat quality and habitat fragmentation on butterflies and grasshoppers. Journal of Applied Ecology, 36, 363-373]. Community composition may be influenced by habitat variation at patch and/or landscape-scales depending on the body size, home range area, and dispersal distances of the focal taxa [Calder III, W.A., 1984. Size, function, and life history. Harvard University Press, Cambridge, MA; Haskell, J.P., Ritchie, M.E., Olff, H., 2002. Fractal geometry predicts varying body size scaling relationships for mammal and bird home ranges. Nature 418, 527-530; Thomas, C.D., 2000. Dispersal and extinction in fragmented landscapes. Proceedings of the Royal Society Biological Sciences Series B 267, 139-145], not merely their phylogenetic affinity. We investigated the importance of habitat variables at different scales on the richness and abundance of bumble bees both annually and seasonally in Sierran montane meadows over two years. We found that both patch and landscape factors influence the species richness and abundance of bumble bees and these factors have a seasonal component to their importance. The proportion of meadow in the surrounding habitat was the most consistent positive influence on both species richness and abundance across years. In the second year, 2003, patch factors, plant species richness and current livestock grazing also influenced bumblebee species richness; plant species richness was positively correlated and current livestock grazing was negatively correlated with bumble bee species richness. Bumble bee abundance was positively influenced by meadow wetness and proportion of meadow in the surrounding habitat in both years. These data suggest conservation of pollinators depends on conservation planning with attention to the quality and context of the landscape.
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683. **Patch size and landscape effects on density and nesting success of grassland birds.**
Winter, M.; Johnson, D. H.; Shaffer, J. A.; Donovan, T. M.; and Svedarsky, W. D.
Journal of Wildlife Management 70(1): 158-172. (2006)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: bird density/ bobolink/ clay-colored sparrow/ Dolichonyx oryzivorus/ landscape composition/ nest success/ Passerculus sandwichensis/ patch size/ replication/ Savannah sparrow/ Spizella pallida/ variability
Abstract: Current management recommendations for grassland birds in North America emphasize providing large patches of grassland habitat within landscapes that have few forest or shrubland areas. These Bird Conservation Areas are being proposed under the assumption that large patches of habitat in treeless landscapes will maintain viable populations of grassland birds. This assumption requires that patch size and landscape features affect density and nesting success of grassland birds, and that these effects are consistent among years and regions and across focal species. However, these assumptions have not yet been validated for grassland birds, and the relative importance of local vegetation structure, patch size, and landscape composition on grassland bird populations Is not well known. In addition, factors influencing grassland bird nesting success have been investigated mostly in small-scale and short-duration studies. To develop management guidelines for grassland birds, we tested the spatial and temporal repeatability of the influence of patch size and

landscape composition on density and nesting success of 3 grassland passerines, after controlling for local-scale vegetation structure, climate, and-when analyzing nest success-bird density. We conducted our study during 4 years (1998-2001) in 44 study plots that were set up in 3 regions of the northern tallgrass prairie in Minnesota and North Dakota, USA. In these study plots we measured density and nesting success of clay-colored sparrows (Spizella pallida), Savannah sparrows (Passerculus sandwichensis), and bobolinks (Dolichonyx oryzivorusj. Statistical models indicated that density was influenced by patch size, landscape, region, and local vegetation structure more so than by local vegetation structure alone. Both magnitude and direction of the response of density to patch size varied among regions, years, and species. In contrast, the direction of landscape effects was consistent among regions, years, and between Savannah sparrows and bobolinks. In each species, this landscape effect was independent of patch size. Nesting success was not clearly influenced by patch size or landscape composition, and none of the factors that influenced avian density also influenced nesting success in any of the 3 species. General statements on "optimal habitat" for grassland birds should therefore be viewed cautiously. Instead, long-term studies in different regions as well as a deeper understanding of the local system are needed to determine which factors are most important for grassland birds in a particular area.
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684. **Patterns of avian nest predators and a brood parasite among restored riparian habitats in agricultural watersheds.**
Maul, Jonathan D.; Smiley, Peter C.; and Cooper, Charles M.
Environmental Monitoring and Assessment 108(1-3): 133-150. (2005)
NAL Call #: TD194.E5; ISSN: 0167-6369
Descriptors: nutrition/ diet/ prey/ parasites diseases and disorders/ ecology/ population dynamics/ predators/ terrestrial habitat/ land zones/ Aves: avian prey/ monitoring predators among restored riparian habitats/ community structure/ monitoring avian nest predators and brood parasite among restored riparian habitats/ population size/ avian predators/ monitoring nest predators among restored riparian habitats/ mammalian predators/ reptilian predators/ riparian habitat/ restored habitats/ monitoring avian nest predators and brood parasite/ monitoring avian/ mammalian and reptilian predators/ Mississippi/ Panola County/ Long and Hotophia Creeks/ Reptilia/ birds/ chordates/ mammals/ reptiles/ vertebrates
Abstract: In fragmented edge-dominated landscapes, nest predation and brood parasitism may reduce avian reproductive success and, ultimately, populations of some passerine species. In the fragmented agroecosystem of northwest Mississippi, placement of drop-pipe structures has been used as a restoration technique for abating gully erosion along stream banks. These actions have formed small herbaceous and woody habitat extensions into former agricultural lands. We quantified species relative abundances, species richness, and evenness of avian nest predators and a brood parasite within four categories of constructed habitat resulting from drop-pipe installation. Differences in the abundance of two nest predators, cotton mouse (Peromyscus gossypinus) and blue jay (Cyanocitta cristata), were observed among constructed habitats. However, relative abundances of other predators such as common grackle (Quiscalus quiscula), American crow (Corvus brachyrhynchos), and hispid cotton rat (Sigmodon hispidus), and the obligate brood parasite brown-headed cowbird (Molothrus ater) did not differ among four habitat categories. Although species richness, abundance, and evenness of potential nest predators were generally similar among the constructed habitats, predator species composition varied, suggesting that these habitats supported different predator communities. This difference is important because as each predator species is added to or deleted from the community, variation may occur in the framework of prey search methods, predator strategies, and potentially overall predation pressure. We suggest that land managers using drop-pipes as part of stream restoration projects allow for the development of the constructed habitat with the largest area and greatest vegetative structure.
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685. **Performance of greater sage-grouse models for conservation assessment in the Interior Columbia Basin, U.S.A.**
Wisdom, Michael J.; Wales, Barbara C.; Rowland, Mary M.; Raphael, Martin G.; Holthausen, Richard S.; Rich, Terrell D.; and Saab, Victoria A.
Conservation Biology 16(5): 1232-1242. (2002)
NAL Call #: QH75.A1C5; ISSN: 0888-8892.
http://dx.doi.org/10.1046/j.1523-1739.2002.01074.x
Descriptors: nutrition/ diet/ ecology/ terrestrial habitat/ land and freshwater zones/ Centrocercus urophasianus (Phasianidae): habitat management/ sagebrush steppe restoration/ modeled effects and evaluation/ food plants/ Artemisia/ feeding behavior/ population dynamics/ grassland/ sagebrush steppe/ United States/ Interior Columbia Basin/ Phasianidae/ Galliformes, Aves/ birds/ chordates/ vertebrates
Abstract: Valid modeling of habitats and populations of Greater Sage-Grouse (Centrocercus urophasianus) is a critical management need because of increasing concern about population viability. Consequently, we evaluated the performance of two models designed to assess landscape conditions for Greater Sage-Grouse across 13.6 million ha of sagebrush steppe in the interior Columbia Basin and adjacent portions of the Great Basin of the western United States (referred to as the basin). The first model, the environmental index model, predicted conditions at the scale of the subwatershed (mean size of approximately 7800 ha) based on inputs of habitat density, habitat quality, and effects of human disturbance. Predictions ranged on a continuous scale from 0 for lowest environmental index to 2 for optimal environmental index. The second model, the population outcome model, predicted the composite, range-wide conditions for sage grouse based on the contribution of environmental index values from all subwatersheds and measures of range extent and connectivity. Population outcomes were expressed as five classes (A through E) that represented a gradient from continuous, well-distributed populations (outcome A) to sparse, highly isolated populations with a high likelihood of extirpation (outcome E). To evaluate performance, we predicted environmental index values and population outcome classes in areas currently occupied by sage grouse versus areas where extirpation has occurred. Our a priori expectations were that models should predict substantially

worse environmental conditions (lower environmental index) and a substantially higher probability of extirpation (lower population outcome class) in extirpated areas. Results for both models met these expectations. For example, a population outcome of class E was predicted for extirpated areas, as opposed to class C for occupied areas. These results suggest that our models provided reliable landscape predictions for the conditions tested. This finding is important for conservation planning in the basin, where the models were used to evaluate management of federal lands for sage grouse. [Ingenta]
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686. **Planting trees in prairie landscapes: Do the ecological costs outweigh the benefits?**
Kelsey, K. W.; Naugle, D. E.; Higgins, K. F.; and Bakker, K. K.
Natural Areas Journal 26(3): 254-260. (2006)
NAL Call #: QH76.N37; ISSN: 08858608
Descriptors: avian diversity/ grassland birds/ native prairie/ riparian woodlands/ tree plantings
Abstract: Tree plantings are striking landscape features that symbolize settlement of the West. Although grassland birds require large tracts of treeless grasslands, planting trees in prairie landscapes is still regarded by many as a positive management practice. We compared bird use of tree plantings (n=182) and natural riparian woodlands (n=37) to evaluate whether ecological costs of tree plantings to grassland birds is compensated for by the benefit they provide to forest birds of management concern. Findings indicate that ecological costs of tree plantings outweigh their benefits because they fail to provide habitat for forest birds of management concern. Thus, loss of native grassland bird communities is the currency in which we pay the ecological costs of plantings trees in prairie landscapes. We recommend that managers refrain from planting trees in or adjacent to grassland habitats. We further recommend that managers refocus their tree plantings efforts to restoration of riparian woodlands that maximize avian diversity in prairie landscapes.
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687. **A population decline recorded by operation burrowing owl in Saskatchewan.**
Skeel, M. A.; Keith, J.; and Palaschuk, C. S.
Journal of Raptor Research 35(4): 371-377. (2001)
NAL Call #: QL696.F3J682; ISSN: 08921016
Descriptors: Athene cunicularia/ burrowing owl/ endangered species/ habitat conservation/ population decline/ Saskatchewan/ stewardship
Abstract: Operation Burrowing Owl (OBO) is a prairie stewardship program launched in Saskatchewan in 1987 to preserve Burrowing Owl (Athene cunicularia) habitat from cultivation. As of 2000, 459 OBO members were protecting 61 259 ha of grassland habitat. Of the sites protected, 97% (466) involved privately-owned land (21 376 ha) and the remaining sites were publicly owned (39883 ha). Participants signed a voluntary agreement to report annually the number of owls on their land and to conserve the owls' nesting areas, even if sites became unoccupied. In recent years, the program has promoted conservation easements and assisted landowners with owl habitat enhancement. In recognition of participation, members received a gate sign, an annual newsletter, and educational material. In addition to conserving habitat, OBO has increased public awareness of the owl, participated in research, and monitored owl population changes. In 2000, 459 OBO members reported a total of 54 pairs, considerably fewer than the 681 pairs reported by 352 members in 1988. After correcting for non-responding members each year, the annual census indicated a 95% decline in estimated number of pairs over 13 yr from 1988 (1032 pairs) to 2000 (56 pairs); this represents an average decline of 21.5% per year. Between 1987-93, the mean number of sites with ≥5 pairs of owls was 26 (range = 10-42; 5-11% of sites). In contrast, by 2000, 94% of all formerly-occupied sites had zero owls, two sites had five pairs (<1% of sites), and no site had ≥5 pairs of owls.
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688. **Population dynamics of hispid cotton rats (Sigmodon hispidus) across a nitrogen-amended landscape.**
Clark, J. E.; Hellgren, E. C.; Jorgensen, E. E.; Tunnell, S. J.; Engle, D. M.; and Leslie, D. M.
Canadian Journal of Zoology 81(6): 994-1003. (2003)
NAL Call #: 470 C16D; ISSN: 00084301.
Notes: doi: 10.1139/z03-084.
Descriptors: biodiversity/ biomass/ nitrogen/ exclosure fencing/ population statistics/ exclusion experiment/ grassland/ nitrogen/ nutrient enrichment/ population dynamics/ rodent/ Sigmodon hispidus
Abstract: We conducted a mark-recapture experiment to examine the population dynamics of hispid cotton rats (Sigmodon hispidus) in response to low-level nitrogen amendments (16.4 kg nitrogen/ha per year) and exclosure fencing in an old-field grassland. The experimental design consisted of sixteen 0.16-ha plots with 4 replicates of each treatment combination. We predicted that densities, reproductive success, movement probabilities, and survival rates of cotton rats would be greater on nitrogen-amended plots because of greater aboveground biomass and canopy cover. Population densities of cotton rats tended to be highest on fenced nitrogen plots, but densities on unfenced nitrogen plots were similar to those on control and fenced plots. We observed no distinct patterns in survival rates, reproductive success, or movement probabilities with regard to nitrogen treatments. However, survival rates and reproductive success tended to be higher for cotton rats on fenced plots than for those on unfenced plots and this was likely attributable to decreased predation on fenced plots. As low-level nitrogen amendments continue to be applied, we predict that survival, reproduction, and population-growth rates of cotton rats on control plots, especially fenced plots with no nitrogen amendment, will eventually exceed those on nitrogen-amended plots as a result of higher plant-species diversity, greater food availability, and better quality cover.
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689. **Population responses of Microtus pennsylvanicus across a chronological sequence of habitat alteration.**
Dooley, James L. and Murray, Amanda L.
Ohio Journal of Science 106(3): 93-97. (2006)
NAL Call #: 410 Oh3; ISSN: 0030-0950
Descriptors: conservation measures/ ecology/ land zones/ Microtus pennsylvanicus: habitat management/ population dynamics/ man-made habitat/ reclaimed surface mined habitats/ Ohio/ international Center for the Preservation of

Wild animals/ Mammalia, Rodentia, Muridae/ chordates/ mammals/ rodents/ vertebrates
Abstract: Understanding the effects of habitat alteration on population demography and persistence is emerging as one of the most important and challenging areas facing ecologists and conservation biologists today. Here we compare the population demography of a common but important consumer species in eastern and mid-western grassland communities (Microtus pennsylvanicus) across three habitats that differ in the amount of time since reclamation following strip-mining (30, 25, and 15 years). We established two 40 x 40 m plots at each of the three sites and used traditional capture-recapture techniques to monitor population size, survival, and recruitment through a nine-month period during 1999-2000. We predicted that populations of M. pennsylvanicus would exhibit higher population numbers, better survival rates, and higher rates of recruitment in habitat patches that had been recovering for longer periods of time. In contrast to our predictions, results indicated higher peak population numbers at the most recently disturbed site (Z = 81.18 ± 9.59 individuals) and higher numbers of reproductive females ($\bar{x}$ = 3.38 ± 0.85) relative to sites recovering for 25 and 30 years ($\bar{x}$ peak population size = 28.08 ± 23.09 and 31.16 ± 1.75 individuals, respectively; ($\bar{x}$ number of reproductive females = 0.57 ± 0.32 and 1.13 ± 0.13, respectively). Thus it would appear that time since disturbance was not an important predictor of population performance for this species in this altered system. Alternative hypotheses such as the influence of local habitat attributes and population fluctuations are discussed.
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690. **Population status and management of lesser prairie-chicken in Colorado.**
Giesen, Kenneth M.
Prairie Naturalist 32(3): 137-148(2000)
NAL Call #: QH540.P7; ISSN: 0091-0376
Descriptors: population studies/ wildlife management: conservation/ translocation/ management method/ conservation status/ grassland restoration/ grazing management/ habitat degradation/ habitat suitability/ population changes/ population size/
United States Forest Service
Abstract: Populations of lesser prairie-chicken (Tympanuchus pallidicinctus), apparently abundant in southeastern Colorado prior to EuroAmerican settlement, reached a low during the "Dust Bowl" years in the 1930's. Restoration of native sand sagebrush (Artemisia filifolia) grasslands and management of grazing on the Comanche National Grasslands by the United States Forest Service have resulted in modest population increases of lesser prairie-chicken since the 1960's. Past translocation efforts to expand distribution in Colorado and increase population size were not successful because too few birds were released and habitats may not have been suitable. Continued restoration and management of degraded habitats, as well as successful transplants into suitable habitats, could result in substantial increases in both distribution and population size. Precipitation appears to be a major factor affecting population changes as reflected in annual counts of active leks and males. Present populations in Colorado are estimated at less than 1,500 breeding individuals.
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691. **Potential effects of livestock water-trough modifications on bats in northern Arizona.**
Tuttle, S. R.; Chambers, C. L.; and Theimer, T. C.
Wildlife Society Bulletin 34(3): 602-608. (Oct. 2006)
NAL Call #: SK357.A1W5
Descriptors: livestock/ water troughs/ fences/ Myotis/ Chiroptera/ drinking/ animal behavior/ Arizona/ Antrozous pallidus/ natural resources, environment, general ecology, and wildlife conservation/ animal ecology and behavior/ animal production
This citation is from AGRICOLA.

692. **Potential effects of mowing prior to summer burning on the Eastern Massasauga (Sistrurus c. Catenatus) at Squaw Creek National Wildlife Refuge, Holt County, Missouri, USA.**
Durian, Francis E. and Lenhoff, Lisa
Transactions of the Kansas Academy of Science 38: 21-25. (2004)
NAL Call #: 500 K13T; ISSN: 0544-540X
Descriptors: conservation measures/ ecology/ population dynamics/ terrestrial habitat/ land zones/ Sistrurus catenatus catenatus: habitat management/ mowing prior to summer burning/ potential effects on mortality rate/ mortality/ mortality rate/ grassland/ prairie/ Missouri/ Holt County/ Squaw Creek National Wildlife Refuge/ Reptilia, Lepidosauria, Squamata, Serpentes, Viperidae/ chordates/ reptiles/ vertebrates
Abstract: We conducted a pilot study to begin evaluating the use of pre-burn mowing to reduce or eliminate Eastern Massasauga (Sistrurus c. catenatus) mortality during summer prescribed fires. Drift fencing was used to determine the presence of Eastern Massasaugas on a 8.1 ha portion of native wet prairie at Squaw Creek National Wildlife Refuge during the summer 2001. Twenty-two days of trapping with 10 randomly located drift fence traps (n=220 trap nights) resulted in the capture of 96 snakes representing 8 species, including 9 Eastern Massasaugas. After trapping was completed the site was mowed to a height of 20 cm and then burned 13 days after mowing was completed. Post-burn transect searches of the site revealed one yellow-bellied racer (Coluber constrictor) mortality due to the fire. The low mortality rate suggests that pre-burn mowing may potentially reduce fire related mortality of Eastern Massasaugas and other snake species by negatively modifying occupied habitat which in turn forces snakes to leave the area or seek refuge below ground.
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693. **Potential uses of cattle grazing to manage waterfowl nesting cover on Turnbull National Wildlife Refuge.**
Rees, J. R.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 86-93; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: Washington/ grazing/ waterfowl/ nesting
This citation is from AGRICOLA.

694. **Predation and the management of prairie grouse.**
Schroeder, M. A. and Baydack, R. K.
Wildlife Society Bulletin 29(1): 24-32. (2001)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Centrocercus urophasianus/ greater prairie-chicken/ Grouse management/ lesser prairie-chicken/ population regulation/ predator-prey relationships/ sage grouse/ sharp-tailed grouse/ Tympanuchus cupido/ Tympanuchus pallidicinctus/ Tympanuchus phasianellus/ gamebird/ management/ predation/ Centrocercus urophasianus/ Tympanuchus cupido/ Tympanuchus pallidicinctus/ Tympanuchus phasianellus
Abstract: This paper examines the importance of predation in the life cycles of sage grouse (Centrocercus urophasianus), sharp-tailed grouse (Tympanuchus phasianellus), greater prairie-chicken (T. cupido), and lesser prairie-chicken (T. pallidicinctus). Most individual prairie grouse eventually succumb to predation, with substantial effects on nest success, juvenile survival, and adult survival. Predator control has occasionally been used as a management tool with the belief that reducing predator numbers can enhance viability of game populations in general and prairie grouse in particular. Although some experimental research has shown that direct reduction of predator numbers can increase grouse recruitment, most current management plans recommend indirect management of the grouse-predator relationship by manipulating habitats. However, as habitats become more fragmented and altered and populations of prairie grouse become more threatened and endangered, it is important to reconsider predator control as a management option and to evaluate its viability through experimentation.
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695. **Predator activity related to landscape features in northern Iowa.**
Kuehl, A. K. and Clark, W. R.
Journal of Wildlife Management 66(4): 1224-1234. (2002)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: Akaike weights/ corn belt/ habitat fragmentation/ Iowa/ isolation/ Mephitis mephitis/ predation/ Procyon lotor/ raccoon/ red fox/ striped skunk/ track stations/ Vulpes vulpes/ grassland/ predation risk/ predator/ predator-prey interaction/ United States/ Mephitis mephitis/ Phasianus colchicus/ Procyon lotor/ Vulpes vulpes
Abstract: We studied mammalian predator activity in relation to patches of grassland habitat in the agricultural landscape of northern Iowa to understand the potential interactions with ground-nesting birds, including waterfowl and ring-necked pheasant (Phasianus colchicus). We quantified presence and movement direction of striped skunk (Mephitis mephitis), raccoon (Procyon lotor), and red fox (Vulpes vulpes) using unbaited track stations placed along the edges of 100-ha blocks of grassland and at other locations throughout the surrounding landscape. We used logistic regression with repeated measures and Akaike weights to develop predictive models of predator presence as a function of landscape variables including distance from a grassland block, shape of grassland edges, and presence of woodlands, farmsteads, and wetlands. Predators were detected at track stations in the landscape near (≤500 m) grassland blocks 33.5% of the time, more frequently than at stations immediately adjacent to edges of blocks (22.6%), and much more frequently than at stations distant (>500 m) from blocks (13.6%). Striped skunk presence at a station decreased as distance from grassland patches increased and was positively related to the number of farmsteads; raccoon presence was positively related to presence of woody cover; and red fox presence increased with greater area of pastureland and greater isolation from farmsteads, and decreased with increasing amount of strip habitat in the landscape. Predicted predator presence at locations where duck nests were found ≤5500 m from blocks of grassland (23.1%) was within 1 SE of the Mayfield nest mortality rate, whereas predicted presence at isolated nest locations (12.0%) was greater than observed nest mortality. Track stations indicated that predators moved into and out of grassland patches at corners of blocks (80% of the time) much more frequently than when they traveled along the straight sides of blocks (7%). If presence of predators is directly related to predation rate, our models predict that risk to nesting birds would be greatest in patches near large grassland blocks where corridors, corners, and smaller patches focus predator activity. We envision that wildlife biologists could use models of predator activity to predict the potential influence of landscape configuration on predation risk to nesting birds.
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696. **Predicting regional abundance of rare grassland birds with a hierarchical spatial count model.**
Thogmartin, W. E.; Knutson, M. G.; and Sauer, J. R.
Condor 108(1): 25-46. (2006)
NAL Call #: QL671.C6; ISSN: 00105422
Descriptors: abundance/ bobolink/ grasshopper sparrow/ Henslow's sparrow/ hierarchical model/ sedge wren/ upland sandpiper
Abstract: Grassland birds are among the most imperiled groups of birds in North America. Unfortunately, little is known about the location of regional concentrations of these birds, thus regional or statewide conservation efforts may be inappropriately applied, reducing their effectiveness. We identified environmental covariates associated with the abundance of five grassland birds in the upper midwestern United States (Bobolink [Dolichonyx oryzivorus), Grasshopper Sparrow [Ammodramus savannarum], Henslow's Sparrow [A. henslowii], Sedge Wren [Cistothorus platensis], and Upland Sandpiper [Bartramia longicauda]) with a hierarchical spatial count model fitted with Markov chain Monte Carlo methods. Markov chain Monte Carlo methods are well suited to this task because they are able to incorporate effects associated with autocorrelated counts and nuisance effects associated with years and observers, and the resulting models can be used to map predicted abundance at a landscape scale. Environmental covariates were derived from five suites of variables: landscape composition, landscape configuration, terrain heterogeneity and physiognomy, climate, and human influence. The final models largely conformed to our a priori expectations. Bobolinks and Henslow's Sparrows were strongly sensitive to grassland patch area. All of the species except Henslow's Sparrows exhibited substantial negative relations with forest composition, often at multiple spatial scales. Climate was found to be important for all species, and was the most important factor influencing abundance of Grasshopper Sparrows. After mapping predicted abundance, we found no obvious correspondence in the regional patterns of the five species. Thus, no clearly defined areas exist within the upper midwestern United

States where management plans can be developed for a whole suite of grassland birds. Instead, a larger, region-wide initiative setting different goals for different species is recommended. © The Cooper Ornithological Society 2006.
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697. **Preliminary evaluation of elk habitat use within a three-pasture rest-rotation grazing system.**
Frisina, M. R.
Proceedings of the Montana Academy of Sciences 46: 27-36. (1986)
NAL Call #: 500 M762
Descriptors: Cervus elaphus canadensis/ grazing/ habitats/ livestock/ range management/ resource management/ rotational grazing/ wildlife management/ plant protection/ wildlife-livestock relations/ Montana
This citation is from AGRICOLA.

698. **A preliminary report on the effects of a deferred-rotation grazing system on wildlife at the Sheldon National Wildlife Refuge.**
Oldemeyer, J. L.; Martin, S. J.; and Woodis, S. G.
Cal-Neva Wildlife Transactions: 26-42. (1983)
NAL Call #: SK351.W523; ISSN: 0095-3601
Descriptors: cattle/ Nevada/ rangelands/ wildlife/ rotational grazing
This citation is from AGRICOLA.

699. **Prescribed fire and cattle grazing influences on the vegetation and elk use of a rough fescue community.**
Jourdonnais, C. S. Univ. of Montana, 1985.
Descriptors: Cervus canadensis/ habitat management/ livestock/ interspecific relations/ food supply/ Montana/ burning/ carbohydrates/ cattle/ chemical analysis/ communities/ elk/ fall/ fescue/ grasses/ grazing/ nutrients/ production/ soils/ spring/ standing crop/ utilization/ vegetation/ weather
Abstract: The influence of seasonal burning and fall cattle grazing were compared to the following: (1) production and composition of a rough fescue community; (2) elk use; (3) nutrient content of rough fescue, Idaho fescue (F. idahoensis) and bluebunch wheatgrass (Agropyron spicatum); (4) total nonstructural carbohydrate reserves of rough fescue and idaho fescue; and (5) soil organic carbon content.
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700. **Prescribed fire and cattle grazing on an elk winter range in Montana.**
Jourdonnais, C. S. and Bedunah, D. J.
Wildlife Society Bulletin 18(3): 232-240. (1990)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: prescribed burns/ fire management/ cattle/ grazing/ Cervus elaphus/ American elk/ Montana
Abstract: Burn and cattle-grazing treatments reduced rough fescue Festuca scabrella standing crop, the preferred winter elk Cervus elaphus forage, during the initial growing season. By the 2nd growing season, the rough fescue standing crop was similar to the control in all treatments. Cattle grazing maintained more down litter accumulations than the burn treatments, were similar for all treatment in the second and third growing seasons after treatment. Elk use of the study area was limited to lake fall, winter, and early spring and was greater in the burn and cattle-grazed treatments compared with the control. Elk use of rough fescue was concentrated on plants without heavy litter. Idaho fescue F. idahoensis received significant use by elk only after rough fescue was heavily utilized. Other native species received little or no use. -from Authors
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701. **Prescribed fire effects on herpetofauna: Review and management implications.**
Russell, K. R.; Van Lear, D. H.; and Guynn, D. C.
Wildlife Society Bulletin 27(2): 374-384. (Summer 1999)
NAL Call #: SK357.A1W5; ISSN: 0091-7648 [WLSBA6]
Descriptors: prescribed burning/ amphibia/ reptiles/ wildlife management/ mortality
This citation is from AGRICOLA.

702. **Prescribed sheep grazing to enhance wildlife habitat on North American rangelands.**
Mosley, J. C.
Sheep Research Journal Special Issue: 79-91. (1994)
NAL Call #: SF371.R47; ISSN: 1057-1809
Descriptors: sheep/ grazing/ species diversity/ botanical composition/ habitats/ wildlife management/ Ovis canadensis/ plant litter
This citation is from AGRICOLA.

703. **Private-land habitat opportunities for prairie grouse through federal conservation programs.**
Riley, T. Z.
Wildlife Society Bulletin 32(1): 83-91. (2004)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Conservation Reserve Program/ Conservation Security Program/ CRP/ CSP/ Environmental Quality Incentives Program/ EQIP/ Farm and Ranch Lands Protection Program/ federal conservation programs/ grasslands/ Grassland Easement Program/ Grassland Reserve Program/ GRP/ gamebirds/ habitat restoration/ prairies/ private land/ United States/ Centrocercus minimus/ Centrocercus urophasianus/ Tympanuchus cupido/ Tympanuchus pallidicinctus/ Tympanuchus phasianellus
Abstract: Habitat alterations have resulted in significant declines in the populations of prairie grouse (Centrocercus minimus, C. urophasianus, Tympanuchus cupido, T. pallidicinctus, T. phasianellus) throughout the last century. Landscape-level habitat restoration through federal conservation programs may be the only option available to prevent several of these species from declining to dangerously low levels. I examined 7 federal conservation programs available through the United States Department of Agriculture (USDA) and 5 programs through the United States Fish and Wildlife Service (USFWS) to determine how they might be used to restore and protect habitat for prairie grouse on private land. The USDA's Conservation Reserve Program (CRP) has restored ≥15 million ha of grassland with cost-share agreements and 10-year contracts. The Environmental Quality Incentives Program (EQIP) has the potential to restore habitat for prairie grouse because it is well funded and primarily focused on improving livestock operations on grasslands, much of which occurs on native prairies. Other USDA conservation programs provide the necessary funding and incentives to landowners to protect and restore prairie grouse habitat, but competition among states for available funds and authorized practices may reduce their effectiveness at restoring habitat over large landscapes. The USFWS

Grassland Easement Program, Partners for Fish and Wildlife Program, and Private Stewardship Grants Program collectively have restored and protected ≥ 300,000 ha of grassland and native prairie with perpetual easements, cost-share agreements, technical assistance, and term contracts. Much of the vegetation provided by these programs should be of significant value for prairie grouse habitat. The USFWS State and Tribal Wildlife Grants Program and the Landowner Incentive Program should enable the states to develop their own programs to restore and protect prairie grouse habitat on private land.
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704. **Pronghorn use of agricultural land in northwestern South Dakota.**
Griffin, S. L.
Brookings, SD: South Dakota State University, 1991.
Notes: M.S. Thesis
Descriptors: Conservation Reserve Program/ State conservation programs/ South Dakota
Abstract: Studied the seasonal use of CRP grasslands by pronghorns.

705. **Protecting the prairie.**
Ness, Eric
Frontiers in Ecology and the Environment 1(6): 287. (2003)
Descriptors: Grassland Reserve Program/ prairies/ haying/ grazing/ Natural Resources Conservation Service/ NRCS/
Abstract: The author discusses the Grassland Reserve Program of the Natural Resources Conservation Service. This program will get a disbursement of $49.9 million and will protect the prairies. Under conservation management the program will look into the haying and grazing of eligible lands. More than 525 million acres of grasslands dominate American private land. Between 1982 and 1997 almost 23 million acres of grassland and scrublands were converted to crops. According to the 1997 Natural Resources Inventory another six million acres were developed. Threats to short grass prairie in Colorado and in other areas have affected grassland birds. The populations of mountain plover, prairie chicken, Henslow's sparrow, sedge wrens, the Florida grasshopper sparrow, and Bachman's sparrow have been declining over the past quarter century. Mowing during the breeding season and invasion by non-native grasses or shrubs due to fire suppression and abandonment are the main threats to these prairie grassland birds. The reserve program would work by allowing haying and grazing of eligible lands under conservation management.
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706. **Ranching and prairie dogs.**
Long, Dustin and Truett, Joe
In: Grasslands Ecosystems, Endangered Species, and Sustainable Ranching in the Mexico-U.S. Borderlands: Conference Proceedings, Proceedings-RMRS 40/ Basurto, Xavier and Hadley, Diana; Ogden, UT: Rocky Mountain Research Station, Forest Service, U.S. Department of Agriculture, 2006. pp. 87-91.
http://www.fs.fed.us/rm/pubs/rmrs_p040.html
Descriptors: commercial activities/ Cynomys ludovicianus: farming and agriculture/ ranching/ Compatibility of management practices with ranching/ Mammalia, Rodentia, Sciuridae/ chordates/ mammals/ rodents/ vertebrates
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707. **Ranching for longhorns and wildlife.**
Ikenson, Ben
Endangered Species Bulletin 25(1-2): 10-11. (2000); ISSN: 1091-7314.
http://www.fws.gov/Endangered/bulletin/2000/01-04/10-11.pdf
Descriptors: Galliformes/ Phasianidae/ Tympanuchus cupido attwateri/ ranching/ cattle/ Coastal Prairie Conservation Initiative/ Texas
Abstract: The San Bernard River in southeastern Texas passes through a ranch where the Attwater's prairie chicken once thrived. This species has become North America's most endangered bird. John Elick, the owner of the Eagle Roost Ranch wanted to help restore this bird and maintain habitat for wildlife. With the help of other landowners, he started restoration of Texas coastal prairie habitat as part of the Coastal Prairie Conservation Initiative. By this program, the landowners receive cost-share incentives for voluntary prairie habitat conservation practices. This improves the health of the rangeland and enhances wildlife habitat. The landowners can also sign a 'safe harbor' agreement, which relieves landowners of liability under the Endangered Species Act if the management practices attract endangered species. The various endangered species covered under Safe Harbor provisions are included in the article. By this agreement, the rancher improves his habitat for cattle operation and the Attwater's prairie chicken benefits from the improved habitat. Due to high rates of private ownership in Texas, this program has mushroomed in popularity.
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708. **Rangeland modeling - Forage, water, and nutrients: Species competition and tree effects.**
Zhai, T.; Mohtar, R. H.; and Chen, X.
In: ASAE Annual International Meeting 2004.
Ottawa, ON; pp. 3865-3886; 2004.
Descriptors: agroforestry/ APEX/ forage growth modeling/ GRASIM/ grazing management/ pasture modeling/ silvopasture/ computer simulation/ decision support systems/ ecology/ watersheds/ ecology/ forestry/ mathematical models/ nutrients
Abstract: Diverse uses of pasture and rangeland - from grazing to watersheds, wildlife habitats, and recreations - require an improved understanding of basic ecological processes and the effect of these processes on productivity, environmental pollution, and management practices. On going research is being conducted to develop computer-based modeling and decision support systems that help address research as well as management issues in pasture and range/and based livestock production systems. This paper presents theoretical development and field evaluation for modeling grazing system productivity and environmental impact. This modeling tool includes multispecies naturalized pasture and tree effects in silvopastoral systems. Due to its complexity and large data and computing requirement, this tool is made available on the Internet where all the computation and data needed for simulation reside on a local server. A Web-based interface is developed to facilitate input data entry and output visualization.
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709. **Recovery plan for bighorn sheep in the Peninsular Ranges, California.**
Rubin, E.
Portland, OR: U.S. Fish and Wildlife Service, 2000.
Notes: Unpublished Wildlife Report.
http://ecos.fws.gov/docs/recovery_plan/001025.pdf
Descriptors: mapping/ morphology/ taxonomy/ diseases/ predation genetics/ disturbance/ drought/ livestock/ grazing/ fire/ habitat management for wildlife/ plants, miscellaneous/ exotic species/ reproduction/ mortality/ interspecies relationships/ California/ peninsular ranges
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710. **Relating geomorphic change and grazing to avian communities in riparian forests.**
Scott, M. L.; Skagen, S. K.; and Merigliano, M. F.
Conservation Biology 17(1): 284-296. (2003)
NAL Call #: QH75.A1C5 ; ISSN: 08888892
Descriptors: avifauna/ complexity/ fluvial geomorphology/ grazing/ riparian forest/ United States/ Vireo olivaceus
Abstract: Avian conservation in riparian or bottomland forests requires an understanding of the physical and biotic factors that sustain the structural complexity of riparian vegetation. Riparian forests of western North America are dependent upon flow-related geomorphic processes necessary for establishment of new cottonwood and willow patches. In June 1995, we examined how fluvial geomorphic processes and long-term grazing influence the structural complexity of riparian vegetation and the abundance and diversity of breeding birds along the upper Missouri River in central Montana, a large, flow-regulated, and geomorphically constrained reach. Use by breeding birds was linked to fluvial geomorphic processes that influence the structure of these patches. Species richness and bird diversity increased with increasing structural complexity of vegetation (F1,32 = 75.49, p < 0.0001; F1, 32 = 79.76, p < 0.0001, respectively). Bird species composition was significantly correlated with vegetation strata diversity (rs,33 = 0.98, p < 0.0001). Bird abundance in canopy and tall-shrub foraging guilds increased significantly with increasing tree cover and tall-shrub cover (F1,22 = 34.68, p < 0.0001; F1,20 = 22.22, p < 0.0001, respectively). Seventeen bird species, including five species of concern (e.g., Red-eyed Vireo [Vireo olivaceus]), were significantly associated (p < 0.10) with structurally complex forest patches, whereas only six bird species were significantly associated with structurally simple forest patches. We related the structural complexity of 34 riparian vegetation patches to geomorphic change, woody vegetation establishment, and grazing history over a 35-year post-dam period (1953-1988). The structural complexity of habitat patches was positively related to recent sediment accretion (t33 = 3.31, p = 0.002) and vegetation establishment (t20.7 = -3.63, p = 0.002) and negatively related to grazing activity (t19.6 = 3.75, p = 0.001). Avian conservation along rivers like the upper Missouri requires maintenance of the geomorphic processes responsible for tree establishment and management of land-use activities in riparian forests.
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711. **Relative abundance of small mammals in native and restored tallgrass prairie.**
Kezar, Samuel J. and Jenks, Jonathan A.
Proceedings of the South Dakota Academy of Science 83: 33-37. (2004)
NAL Call #: 500 So82; ISSN: 0096-378X
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Mammalia: habitat management/ habitat restoration/ small taxa/ restored tallgrass prairie/ comparison with native prairie/ community structure/ native and restored tallgrass prairie/ grassland/ native and restored tallgrass prairie habitat/ South Dakota/ Brookings County/ Mammalia/ chordates/ mammals/ vertebrates
Abstract: Relative abundance was assessed for small mammals captured on native and restored tallgrass prairie habitats. Prairie voles (Microtus ochrogaster) (n = 30), meadow voles (Microtus pennsylvanicus) (n = 4), deer mice (Peromyscus spp.) (n = 5), northern short-tailed shrews (Blarina brevicauda) (n = 3), pygmy shrews (Sorex hoyi) (n = 2), and thirteen-lined ground squirrels (Citellus tridecemlineatus) (n = 3) were captured using snap traps. Relative abundance of voles (Microtus spp.) was higher in native prairie (163.3) than in restored prairie (10.2). Relative abundance of deer mice (20.4), thirteen-lined ground squirrels (13.3), and shrews (20.4) was higher in restored than native prairie (< 5.1) habitat. Results indicated that restored prairie habitats provide adequate components (forage, cover) to support viable small mammal communities.
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712. **Relative effects of litter and management on grassland bird abundance in Missouri, USA.**
Swengel, S. R. and Swengel, A. B.
Bird Conservation International 11(2): 113-128. (2001); ISSN: 09592709.
Notes: doi: 10.1017/S095927090100020X.
Descriptors: grassland/ litter/ management practices/ prairie/ relative abundance/ songbird/ United States
Abstract: Transect bird surveys were conducted at 43 tallgrass prairies in southwestern Missouri, U.S.A. in mid-June each year from 1992 to 1999. Litter volume on and near the ground was estimated on a nine-point scale during 1994 to 1999. The relative importance of management type (rotational burning, rotational haying, or a combination of both) and litter volume on relative abundance was analysed for three declining grassland songbirds: Henslow's Sparrow Ammodramus henslowii, Grasshopper Sparrow A. savannarum, and Dickcissel Spiza americana. Haying resulted in significantly higher abundance than burning for all species except Dickcissel, for which few significant management effects were detected. Henslow's Sparrow increased in abundance from light to heavy litter, Grasshopper Sparrow peaked in low to intermediate litter, and Dickcissel showed little pattern relative to litter. Litter scores recorded in each management type increased with number of years since last treatment. Although litter profoundly affected bird abundance, independent and equally important was whether that litter was obtained via haying or burning. Greater consistency among years in hayed vegetation structure may help explain these birds' preference for haying over burning or haying + burning.

Rotational haying should be employed more than burning in the management of these declining birds, especially for the sharply declining, fire-sensitive Henslow's and Grasshopper Sparrows.
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713. **Reproduction by northern bobwhites in western Oklahoma.**
Cox, S. A.; Guthery, F. S.; Lusk, J. J.; Peoples, A. D.; Demaso, S. J.; and Sams, M.
Journal of Wildlife Management 69(1): 133-139. (2005)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: Clutch size/ Colinus virginianus/ nest phenology/ nest success/ northern bobwhite/ Oklahoma/ reproduction/ clutch size/ gamebird/ latitudinal gradient/ nest predation/ nesting success/ phenology
Abstract: We studied northern bobwhites (Colinus virginianus) in western Oklahoma, USA, during the nesting seasons of 1992-2001. We obtained latitude-specific information on nesting biology and tested hypotheses on the cause of declines in clutch size with progression of the nesting season and on the phenological relation of first, second, and third nesting attempts. For pooled data on bobwhites alive during 15 April-15 September, 64 ± 6.5% of juvenile females (n = 56), 90 ± 10.0% of adult females (n=9), 13 ± 4.1% of juveniles males (n = 68), and 41 ± 10.7% of adult males (n = 22) incubated ≥ 1 nest. Bobwhites that entered the reproduction period starting on 15 April (n = 229) accumulated 203 nesting attempts (male and female incubations), which translated to 1.7 attempts/hen for all hens that entered (n = 117) and 3.1 attempts/hen for hens that survived to 15 September (n = 65). Overall success for incubated nests (48 ± 2.8%, n = 331) was independent of sex-age class and nesting attempt (1, 2, 3), but it declined at a rate of 2.37%/year (95% CL = 1.10-3.64%/year) during the study. Clutch size declined by 1 egg for every 14-20 elapsed days in the nesting season and the rate of decline was independent of incubation attempt (1 or 2); this result suggests that lower clutch sizes later in the nest season were not necessarily a function of re-nesting. Ending of nest-incubation attempts (1, 2, 3) occurred within an 8-day period from 26 August-2 September. Our results implied that early-season nesting cover is a management concern and that high nest success is possible in the absence of nest predator suppression where abundant nest sites occur across the landscape.
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714. **Reproductive success and brood survival of bobwhite quail as affected by grazing practices.**
Cantu, R. and Everett, D. D.
In: Proceedings, Second National Bobwhite Quail Symposium. Schitoskey, F.; Schitoskey, E. C.; and Talent, L. G. (eds.)
Stillwater, Okla.: Oklahoma State University; pp. 79-83; 1982 .
NAL Call #: QL696.G27N3 1982
Descriptors: Texas/ Colinus virginianus/ bobwhite quail/ grazing practices/ livestock
This citation is from AGRICOLA.

715. **Reproductive success of chestnut-collared longspurs in native and exotic grassland.**
Lloyd, John D. and Martin, Thomas E.
Condor 107(2): 363-374. (2005)
NAL Call #: QL671.C6; ISSN: 0010-5422
Descriptors: Passeriformes/ Emberizidae/ Calcarius ornatus/ Fringillidae/ Agropyron cristatum/ chestnut-collared longspur/ terrestrial ecology/ breeding habitat/ native grassland/ exotic grassland/ nest survival rate/ grasslands/ ecosystems/ habitat management/ Medicine Lake National Wildlife Refuge/ Montana/ native prairie/ crested wheatgrass/ productivity/ reproductive success/ conservation/ wildlife management/ land zones/ reproduction/ Conservation Reserve Program/ exotic plant/ grassland birds/ nest success
Abstract: Habitat loss and fragmentation have been identified as important factors in the decline of grassland bird populations. However, population declines are apparent even in prairie ecosystems that remain relatively intact suggesting that additional factors are involved. The degradation of breeding habitat may be one such factor, but few studies have examined habitat-specific demography of grassland birds, and thus little is known of how changes in breeding habitat may be related to population declines. We addressed this question by comparing reproductive success of Chestnut-collared Longspurs (Calcarius ornatus) in patches of native prairie and in monocultures of crested wheatgrass (Agropyron cristatum), a grass introduced from Asia. Using recently developed methods for estimating nest survival rate, we found that, independent of habitat type, daily nest survival generally declined from egg laying to fledging. We also found a positive effect of clutch size on nest survival rate, which we interpreted as evidence for individual heterogeneity in nest survival. Finally, we found that the odds of a nest surviving a given day were 17% lower in the exotic habitat, and that nestlings grew more slowly, and had a smaller final mass in the exotic habitat. Despite having lower reproductive success in the exotic habitat, we found no evidence that Chestnut-collared Longspurs preferred to nest in the native habitat. Our results show that the introduction and spread of a commonly planted exotic grass has adverse fitness consequences for a grassland bird, and highlight the importance of maintaining native prairie.
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716. **Reproductive success, territory size and predation pressures of the Florida scrub-jay (Aphelocoma coerulescens) at Savannas Preserve State Park.**
Cowan, Ernest M.
Endangered Species Update 22(1): 29-39. (2005); ISSN: 1081-3705
Descriptors: Corvidae/ Passeriformes/ Aphelocoma coerulescens/ scrub jay/ fires-burns/ Florida/ habitat management/ predators/ productivity/ reproductive success/ Savannas Preserve State Park/ shrub grasslands/ ecosystems/ territorial defense/ home range-territory/ territory size/ environmental factors/ behavior/ conservation/ wildlife management/ habitat use/ land zones/ reproduction/ Quercus spp./ Saint Lucie County
Abstract: The Florida Scrub-jay is found only in the fire-dependent xeric oak communities of Florida. The number of scrub-jays statewide has been in steady decline over the past century due to the habitat loss resulting from urban development and the aging of xeric oak scrub caused by

fire suppression policies. This study looks at the effect that aging of the scrub has on a population of scrub-jays at the Savannas Preserve State Park in Port St. Lucie, Florida. The population of scrub-jays at Savannas has been in decline over the past eight years. This study revealed that they are occupying territories that are much smaller than the normal optimal size and are having minimal reproductive success. In addition, the birds are subjected to predation pressures from natural predators present at higher than normal densities and by other predators brought into their habitat by encroaching urban development. The implementation of an aggressive prescribed fire program to restore their habitat is crucial to the long-term survival of this population of Florida Scrub-jays.
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717. **Research observation: Effects of rangeland ecological condition on scaled quail sightings.**
Joseph, J.; Holechek, J. L.; Valdez, R.; Collins, M.; and Thomas, M.
Journal of Range Management 56: 314-318. (July 2003)
NAL Call #: 60.18 J82
Descriptors: Callipepla/ game birds/ drought/ pastures/ arid lands/ wildlife habitats/ ecological succession/ grazing intensity/ plant litter/ biomass/ vegetation cover/ population size/ New Mexico/ Callipepla squamata/ seral stages/ animal ecology and behavior
Abstract: Scaled quail (Callipepla squamata) numbers were evaluated during and after a 2-year drought period using strip census techniques on 2 pastures in late seral rangeland ecological condition and 2 pastures in mid-seral rangeland ecological condtion. This study was conducted on the Chihuahuan Desert Rangeland Research Center (CDRRC) in south-central New Mexico on 4 adjoining pastures that were similar in size and terrain. During part of the study (August 1994 to April 1997) all 4 pastures were destocked due to depletion of perennial grass cover and biomass from a combination of drought and heavy cattle grazing. Scaled quail sightings pooled across sampling periods (9) were different (P = 0.08) on high and low rangeland ecological condition treatments. They averaged 10.72 birds per pasture on late-seral and 4.22 birds per pasture on mid-seral rangeland ecological condition treatments. Autumn perennial grass cover and standing biomass levels was higher (P < 0.10) on late seral than on mid-seral rangeland ecological condition pastures during both years of study. Availability of scaled quail foods such as leatherweed croton and broom snakeweed did not differ (P > 0.10) between treatments. Our study indicates that during extended dry periods livestock grazing at moderate intensities may adversely affect scaled quail populations in the Chihuahuan Desert by depleting perennial grass cover. However, in years of above average precipitation there is evidence scaled quail prefer mid-seral pastures over late-seral pastures. Maintaining a mosaic of conservatively (late-seral) and moderately (mid-seral) grazed pastures should best meet the habitat needs of scaled quail in the Chihuahuan Desert.
This citation is from AGRICOLA.

718. **Response of a sage grouse breeding population to fire in southeastern Idaho.**
Connelly, J. W.; Reese, K. P.; Fischer, R. A.; and Wakkinen, W. L.
Wildlife Society Bulletin 28(1): 90-96. (2000)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Artemisia/ Centrocercus urophasianus/ fire/ habitat/ lek/ sage grouse/ sagebrush/ burning/ gamebird/ habitat management/ methodology/ species conservation/ wildlife management/ United States
Abstract: Prescribed burning is a common method to eliminate sagebrush (Artemisia spp.) and has been suggested as a tool to enhance the habitat of sage grouse (Centrocercus urophasianus). Effects of this practice on sage grouse have not been evaluated rigorously. We studied effects of prescribed fire on lek (traditional breeding display areas) attendance by male sage grouse occupying low-precipitation (<26 cm) sagebrush habitats in southeastern Idaho from 1986 through 1994. During the preburn period (1986-89), average declines for male attendance were 48% and 46% for treatment and control leks, respectively. Lek counts were similar for treatment and control leks during the preburn years (G-test, 0.25 > P > 0.10). During the postburn period (1990-94), male attendance at treatment leks declined 90% and control leks declined 63%. Although declines were similar between treatment and control leks during the preburn period, postburn declines were greater for treatment than control leks (0.05 < P < 0.10). We rejected the null hypothesis that for the 2 largest leks in both the treatment and control areas, counts were independent of years for preburn (0.05 < P < 0.10) and postburn (P ≤ 0.05) periods and concluded that breeding population declines became more severe in years following fire. Prescribed burning negatively affected sage grouse in southeastern Idaho and should not be used in low-precipitation sagebrush habitats occupied by breeding sage grouse.
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719. **Response of birds to grazing of riparian zones.**
Popotnik, Gary J. and Giuliano, William M.
Journal of Wildlife Management 64(4): 976-982. (2000)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: avian abundance/ avian communities: bird counts, nest density, nest monitoring, reproductive success, riparian area livestock grazing impacts, species richness/ livestock grazing/ pasture/ pasture streams/ riparian areas/ vegetative cover/ vegetative structure/ wetlands
Abstract: Livestock grazing of streams and associated riparian areas may negatively impact avian communities through direct disturbance and alteration of vegetation structure. We determined the effects of grazing on vegetation, avian abundance, species richness, and reproductive success on pasture streams and associated riparian habitats in southwest Pennsylvania. Bird counts, nest monitoring, and vegetation sampling were conducted on 12 pairs (grazed and control) of streams in 1996 and 10 pairs in 1997. Compared with control streams, grazed areas had lower avian species richness and abundance. Several wetland-and riparian-dependent species (e.g., common snipe (Gallinago gallinago), great blue heron (Ardea herodias), green-backed heron (Butorides striatus), belted kingfisher (Ceryle alcyon), and solitary sandpiper (Tringa solitatia)) were found more often or only on control areas. Although nest density was higher and nest

destruction rates by livestock were lower on control streams, nest success (all species combined) was not affected by grazing. Avian communities in control areas appear to benefit primarily from improved vegetative cover and structure. Thus, management should focus on excluding livestock from such areas.
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720. **Response of bobwhites to cover changes within three grazing systems.**
Hammerquist-Wilson, M. M. and Crawford, J. A.
Journal of Range Management 34(3): 213-215. (1981)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume34/Number3/azu_jrm_v34_n3_213_215_m.pdf
Descriptors: Texas/ Colinus virginianus/ bobwhite quail/ grazing/ livestock
This citation is from AGRICOLA.

721. **Response of breeding Florida grasshopper and Bachman's sparrows to winter prescribed burning.**
Shriver, W. G. and Vickery, P. D.
Journal of Wildlife Management 65(3): 470-475. (2001)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: Aimophila aestivalis/ Ammodramus savannarum floridanus/ Bachman's sparrow/ breeding density/ dry prairie/ endangered species/ Florida grasshopper sparrow/ grassland/ prescribed fire/ reproduction/ density/ fire management/ grasshopper/ passerines/ population decline/ reproductive success/ United States/ Aimophila aestivalis/ Ammodramus savannarum
Abstract: Populations of Florida grasshopper (Ammodramus savannarum floridanus) and Bachman's sparrows (Aimophila aestivalis) are small and declining. Prescribed burning is the primary management tool used to maintain their grassland habitats, but the effects of this management practice on the breeding density and reproductive success of these populations are poorly understood. We conducted a 3-year spot-mapping study of 3 winter burn classes (0.5-yr, 1.5-yr, and 2.5-yr postfire) in native dry prairie on 2 sites in central Florida to determine the effects of fire management on breeding density and reproductive success of these 2 sparrows. Florida grasshopper sparrow densities were greater on recently burned plots (0.5 yr postburn: $\bar{x}$ = 4.0 ± 1 territories/10 ha ($\bar{x}$ ± SE); 1.5 yr postburn $\bar{x}$ = 3.4 ± 0.8 territories/10 ha) than on plots that had not been burned in 2.5 years ($\bar{x}$ = 1.8 ± 0.8 territories/10 ha). Grasshopper sparrow reproductive success was also higher in recently burned plots (0.5 yr post-burn; $\bar{x}$ = 1.6 successful territories/plot) than in 2.5-year burn plots ($\bar{x}$ = 0.6 successful territories/plot). In contrast, Bachman sparrow breeding densities and reproductive success were not affected by fire management rotation. Our results indicate that a fire rotation of ≤3 years is necessary to maintain suitable breeding habitat for Florida grasshopper sparrows but does not appear to negatively affect breeding Bachman's sparrows.
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722. **Response of elk to changes in plant production and nutrition following prescribed burning.**
Van Dyke, F. and Darragh, J. A.
Journal of Wildlife Management 71(1): 23-29. (Feb. 2007)
NAL Call #: 410 J827
Descriptors: animal ecology/ animal nutrition/ prescribed burning/ wildlife habitats/ wildlife food habits/ elks/ Cervus elaphus/ Artemisia/ grazing/ plant communities/ seasonal variation/ nutritive value/ botanical composition/ species diversity/ forage production/ forage quality/ habitat preferences/ forbs/ biomass/ grasses/ animal preferences/ Montana
Abstract: Researchers have ascribed use of areas by grazers after burning to changes in plant community structure, community composition, nutritional quality, and seasonal availability. Researchers can better evaluate these alternatives if they monitor changes in plant communities following burning concurrently with changes in animal use. We examined responses of elk (Cervus elaphus) to prescribed burning of areas dominated by sagebrush (Artemisia spp.) in south-central Montana, USA, within which we monitored changes in plant production, nutritional quality, and community composition and diversity from 1989 to 1999. Elk increased use of burned sites 1-2 years after burning, then reduced use to levels associated with preburn conditions over the next 3-10 years. Burning transformed low-diversity, sagebrush-dominated communities into relatively high-diversity, grass- and forb-dominated communities that persisted for 10 years, but forage biomass and protein content declined on burned sites after initial short-term increases. Changes in elk use closely tracked changes in production and nutritional quality of plants. Therefore, we concluded that increases in quantity and quality of forage were the primary cause for increased use of burned sites by elk. Managers may observe only short-term responses from elk following burning but can expect longer-term increases in plant diversity and persistence of grass-forb communities on burned sites for >10 years that may be important to elk or other grazing ungulates.
This citation is from AGRICOLA.

723. **Response of northern bobwhite to intensive habitat development on a prairie site in Mississippi (Colinus virginianus).**
Smith, Mark Dean. Mississippi State University, 2002.
Notes: Degree: MS; Advisor: Burger, Loren W.
Descriptors: bobwhite quail/ prairies/ Colinus virginianus/ nesting/ habitat management/ landscape structure/ brood survival/ habitat use/ Mississippi
Abstract: I documented annual changes in bobwhite population size during the initial phases of habitat management implementation on Black Prairie Wildlife Management Area (BPWMA), Mississippi, during 1997-1998. Additionally, I estimated survival, reproductive success, and habitat use of 197 radio-marked northern bobwhite during the 1997-1998 breeding seasons to identify mechanisms of population growth. The northern bobwhite population exhibited positive growth (r = 0.4215), primarily because of high breeding season survival, nest success, renesting effort, renest success, and brood survival. Demographic parameters did not differ between

years. Measurements of vegetation at nest sites and surrounding landscape structure were associated with probability of hatching. In establishment of home ranges and allocation of time among habitats, bobwhite exhibited selection for specific managed habitats. Habitat models using macro-habitat characteristics within home ranges were useful predictors of bobwhite habitat occupancy.
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724. **Response of small mammal populations to fescue hayfield conversion to native warm season grasses in Bath County, Virginia.**
Mengak, Michael T.
Virginia Journal of Science 55(4): 169-176. (2004); ISSN: 0042-658X
Descriptors: commercial activities/ ecology/ population dynamics/ terrestrial habitat/ man-made habitat/ land zones/ Mammalia: farming and agriculture/ grassland management influence on populations of small taxa/ population size/ Influence of grassland management on small taxa/ habitat utilization/ grassland types/ grassland/ existing fescue hayfield conversion to switchgrass/ impact on populations of small taxa/ cultivated land habitat/ Virginia/ George Washington National Forest/ Hidden Valley/ small taxa population responses to grassland management/ Mammalia/ chordates/ mammals/ vertebrates
Abstract: I investigated the effect on small mammal populations of converting an existing fescue (Festuca arundinacea) hayfield to switchgrass (Panicium virgatum) on the George Washington National Forest at Hidden Valley in Bath County, Virginia. Native warm season grasses are thought to provide better habitat than fescue pastures for Northern Bobwhite (Colinus virginianus) and several species of grassland birds as well as herbivorous small mammals. I established one live-trapping grid and conducted trapping (pretreatment) in both the switcligrass (treatment) and the fescue (control) field in March and May 1997. The treatment field was sprayed with glyphosate herbicide (Roundup[registered trademark]) in June 1997, burned and seeded to switchgrass. Live trapping was conducted at approximately 60-day intervals during the growing season from March 1997 until October 1999. I caught significantly more individuals in the treatment field (n=349 individuals of 5 species) than in the control field (n=59 individuals of 4 species; X^2 = 196.7, d.f. = 1, P0.05). The overall capture index was 14.432 and 2.273 animals per 100 trap nights in the treatment and control fields, respectively. The treatment field had a significantly higher mean 2 plant biomass weight ($\bar{x}$=58.24 g/m^2) than the control field ($\bar{x}$=38.41 g/m^2; t =4.323; P0.00008, D.F. = 44).
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725. **Response of small mammals to livestock grazing in south-central Idaho.**
Johnson, M. K.
Journal of Range Management 35(1): 51-53. (1982)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume35/Number1/azu_jrm_v35_n1_51_53_m.pdf
Descriptors: Idaho/ small mammals/ livestock/ grazing
This citation is from AGRICOLA.

726. **Response of vegetation and breeding birds to the removal of cattle on the San Pedro River, Arizona (U.S.A.).**
Krueper, D.; Bart, J.; and Rich, T. D.
Conservation Biology 17(2): 607-615. (2003)
NAL Call #: QH75.A1C5; ISSN: 0888-8892
Descriptors: riparian environments/ arid environments/ riparian vegetation/ breeding success/ environment management/ nature conservation/ population density/ conservation/ Aves/ Arizona/San Pedro R./ birds/ cattle removal/ passeriformes/ landbirds/ songbirds
Abstract: In late 1987 cattle were removed from the San Pedro Riparian National Conservation Area (NCA) in southeastern Arizona (U.S.A.). We monitored vegetation density and abundance of birds during the breeding season during 1986-1990 in riparian, mesquite grassland, and Chihuahuan desert-scrub communities in the NCA. The density of herbaceous vegetation increased four- to six-fold in riparian and mesquite grassland communities. Little change occurred in herbaceous vegetation in desert scrub, or in the density of shrubs or trees in any of the communities. Of 61 bird species for which sufficient data were collected, mean detections per kilometer increased for 42 species, 26 significantly, and decreased for 19 species, 8 significantly. The number of individuals of all avian species detected on surveys increased each year from 103/kilometer in 1986 to 221/kilometer in 1991, an average annual increase of 23% ($p < 0.001$). The largest increases occurred in riparian species, open-cup nesters, Neotropical migrants, and insectivores. Species of the Chihuahuan desert-scrub, in which vegetation changed the least, showed the smallest increases. Only a few of the species showed increasing regional trends for the same period, as demonstrated by the North American Breeding Bird Survey; thus, increases on the San Pedro Riparian NCA were likely caused by the change in local conditions, not by regional effects. Our results suggest that removing cattle from riparian areas in the southwestern United States can have profound benefits for breeding birds.
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727. **Response of winter birds to drought and short-duration grazing in southeastern Arizona.**
Bock, Carl E. and Bock, Jane H.
Conservation Biology 13(5): 1117-1123. (1999)
NAL Call #: QH75.A1C5 ; ISSN: 0888-8892
Descriptors: canopy cover/ cattle ranch/ drought/ grassland oak savanna/ grazing/ livestock exclosure/ short duration grazing/ species abundance/ vegetative ground cover
Abstract: In a grassland-oak savanna in southeastern Arizona, we compared vegetative ground cover and bird populations between a 29-year livestock exclosure and an adjacent cattle ranch that was managed according to the principles of holistic resource management, including short-duration rotational grazing. The study took place in the winter after a 2-year drought and 1 year after the drought ended and stocking densities were reduced. During the first winter, grasses on the livestock exclosure were taller (4.4 times) and had higher basal area ground cover (2.5 times), canopy cover (2.2 times), and reproductive canopy cover (10 times) than in the grazed area. These differences persisted into the second winter but at lower levels. As a group, 19 species of ground-foraging, seed-eating birds (e.g., doves, quail, sparrows, towhees) were 2.7 times more abundant on the exclosure than on adjacent grazed

grasslands during the first winter. These same species were 1.7 times more abundant on the exclosureduring the second winter and were 2.9 times more abundant on both sites combined after the drought had ended. A second group of 24 avian species with different foraging ecologies (e.g., predators, frugivores, arboreal insectivores) did not differ between treatments or years. High-density, short-duration rotational grazing, coupled with a drought, left the land in a substantially denuded condition through two winters and negatively affected a variety of resident and migratory birds dependent on ground cover and seed production for over-winter survival.
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728. **Responses of birds, rodents, and vegetation to livestock exclosure in a semi desert grassland site.**
Bock, C. E.; Bock, J. H.; Kenney, W. R.; and Hawthorne, V. M.
Journal of Range Management 37(3): 239-242. (1984)
NAL Call #: 60.18 J82; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume37/Number3/azu_jrm_v37_n3_239_242_m.pdf
Descriptors: Bouteloua spp./ Eragrostis intermedia/ Trichachne californicum/ shrub/ seasonality/ xeric habitat/ feeding/ grazing/ Arizona
Abstract: Livestock were excluded from a 3160-ha range in southeastern Arizona [USA] since 1968. Compared to an adjacent continuously grazed area, in 1981-1982 a protected upland site supported 45% more grass cover, a comparatively heterogeneous grass community and 4 times as many shrubs. Grama grasses (Bouteloua spp.) were equally common in and outside the exclosure, while a variety of other species, especially plains lovegrass (Eragrostis intermedia) and Arizona cottontop (Trichachne californicum) were much more abundant on the protected site. The grazed area supported significantly higher numbers of birds in summer, while densities did not differ in winter. Rodents were significantly more abundant inside the protected area. Species of birds and rodents more common in the grazed area included those typical of more xeric lowland habitats and those preferring open ground for feeding. Species more common on the protected site were those which characterize semidesert or plains grasslands, and which prefer substantial grass or shrub cover. Grazing appeared to favor birds as a class over rodents.
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729. **Responses of bobwhite to short duration and continuous grazing in south Texas.**
Bareiss, Laura J. Texas Tech University, 1985.
Descriptors: Colinus virginianus/ food supply/ habitat disturbance/ interspecific relations/ land use/ livestock/ mortality/ Texas/ bobwhite quail
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730. **Responses of plant and bird communities to prescribed burning in tallgrass prairies.**
Van Dyke, F.; Schmeling, J. D.; Starkenburg, S.; Yoo, S. H.; and Stewart, P. W.
Biodiversity and Conservation 16(4): 827-839. (2007)
NAL Call #: QH75.A1B562; ISSN: 09603115.
Notes: doi: 10.1007/s10531-006-9107-9.
Descriptors: DeSoto National Wildlife Refuge/ grassland birds/ Grassland plants/ prairie restoration/ prescribed burning/ tallgrass prairie
Abstract: Historic losses and fragmentation of tallgrass prairie habitat to agriculture and urban development have led to declines in diversity and abundance of plants and birds associated with such habitat. Prescribed burning is a management strategy that has potential for restoring and rejuvenating prairies in fragmented landscapes, and through such restoration, might create habitat for birds dependent upon prairies. To provide improved data for management decision-making regarding the use of prescribed fire in tallgrass prairies, we compared responses of plant and bird communities on five burned and five unburned tallgrass prairie fragments at the DeSoto National Wildlife Refuge, Iowa, USA, from 1995 to 1997. Overall species richness and diversity were unaffected by burning, but individual species of plants and birds were affected by year-treatment interactions, including northern bobwhite (Colinus virginianus) and ring-necked pheasant (Phasianus colchicus), which showed time-delayed increases in density on burned sites. Analyses of species/area relationships indicated that, collectively, many small sites did make significant contributions to plant biodiversity at landscape levels, supporting the overall conservation value of prairie fragments. In contrast, most birds species were present on larger sites. Thus, higher biodiversity in bird communities which contain area-sensitive species might require larger sites able to support larger, more stable populations, greater habitat heterogeneity, and greater opportunity for niche separation. © 2006 Springer Science+Business Media B.V.
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731. **Responses of plants and arthropods to burning and disking of riparian habitats.**
Benson, T. J.; Dinsmore, J. J.; and Hohman, W. L.
Journal of Wildlife Management 71(6): 1949-1957.(Aug. 2007)
NAL Call #: 410 J827
Descriptors: riparian areas/ wildlife habitats/ wetland conservation/ grasslands/ arthropods/ discing/ conservation buffers/ ecosystem management/ land restoration/ Lepidoptera/ Hemiptera/ plant litter/ plant response/ vegetation/ species diversity/ plant communities/ population size/ forbs/ biomass/ botanical composition/ wild birds/ prescribed burning/ Wetlands Reserve Program/ woody plants/ Iowa/ plant ecology/ animal ecology and behavior/ entomology related/ natural resources, environment, general ecology, and wildlife conservation
Abstract: Alteration of Iowa, USA, landscapes for agricultural production has resulted in a loss of 99% of the original prairie and 95% of native wetlands. This conversion has included riparian areas, which, as interfaces between terrestrial and aquatic ecosystems, are important to many wildlife species. Farm Bill programs have resulted in the reestablishment of millions of hectares of grasslands and wetlands nationwide, including. 100,000 ha in riparian areas of the Midwest. We assessed plant and arthropod responses to burning and disking of riparian grasslands in east-central Iowa in 2001 and 2002. Burning altered the plant community by removing litter and standing dead vegetation and had negative effects on several arthropod taxa, including Hemiptera and Lepidoptera. However, we observed no differences in vegetation or arthropods between burned and unburned fields during the second year postburning ($P > 0.05$). Disking decreased the cover of grasses, litter, and standing dead vegetation and increased

plant species richness and the cover of forbs and bare ground ($P < 0.05$). Arthropod abundance and dry biomass were greater on disked than undisked portions of fields ($P < 0.05$). Increases in the abundance and biomass of arthropods associated with changes in vegetation structure and composition likely improved habitat quality for a number of breeding bird species. Both burning and disking appear to be effective management options for maintaining or enhancing riparian grasslands for wildlife.
This citation is from AGRICOLA.

732. **Responses of raptors to livestock grazing in the western USA.**
Kochert, M. N.
In: Proceedings of the Western Raptor Management Symposium and Workshop. Boise, Idaho, USA
Pendleton, B. G. (eds.)
Washington, D.C., USA: Institute for Wildlife Research and National Wildlife Federation; pp. 194-203; 317 p.; 1989.
Notes: Literature review; ISSN: 1044-4971.
NAL Call #: QL696.F3W47 1989; ISBN: 0945051026
Descriptors: mammal/ grazing system/ plant population change/ habitat destruction/ nesting/ prey availability/ diversity/ population/ conservation
© Thomson Reuters Scientific

733. **Restoring forbs for sage grouse habitat: Fire, microsites, and establishment methods.**
Wirth, Troy A. and Pyke, David A.
Restoration Ecology 11(3): 370-377. (2003)
NAL Call #: QH541.15.R45R515; ISSN: 1061-2971.
Descriptors: Galliformes/ Phasianidae/ Centrocercus urophasianus/ terrestrial ecology/ establishment method/ fires-burns/ restoration ecology/ revegetation/ sage grouse habitat restoration/ sagebrush steppe/ grasslands/ ecosystems/ grassland revegetation/ habitat management/ habitat revegetation/ Hart mountain National Antelope Refuge/ Oregon/ conservation/ wildlife management/ land zones/ Artemisia spp.
Abstract: The decline and range reduction of sage grouse populations are primarily due to permanent loss and degradation of sagebrush-grassland habitat. Several studies have shown that sage grouse productivity may be limited by the availability of certain preferred highly nutritious forb species that have also declined within sagebrush ecosystems of the Intermountain West, U.S.A. The purpose of this study was to determine the suitability of three species of forbs for revegetation projects where improving sage grouse habitat is a goal. Species suitability was determined by evaluating the emergence, survival, and reproduction of Crepis modocensis, C. occidentalis, and Astragalus purshii in response to method of establishment (seeding or transplanting), site preparation treatment (burned or unburned), and microsite (mound or interspace) in an Artemisia tridentata ssp. wyomingensis vegetation association in south central Oregon. For seeded plants A. purshii had the lowest emergence (8%) of all three species. Both seeded Crepis species had similar overall emergence (38%). Significantly more Crepis seedlings emerged from shrub mounds in unburned areas (50%) than in any other fire-by-microsite treatment (33 to 36%). Approximately 10% more Crepis seedlings survived in mounds compared with interspaces. Nearly twice as many emerging Crepis seedlings survived in the burned areas as opposed to unburned areas ($p<0.01$). This resulted in more plant establishment in burned mounds despite higher emergence in unburned mounds. Astragalus purshii seedlings also survived better in burned areas ($p=0.06$) but had no differential response to microsite. Fire enhanced survival of both Crepis and A. purshii transplants ($p=0.08$ and $p=0.001$). We believe additional research is needed to improve A. purshii emergence before it will become an effective plant for restoring sage grouse habitat. Conversely, we conclude that these Crepis species provide a viable revegetation option for improving sage grouse habitat in south central Oregon.
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734. **Restoring grassland savannas from degraded pinyon-juniper woodlands: Effects of mechanical overstory reduction and slash treatment alternatives.**
Brockway, D. G.; Gatewood, R. G.; and Paris, R. B.
Journal of Environmental Management 64(2): 179-197. (2002)
NAL Call #: HC75.E5J6 ; ISSN: 03014797.
Notes: doi: 10.1006/jema.2001.0522.
Descriptors: Bouteloua gracilis (Willd. ex Kunth) Lag. ex Griffiths/ herbaceous biomass/ Juniperus monosperma (Engelm.) Sarg./ logging slash/ plant cover/ soil erosion/ species diversity/ grassland/ habitat restoration/ overstory/ savanna/ species diversity/ biodiversity/ biomass/ climate change/ controlled study/ domestic animal/ environmental management/ environmental protection/ fire ecology/ forest/ grass/ grassland/ grazing/ Juniperus/ livestock/ nutrient/ nutritional status/ plant litter/ prescribed burning/ savanna/ scrub/ soil chemistry/ soil erosion/ tree/ United States/ biomass/ climate/ Conservation of natural Resources/ environmental monitoring/ forestry/ plant Leaves/ Poaceae/ population dynamics/ rain/ soil/ trees/ United States/ Bouteloua/ Bouteloua gracilis/ Juniperus/ Juniperus monosperma/ Pinus edulis/ Poaceae
Abstract: Although the distribution and structure of pinyon-juniper woodlands in the southwestern United States are thought to be the result of historic fluctuations in regional climatic conditions, more recent increases in the areal extent, tree density, soil erosion rates and loss of understory plant diversity are attributed to heavy grazing by domestic livestock and interruption of the natural fire regime. Prior to 1850, many areas currently occupied by high-density pinyon-juniper woodlands, with their degraded soils and depauperate understories, were very likely savannas dominated by native grasses and forbs and containing sparse tree cover scattered across the landscape. The purpose of this study was to evaluate the effectiveness of mechanical overstory reduction and three slash treatment alternatives (removal, clustering and scattering) followed by prescribed fire as techniques for restoring grassland savannas from degraded woodlands. Plant cover, diversity, biomass and nutrient status, litter cover and soil chemistry and erosion rates were measured prior to and for two years following experimental treatment in a degraded pinyon-juniper woodland in central New Mexico. Treatment resulted in a significant increase in the cover of native grasses and, to a lesser degree, forbs and shrubs. Plant species richness and diversity increased most on sites where slash was either completely removed or scattered to serve as a mulch. Although no changes in soil chemistry or plant nutrient status were observed,

understory biomass increased over 200% for all harvest treatments and was significantly greater than controls. While treatment increased litter cover and decreased soil exposure, this improvement did not significantly affect soil loss rates. Even though all slash treatment alternatives increased the cover and biomass of native grasses, scattering slash across the site to serve as a mulch appears most beneficial to improving plant species diversity and conserving site resources.
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735. **Restoring heterogeneity on rangelands: Ecosystem management based on evolutionary grazing patterns.**
Fuhlendorf, Samuel D. and Engle, David M.
Bioscience 51(8): 625-632. (2001)
NAL Call #: 500 Am322A; ISSN: 0006-3568.
http://teamquail.tamu.edu/fuhlendorf-engle2001.pdf
Descriptors: commercial activities/ conservation measures/ land and freshwater zones/ Aves: farming and agriculture/ grazing management/ habitat management/ rangeland grazing/ ecosystem conservation applications/ terrestrial habitat/ role of grazing management/ North America/ Great Plains/ rangeland ecosystem conservation/ grazing management applications/ Aves/ birds/ chordates/ vertebrates
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736. **Restoring resources for an endangered butterfly.**
Schultz, Cheryl B.
Journal of Applied Ecology 38(5): 1007-1019. (2001)
NAL Call #: 410 J828; ISSN: 0021-8901
Descriptors: conservation measures/ nutrition/ diet/ life cycle and development/ terrestrial habitat/ land and freshwater zones/ Icaricia icarioides fenderi (Lycaenidae): habitat management/ prairie grasslands/ habitat restoration/ food plants/ Lupinus sulphureus kincaidii/ life cycle/ life history/ grassland/ prairie/ Oregon/ Eugene area/ Prairie Grassland Habitat Restoration Project/ Lycaenidae/ Papilionoidea, Heteroneura, Glossata, Lepidoptera, Insecta/ arthropods/ insects/ invertebrates/ Lepidopterans
Abstract: 1. Recent changes in land use have resulted in dramatic habitat loss for numerous species. More than 99% of the habitat for Fender's blue butterfly Icaricia icarioides fenderi, an endangered butterfly in Oregon, USA, has been lost. 2. Fender's blue butterflies require larval host-plants (Kincaid's lupine Lupinus sulphureus kincaidii) and nectar from native wildflowers. 3. An experiment was conducted at two degraded sites near Eugene, Oregon, to investigate methods for restoration of Fender's blue habitat. The experimental design included four soil treatments (tilling, reverse fertilization, solarization and a control) combined with two planting treatments (50% forb seed: 50% grass seed and 10% forb seed: 90% grass seed) and two weeding treatments (weeding or not weeding). Treatments were replicated in eight experimental blocks (9 [x] 28 m) at each site. Seeds from 12 native plant species were field collected and sown in September 1995. 4. Plant establishment was monitored in May 1996, 1997, 1998 and 1999. In 1999, flowers of all nectar species and leaves of Kincaid's lupine were counted. 5. Based on estimates of resource needs from previous work, resources were evaluated as insufficient, sufficient or ample. 6. Solarization combined with 50% forb: 50% grass planting promoted sufficient nectar to sustain butterflies at both sites. Control treatments provided insufficient nectar at both sites. None of the treatments produced sufficient larval resources. 7. This experiment demonstrates a method to quantitatively link habitat restoration to the resource needs of focal species. The results emphasize the importance of connecting restoration efforts to the life-history features of focal species. In addition, they highlight the importance of using experiments conducted across a range of sites to test restoration methods before large-scale efforts are implemented.
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737. **Results from the use of a system of "rest rotational grazing" for livestock to improve wildlife habitat in Montana.**
Mccarthy, J. J.
IBEX Journal of Mountain Studies 7(Supplement): 13-16. (2003); ISSN: 1590-3907
Descriptors: commercial activities/ conservation measures/ land zones/ North America/ Cervus canadensis (Cervidae): farming and agriculture/ rest rotation grazing system/ rangeland management/ habitat quality/ habitat management/ terrestrial habitat/ rangelands/ Montana/ grazing management/ Cervidae/ Artiodactyla/ Mammalia/ chordates/ mammals/ ungulates/ vertebrates
Abstract: Rest rotation grazing is a forage management system that utilizes livestock grazing to improve forage vigor, reduce erosion and improve range conditions. Cyclic movement of livestock through pastures allow plants to carry out photosynthetic processes and assist in seed dissemination and seedling establishment. Elements of such a grazing system are discussed, as are the benefits to plants and soils. An example of a system that has been in operation since 1980 is also described, as are the benefits to livestock producers and the area's wildlife.
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738. **Richness and abundance of Carabidae and Staphylinidae (Coleoptera), in northeastern dairy pastures under intensive grazing.**
Byers, R. A.; Barker, G. M.; Davidson, R. L.; Hoebeke, E. R.; and Sanderson, M. A.
Great Lakes Entomologist 33(2): 81-105. (2000)
NAL Call #: QL461.M5; ISSN: 0090-0222
Descriptors: ecology/ terrestrial habitat/ land and freshwater zones/ Carabidae: community structure/ intensively grazed pastures/ Pennsylvania and Vermont/ grassland/ intensively grazed dairy pastures/ New York/ Pennsylvania/ Vermont/ new records/ community structure in intensively grazed pasture/ Carabidae/ Caraboidea/ Adephaga/ Coleoptera/ Insecta/ arthropods/ coleopterans beetles/ insects/ invertebrates
Abstract: Dairy cattle grazing has become popular to dairy farmers in the Northeast looking for management schemes to cut production costs. Carabidae (ground beetles) and Staphylinidae (rove beetles) are indicators of habitat disturbances, such as drainage of wetlands, or grassland for grazing animals, and their monitoring could provide one measure of ecosystem sustainability if intensive grazing management systems expand or intensify in the future. Our objective was to assess the abundance and species richness of these two beetle families under intensive grazing throughout Pennsylvania, southern New York and Vermont. We collected 4365 ground beetles (83 species) and 4,027 rove beetles (79 species) by pitfall traps in three

years in Pennsylvania. Nine ground beetle species, Amara aenea, Poecilus chalcites, Pterostichus melanarius, Bembidion quadrimaculatum oppositum, Amara familiaris, Poecilus lucublandus, Agonum muelleri, Bembidion obtusum and Bembidion mimus represented 80% of the Carabidae collected. Five other species were new to Pennsylvania. Four rove beetle species, Philonthus cognatus, Meronera venustula, Amischa analis, and Philonthus various=(carbonarius), comprised 74% of the total Staphylinidae collected. Yearly distributions of the dominant species did not change significantly in the three years with A. aenea and P. cognatus being most abundant every year. A parasitic rove beetle, Aleochara tristis, was recovered for the first time in Pennsylvania and Vermont since its release in the 1960's to control face fly, Musca autumnalis. Similar results were found in New York and Vermont. We collected 1,984 ground beetles (68 species). Pterostichus melanarius was most abundant. Pterostichus vernalis was detected for the first time in the United States (Vermont). It was previously reported from Montreal, Canada. We collected 843 rove beetles (45 species). Philonthus cognatus was the most abundant rove beetle. In addition, Tachinus corticinus, previously known only from Canada, was discovered for the first time in the United States in Vermont. Pastures in Pennsylvania were diverse, containing 14 species of forage plants and 17 weed species. Botanical composition was similar in New York and Vermont. Sixteen species of grasses and legumes made up 90% of the plant composition and 36 species of weeds made up the remainder. This diverse plant ecosystem may explain the richness of ground and rove beetles in northeastern U.S. pastures because the heterogeneity in the plant population provided additional resources which can support a rich assemblage of beetles. Monitoring richness and abundance of Carabidae and Staphylinidae over three years in Pennsylvania suggests intensive grazing systems are ecologically sustainable.
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739. **Ring-necked pheasant and passerine abundance in Conservation Reserve Program grasslands of differing age-classes and cover types in eastern South Dakota, 1998-2000.**
Eggebo, S. L. South Dakota State University, 2001.
Notes: Degree: M.S.; SD W-075-R/Study No. 7588; Wildlife Coop. Unit Report - Thesis
Descriptors: Phasianus colchicus/ phasianidae/ phasianus/ Phasianus colchicus/ abundance/ age/ birds, passerines/ broods and brooding/ conservation programs/ cover/ cultivated farmland/ grassland/ habitat management for wildlife/ pheasant, ring-necked/ productivity/ surveys/ vegetation/ South Dakota: eastern region/ Big Sioux River Basin/ Prairie Coteau/ Brookings County/ Kingsbury County/ Lake County/ Moody County/ Aurora County/ Davison County/ Hanson County/ Hutchinson County
Abstract: Objectives were to: (1) determine ring-necked pheasant and passerine abundance in relation to two differing age-classes of cool- and warm- season grasslands and row-crop fields within low and high pheasant density areas in eastern South Dakota; and (2) evaluate cover quality characteristics (e.g., height-density index, litter depth) in relation to differing age class stands and cover types of Conservation Reserve Program.
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740. **Riparian area responses to changes in management.**
Borman, M. M.; Massingill, C. R.; and Elmore, E. W.
Rangelands 21(3): 3-7. (1999)
NAL Call #: SF85.A1R32; ISSN: 0190-0528
Descriptors: grasslands/ riparian grasslands/ grassland management/ grazing/ overgrazing/ surveys/ long term experiments/ cattle/ United States/ Oregon/ condition/ Bos/ Bovidae/ ruminants/ Artiodactyla/ mammals/ vertebrates/ Chordata/ animals/ ungulates/ Pacific Northwest
Abstract: The management of riparian areas in the USA is reviewed. In particular, claims that the exclusion of livestock are the only appropriate management for riparian areas are considered to be based on flawed comparisons of ungrazed riparian areas with adjacent overgrazed non-riparian areas. Surveys of 8 riparian areas in Oregon in the late 1970s and early 1980s were reassessed in 1994, taking into account condition and cattle grazing treatments. Trends in the condition of the riparian communities were not specifically linked to grazing management: with or without grazing, most riparian habitats had improved since their original surveys. Those habitats which began in good condition and which were grazed appropriately remained in good condition. It is considered that climate, landscape setting, soil types and land use history all affected the development of an appropriate grazing management prescription, and that this prescription must be adhered to.
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741. **Riparian ecosystems of semi-arid North America: Diversity and human impacts.**
Patten, D. T.
Wetlands 18(4): 498-512. (1998)
NAL Call #: QH75.A1W47; ISSN: 0277-5212
Descriptors: ecosystems/ semiarid zones/ vegetation types/ plant communities/ deciduous forests/ floods/ forests/ human activity/ hydrology/ latitude/ altitude/ natural resources/ poplars/ riparian vegetation/ sediment/ water quality/ water table/ watersheds/ wetlands/ plant ecology/ species diversity/ erosion/ mixed forests/ coniferous forests/ plant succession/ amenity and recreation areas/ riparian forests/ Prosopis/ Populus deltoides/ Salix/ North America/ Mimosoideae/ Fabaceae/ Fabales/ dicotyledons/ angiosperms/ Spermatophyta/ plants/ Salicaceae/ Salicales
Abstract: This overview paper for the symposium presents a general description of the diversity of riparian ecosystems in the arid-West of North America (extending west from the 100th meridian to the crest of the Cascades and Sierras and south from southern Canada to northern Mexico). Similarities and differences of function, structure and process are discussed. All riparian ecosystems in the region are dependent on supplemental water (usually from the shallow valley alluvial aquifer) and they stabilize stream banks, trap sediment, improve water quality and help control or modulate hydrological processes. They also function as habitat for many western animal species (serving as a small mesic island or strip within an arid landscape) and as recreational sites for humans. Along elevational gradients, riparian vegetation may change from simple deciduous forests to mixed deciduous to coniferous and possibly alpine wetlands. Temporal gradients occur within a location in the riparian zone as early pioneer communities such as cottonwood/willow give way to late successional communities such as mesquite or sagebrush, often a consequence of sediment accumulation. Many

similarities among western riparian ecosystems exist because several dominant genera (e.g. Populus) are common throughout the West, and many geomorphic and hydrological processes that influence riparian establishment are similar. Western riparian ecosystems have been greatly altered by human activity. Major factors include natural resource use, urbanization, alteration of stream flows through dam construction and groundwater withdrawal, modification of biotic conditions through grazing, agriculture, introduction of non-native species and alteration within watersheds.
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742. **Riparian restoration on the Gila River, New Mexico, creates breeding habitat for southwestern willow flycatchers.**
Boucher, Paul F.; Stoleson, Scott H.; Shook, Roland S.; Pope, Ralph D.; and Monzingo, Jerry
Studies in Avian Biology 26: 135-142. (2003)
NAL Call #: QL671.S8; ISSN: 0197-9922
Descriptors: conservation measures/ reproduction/ reproductive behavior/ terrestrial habitat/ land zones/ Empidonax traillii extimus: disturbance by man/ habitat management/ riparian restoration role in breeding habitat creation/ breeding site/ riparian habitat/ New Mexico/ Gila National Forest/ Gila River Bird Area/ Aves, Passeriformes, Tyrannidae/ birds/ chordates/ vertebrates
Abstract: In 1995, the Gila National Forest in southwestern New Mexico was faced with a legal obligation to reduce severe erosion of riverbanks in the Gila River Bird Area. A combination of managed and natural processes stabilized banks and created riparian habitat. Retiring grazing, excavating the riverbank to the water table level, constructing a temporary berm, and planting poles set the stage for the naturally occurring flooding, sediment deposition, and revegetation that followed. Southwestern Willow Flycatchers (Empidonax traillii extimus) colonized and bred for the first time in this restored habitat and nearby natural regeneration in 1997. A similar project undertaken upstream on private property on the U Bar Ranch was colonized in 1999. The rapid colonization of these two restoration sites was due, in part, to their proximity to a large core population of flycatchers upstream in the Cliff-Gila Valley. This project demonstrates that landowners can simultaneously stabilize banks, reduce erosion, and create or improve Willow Flycatcher habitat.
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743. **Riparian wildlife habitat literature review.**
McComb, William. and Hagar, Joan.
Corvallis, OR: Oregon State University, Department of Forest Science; 63 p. (1994).
Notes: Cover title. Includes bibliographical references (p. 25-35).
NAL Call #: QH541.5.R52M36 1994
Descriptors: Riparian areas---United States/ Riparian animals---United States
This citation is from AGRICOLA.

744. **Rodent communities in a grazed and ungrazed Arizona grassland, and a model of habitat relationships among rodents in southwestern grass/shrublands.**
Jones, Zach F.; Bock, Carl E.; and Bock, Jane H.
American Midland Naturalist 149(2): 384-394. (2003)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: rodents/ small mammals/ grazing/ grasslands/ habitat relationships/ shrublands/ Arizona/ Baiomys taylori/ Reithrodontomys fulvescens/ Reithrodontomys megalotis/ Sigmodon fluviventer/ Cricetidae/ Rodentia/ Chaetodipus hispidus/ Dipodomys merriami/ Perognathus flavus/ Heteromyidae/ Muridae
Abstract: We live-trapped rodents in 2000-2001 at eight sites on a 3160 ha grassland and mesquite-oak savanna in southeastern Arizona that had been ungrazed since 1968, and on eight paired sites on adjacent cattle ranches. There were 917 captures of 14 species during 5760 trap-nights. Four species of Muridae (Sigmodon fulviventer, Baiomys taylori, Reithrodontomys megalotis and R. fulvescens) were significantly more common on ungrazed plots, while no species was more abundant on grazed plots. However, Heteromyidae as a group (especially Chaetodipus hispidus and Perognathus flavus) comprised a significantly higher proportion of total captures on grazed plots, and heteromyids as a percentage of total captures was positively correlated across all plots with amount of bare ground. One of the eight cross-fence sites also had been trapped in 1981-1983. In the 17 y between trapping events at this site: (1) the grass canopy on both grazed and ungrazed plots had become dominated by taller species, (2) a kangaroo rat (Dipodomys merriami) that had been the second most common species in grazed areas disappeared from both plots, (3) pocket mice increased on the grazed plot and declined on the ungrazed plot and (4) Muridae (excluding Peromyscus) as a percent of all captures increased by greater than 1.5-fold on both plots. Based on these results, and those from other field studies, we propose a model for the composition of rodent communities in grass/shrublands of the Southwest and Intermountain West, based on ground cover. Kangaroo rats (Dipodomys spp.) are abundant in areas with the most bare soil, Muridae (specifically, Sigmodon, Baiomys and Reithrodontomys) dominate areas with the most and tallest ground cover, and pocket mice (Chaetodipus and Perognathus) are common in areas of intermediate cover. In relatively mesic grasslands, livestock grazing and fire drive the rodent community toward one dominated by heteromyids instead of murids. In more arid landscapes, grazing and fire favor kangaroo rats over pocket mice.
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745. **The role of fire in structuring sagebrush habitats and bird communities.**
Knick, Steven T.; Holmes, Aaron L.; and Miller, Richard F.
Studies in Avian Biology (30): 63-75. (2005)
NAL Call #: QL671.S8; ISSN: 0197-9922.
http://www.sagestep.org/educational_resources/bibliographies/articles/Knicketal2005.pdf
Descriptors: birds/ wildlife habitat/ fire/ Fringillidae/ Galliformes/ Passeriformes/ Phasianidae/ Sturnidae/ Amphispiza belli/ Bromus tectorum/ Centrocercus urophasianus/ Oreoscoptes montanus/ Spizella breweri/ disturbance/ fire regimes/ sagebrush ecosystems/ Artemisia spp./ Juniperus spp.
Abstract: Fire is a dominant and highly visible disturbance in sagebrush (Artemisia spp.) ecosystems. In lower elevation, xeric sagebrush communities, the role of fire has changed in recent decades from an infrequent disturbance maintaining a landscape mosaic and facilitating community processes to frequent events that alter sagebrush communities to exotic vegetation, from which restoration is

unlikely. Because of cheatgrass invasion, fire-return intervals in these sagebrush ecosystems have decreased from an historical pattern (pre-European settlement) of 30 to >100 yr to 5-15 yr. In other sagebrush communities, primarily higher elevation ecosystems, the lack of fire has allowed transitions to greater dominance by sagebrush, loss of herbaceous understory, and expansion of juniper-pinyon woodlands. Response by birds living in sagebrush habitats to fire was related to the frequency, size, complexity (or patchiness), and severity of the bums. Small-scale fires that left patchy distributions of sagebrush did not influence bird populations. However, large-scale fires that resulted in large grassland expanses and isolated existing sagebrush patches reduced the probability of occupancy by sagebrush-obligate species. Populations of birds also declined in sagebrush ecosystems with increasing dominance by juniper (Juniperus spp.) and pinyon (Pinus spp.) woodlands. Our understanding of the effects of fire on sagebrush habitats and birds in these systems is limited. Almost all studies of fire effects on birds have been opportunistic, correlative, and lacking controls. We recommend using the large number of prescribed bums to develop strong inferences about cause-and-effect relationships. Prescribed burning is complicated and highly contentious, particularly in low-elevation, xeric sagebrush communities. Therefore, we need to use the unique opportunities provided by planned bums to understand the spatial and temporal influence of fire on sagebrush landscapes and birds. In particular, we need to develop larger-scale and longer-term research to identify the underlying mechanisms that produce the patterns of bird responses to fire in sagebrush ecosystems.
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746. **Rough-legged hawk habitat selection in relation to livestock grazing on Malheur National Wildlife Refuge, Oregon.**
Littlefield, Carroll D.; Thompson, Steven P.; and Johnstone, Richard S.
Northwestern Naturalist 73(3): 80-84. (1992)
NAL Call #: QL671.M8; ISSN: 1051-1733
Descriptors: Accipitridae/ Ciconiiformes/ Buteo lagopus/ birds/ behavior/ grazing/ habitat use/ habitat alterations/ mowing/ overwintering/ wildlife-livestock relationships
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747. **Sage-grouse nesting and brood habitat use in southern Canada.**
Aldridge, C. L. and Mark Brigham, R.
Journal of Wildlife Management 66(2): 433-444. (2002)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: Alberta/ Artemisia/ broods/ Centrocercus urophasianus/ greater sage-grouse/ nesting/ sagebrush/ endangered species/ gamebird/ habitat management/ habitat use/ nesting/ patch size/ population decline/ Canada/ Artemisia cana/ Centrocercus urophasianus
Abstract: Greater sage-grouse (Centrocercus urophasianus) populations have declined from 66 to 92% during the last 30 years in Canada, where they are listed as endangered. We used radiotelemetry to examine greater sage-grouse nest and brood habitat use in Alberta and assess the relationship between habitat and the population decline. We also identified the patch size at which sage-grouse were selecting nest and brood-rearing sites. Nest areas were in silver sagebrush (Artemisia cana) stands that had greater amounts of tall cover (P ≤ 0.001) at a patch size of 7.5 to 15 m in radius. Within those sagebrush stands, nests were located beneath the densest sagebrush present. Areas used for brood rearing had greater amounts of taller sagebrush cover in an area ≥ 15 m in radius than at random locations. Brood locations were not selected based on forb content; mesic areas containing forbs (20-40% cover) as a food resource for chicks were limiting (only 12% cover available). Overall cover of sagebrush is considerably lower in Canada (5-11%) compared with sagebrush (Artemisia spp.) cover in other areas throughout the range of greater sage-grouse (15-25%). If management goals are to provide suitable nesting and brood-rearing habitat, efforts should be directed toward protecting and enhancing sagebrush stands ≥ 30 m^2 and increasing overall sagebrush cover. Management strategies also should focus on increasing the availability of mesic sites and increasing the abundance of sites with >10% forb cover, to enhance brood rearing habitat.
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748. **Sagebrush-steppe vegetation dynamics and restoration potential in the interior Columbia Basin, U.S.A.**
Hemstrom, M. A.; Wisdom, M. J.; Hann, W. J.; Rowland, M. M.; Wales, B. C.; and Gravenmier, R. A.
Conservation Biology 16(5): 1243-1255. (2002)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1046/j.1523-1739.2002.01075.x.
Descriptors: gamebird/ habitat loss/ habitat quality/ restoration ecology/ steppe/ vegetation dynamics/ United States/ Artemisia/ Artemisia tridentata/ Centrocercus/ Centrocercus urophasianus/ Phasianidae/ Salvia
Abstract: We modeled the dynamics and restoration of sagebrush (Artemisia spp.) habitats for Greater Sage-Grouse (Centrocercus urophasianus) in the interior Columbia Basin and adjacent portions of the Great Basin (referred to as the basin). Greater Sage-Grouse have undergone widespread decline and are the focus of conservation on over 13 million ha of sagebrush steppe in the basin, much of which is managed by the U.S. Forest Service (FS) and U.S. Bureau of Land Management (BLM). Consequently, we evaluated changes in the amount and quality of sage-grouse habitat on 8.1 million ha of FS-BLM lands in the basin. Changes were estimated from historical to current conditions and from current conditions to those projected 100 years in the future under proposed management and under two restoration scenarios. These two scenarios were designed to improve long-term (100-year) projections of sage-grouse habitat on FS-BLM lands in relation to current conditions and proposed management Scenario 1 assumed a 50% reduction in detrimental grazing effects by livestock (through changes in stocking rates and grazing systems) and a six-fold increase in areas treated with active restoration relative to proposed management Scenario 2 assumed a 100% reduction in detrimental grazing effects and the same level of active restoration as scenario 1. Under the two scenarios, the amount of FS-BLM habitat for sage grouse within treated areas declined by 17-19% 100 years in the future compared with the current period, but was 10-14% higher than the 100-year projection under proposed management Habitat quality under both scenarios was substantially improved compared

with the current period and proposed management Our results suggest that aggressive restoration could slow the rate of sagebrush loss and improve the quality of remaining habitat.
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749. **Season of burn influences fire behavior and fuel consumption in restored shortleaf pine-grassland communities.**
Sparks, Jeffrey C.; Masters, Ronald E.; Engle, David M.; and Bukenhofer, George A.
Restoration Ecology 10(4): 714-722. (2002)
NAL Call #: QH541.15.R45R515; ISSN: 1061-2971
Descriptors: Picoides borealis/ Piciformes/ forestry practices/ habitat alterations/ terrestrial ecology/ prescribed burning/ Keetch-Byram drought index/ red-cockaded woodpecker/ Pinus echinata/ Pinus spp.
Abstract: Pine forests of southeastern United States have been burned primarily in the dormant season to accomplish silvicultural objectives, but with increased emphasis on ecosystem restoration fires are now prescribed in other seasons. We observed fire behavior during both growing season and dormant season prescribed fires in shortleaf pine (Pinus echinata) stands managed as pine-grassland communities for the endangered Red-cockaded Woodpecker (Picoides borealis). Fuel beds for dormant season fires were characterized by lower amounts of live fuels, higher amounts of 1-hr time lag fuel and a greater total fuel load than growing season fires. Fuel consumption and percent of the total fuels consumed was greater in dormant season fires than in growing season fires. Fireline intensity, heat per unit area, reaction intensity, and rate of spread were greater in dormant season fires than in growing season fires. Lower fire intensity in growing season fires was possibly a function of lower amounts of 1-hr time lag fuels, higher amounts of live herbaceous fuels, and possibly a less porous fuel bed. Additionally, growing season fires had lower heat per unit area and reaction intensity and slower rates of spread. The Keetch-Byram drought index (KBDI) did not provide a good index for potential fire behavior on our drought-prone sandy loam soils. KBDI during growing season fires averaged over four times greater than during dormant season fires, but fire intensity was greater in dormant season fires. Low KBDI values may be misleading and give a false sense of security for dormant season fire prescriptions on sandy loam soils because the duff layer may dry more quickly as a result of inherent low water holding capacity. High KBDI values may result in prescribed burns being canceled because of conditions that are erroneously perceived to be outside the prescription window. We caution against over-reliance on KBDI as a determining factor for conducting prescribed burns on areas with sandy or sandy loam soils.
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750. **Seasonal use of recently fenced agricultural riparian habitat by avifauna in Pennsylvania.**
Argent, David G. and Zwier, Roberta J.
Northeastern Naturalist 14(3): 361-374. (Sept. 2007)
NAL Call #: QH105.M2M36
Descriptors: streams/ fencing/ riparian areas/ wildlife habitat/ Aves/ birds/ Pennsylvania
Abstract: Streambank fencing is increasingly used to exclude livestock from riparian corridors and to enhance biological communities. Our study examined vegetative change and avian-community use of recently fenced agricultural habitat. We conducted strip-transect surveys to census bird communities, line-transect and plot surveys to assess vegetation, and intensive nest monitoring to gauge use and reproductive success across 12 fenced riparian sites in southwestern Pennsylvania. Selected sites varied in age from 3 to 8 years since fencing and averaged 21 m in width. We found avian use was significantly greater in spring than in fall across our fenced sites. We determined that canopy cover, shrub cover, and herbaceous ground cover could predict various attributes of the avian community present within the fenced riparian areas. Our results also suggest that the avian community has greater species richness within sites containing greater habitat complexity, and that these sites are important breeding and nesting areas. Among the 145 nests monitored, 38% successfully fledged young. We found no differences in distance to corridor edge between successful nests and nests that failed. Our study confirms that riparian renovation efforts do have conservation value for both migratory and resident birds.
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751. **Section-based monitoring of breeding birds within the Shortgrass Prairie Bird Conservation Region (BCR 18).**
Sparks, Robert A. and Hanni, David J. (Feb. 2006).
http://www.rmbo.org/pubs/downloads/BCR_18_2006.zip
Descriptors: conservation measures/ ecology/ population dynamics/ habitat utilization/ terrestrial habitat/ land zones/ Aves: habitat management/ distribution/ population density/ habitat preference/ monitoring/ grasslands/ shortgrass prairie/ conservation/ United States/ Shortgrass Prairie Bird Conservation Region/ birds/ chordates/ vertebrates
Abstract: In this document, we report the findings of the 2005 section-based surveys and an initial population analysis using density estimates for an interval of three years (2003 to 2005). Results are presented for BCR 18 as well as management units participating with RMBO's grassland bird monitoring program including four states (Nebraska, Colorado, Kansas, and Oklahoma) and four National Grasslands (Cimarron, Comanche, Kiowa and Pawnee). This report provides natural resource managers with information on grassland bird populations on both local and regional scales. Such knowledge can assist managers in making effective land management decisions regarding conservation of grassland birds and their habitat. Participating agencies include Colorado Division of Wildlife, Kansas Department of Wildlife and Parks, Nebraska Game and Parks Commission, Oklahoma Department of Wildlife Conservation, Oklahoma City Zoo, and United States Forest Service (USFS).
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752. **Section-based monitoring of breeding birds within the Shortgrass Prairie Bird Conservation Region (BCR 18).**
Sparks, Robert A.; Hanni, David J.; and McLachlan, Megan (2005).
Notes: 2004 survey findings.
http://www.rmbo.org/pubs/downloads/BCR_2005.pdf
Descriptors: conservation measures/ ecology/ population dynamics/ habitat utilization/ terrestrial habitat/ land zones/ habitat management/ distribution/ habitat preference/ population density/ monitoring/ habitat management/

shortgrass prairie/ conservation/ Shortgrass Prairie Bird Conservation Region/ United States, western/ Aves/ birds/ chordates/ vertebrates

Abstract: In 2004, Rocky Mountain Bird Observatory (RMBO) implemented the fourth year of grassland bird-monitoring program within the shortgrass prairie region. During this year, RMBO conducted surveys in four western states (Nebraska, Colorado, Kansas, and Oklahoma) and five National Grasslands (Cimarron, Comanche, Kiowa, Pawnee and Rita Blanca). The objective of this program is to monitor population trends and distributions of grassland birds within the Shortgrass Prairie Bird Conservation Region (BCR 18) using section-based surveys, a road-based point count technique. A one square mile section is the basic land management unit of the prairie. The section-based survey technique was determined to be the most efficient and effective method for surveying and monitoring grassland birds (Hanni 2002) in a landscape dominated by private ownership. RMBO surveyed 2,414 sections within BCR 18, 15 May / 3 July 2004. Sections were stratified by habitat then randomly selected for survey in proportion to habitat acreage on the landscape / 1,802 sections of native prairie habitat, 552 of dry-land agriculture habitat, and 60 of land in CRP. We observed 115 bird species. Included are 38 species of concern, as recognized by Partners In Flight (2004) and/or the participating state and federal agencies. We calculated density estimates for 49 species, analyzed by management unit, habitat type, percent shrub cover and percent grass cover >15 cm. Included among these density estimates are 22 species of concern, as recognized by Partners In Flight (PIF database 2004) and/or the participating state and federal agencies. We present distribution and index of abundance maps for 62 species. In 2004, we conducted exploratory habitat analyses to determine habitat preferences of eight grassland bird species; Burrowing Owl, Loggerhead Shrike, Cassin's Sparrow, Brewer's Sparrow, Lark Bunting, Grasshopper Sparrow, McCown's Longspur and Chestnut-collared Longspur. Two habitat conditions were used in the analysis, percent shrub cover and percent grass cover >15 cm. We used a chi-square goodness of fit test (alpha .05) to detect significant differences between expected use based on availability and observed use within habitat condition categories. Figures were generated to illustrate significant preferences of habitat conditions by selected shortgrass prairie bird species (Neu et. al 1974, and Byers et. al 1984). Long-term monitoring of Short Grass Prairie BCR region will provide valuable information on trends and distribution within a framework that allows land managers to make cooperative management decisions. Equipped with this information and habitat preferences of prairie birds, units to assess habitat suitability for species of concern. In addition, monitoring birds will provide data that can by applied to monitoring ecosystems, since bird species utilize an inclusive habitat spectrum within ecosystems. As a result bird monitoring provides a cost-effective means for monitoring ecosystems at a variety of scales.

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753. **Selective control of rangeland grasshoppers with prescribed fire.**

Vermeire, L. T.; Mitchell, R. B.; Fuhlendorf, S. D.; and Wester, D. B.

Journal of Range Management 57: 29-33. (Jan. 2004)
NAL Call #: 60.18 J82

Descriptors: range management/ prescribed burning/ insect control/ Ageneotettix deorum/ Melanoplus/ Acrididae/ insect pests/ biomass/ fire ecology/ precipitation/ population density/ Oklahoma/ Melanoplus bowditchi/ Melanoplus flavidus/ Hesperotettix viridis/ species differences/ plant production range and pasture grasses/ pests of plants insects/ animal ecology and behavior/ entomology related

Abstract: Grasshoppers (Orthoptera: Acrididae) are considered among the most damaging rangeland pests yet desired for the development of many wildlife species. Most grasshoppers are innocuous, but control with insecticides is non-discriminatory among species. Our objectives were to evaluate the effects of prescribed burning on the abundance and biomass of grasshoppers and to determine if species could be selectively controlled with prescribed fire. Twenty-four 4-ha sites were selected in a sand sagebrush-mixed prairie near Woodward, Okla. and blocked by pasture. Plots were randomly assigned fall-, spring-, or non-burned treatments within block with 4 replications per treatment for each of 2 years. Grasshopper biomass and abundance were sampled in late July and early August by sweeping with canvas beating nets. Specimens were weighed to the nearest 0.1 mg and identified to species. Fire treatments had no effects on the abundance or biomass of grasshoppers across species, with about 10 grasshoppers weighing 4,090 mg per 150 sweeps. Fire effects on the 4 most common species were variable and could be explained by the biology of the animals. Melanoplus bowditchi and M. flavidus were unaffected by fire treatment. Hesperotettix viridis is sensitive to damage to its host plants and was reduced about 88% by fire in either season. Fall burns reduced Ageneotettix deorum abundance by 65% because the species' eggs are laid near the soil surface and exposed to the heat of passing fire. Fire prescriptions can be written to target species-specific vulnerabilities and control pest grasshoppers while maintaining the food base for grasshopper predators.

This citation is from AGRICOLA.

754. **Sentinel nematodes of land-use change and restoration in tallgrass prairie.**

Todd, T. C.; Powers, T. O.; and Mullin, P. G.

Journal of Nematology 38(1): 20-27. (2006);
ISSN: 0022-300X

Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land zones/ Nematoda: farming and agriculture/ role as indicator of land use change/ Kansas and Nebraska/ habitat management/ habitat restoration/ role as indicator/ community structure/ role as indicator of land use change and restoration/ environmental indicators/ grassland/ tallgrass prairie/ Kansas/ Konza prairie/ Nebraska/ homestead National Monument/ Nematoda/ invertebrates/ nematodes

Abstract: Changes in land use and the associated changes in land cover are recognized as the most important component of human-induced global change. Much attention has been focused on deforestation, but grasslands are among the most endangered ecosystems

on Earth. The North American tallgrass prairie is a dramatic example, exhibiting a greater than 95% decline in historical area. Renewed interest in prairie conservation and restoration has highlighted the need for ecological indicators of disturbance and recovery in native systems, including the belowground component. The tallgrass prairie differs from the agricultural systems that have replaced it in having greater diversity and heterogeneity of resources, less physical soil disturbance (although other disturbances, such as fire and grazing, are prominent), and greater nitrogen limitation. Understanding the responses of nematode taxa to these characteristic differences is crucial to the development and improvement of community indices, but while knowledge of disturbance responses by individual taxa is accumulating, the level of necessary taxonomic resolution remains in question. Although nematode communities generally are better described for temperate grasslands than for other natural ecosystems, identification of sentinel taxa is further confounded by high levels of diversity, and both spatial and temporal heterogeneity.
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755. **Sexual segregation in white-tailed deer: Responses to habitat manipulations.**
Steward, Kelley M.; Fulbright, Timothy E.; Drawe, D. Lynn; Bowyer, R. Terry; and Stewart, Kelley M.
Wildlife Society Bulletin 31(4): 1210-1217. (2003)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Artiodactyla/ Cervidae/ Odocoileus virginianus/ Odocoileus virginianus/ white-tailed deer/ social behavior/ behavioral responses/ age-sex relationships/ conservation/ wildlife management/ forage availability/ habitat availability/ habitat management/ habitat manipulations/ intraspecies relationships/ land management/ land zones/ mating season/ nutritional requirements/ parturition/ reproduction/ sexual aggregation/ sexual dimorphism/ sexual segregation/ shrubland matrix/ terrestrial ecology/ Texas/ habitat/ herbicides/ mechanical manipulation/ odocoileus virginianus/ white-tailed deer/ forage/ abundance/ dispersion/ forest/ social organization
Abstract: Sexually dimorphic cervids such as white-tailed deer (Odocoileus virginianus) often sexually segregate outside the mating season. Few studies reporting results of mechanical manipulation of habitat to benefit deer have considered that males and females may respond differently to alterations of their environment. We examined effects of habitat manipulation on sexual segregation in white-tailed deer in south Texas by creating clearings within a shrubland matrix that altered habitat and forage. We used mechanical chopping and herbicides to manipulate forbs and resprouts of shrubs. We hypothesized that adult males and adult females would respond differently to manipulations of available forage during periods of sexual segregation (spring, including parturition) but not sexual aggregation (autumn, including rut). Proportion of males was greater in the study area during sexual aggregation than during sexual segregation, but no differences occurred in proportion of males using vegetation treatments during sexual aggregation. During sexual segregation, however, proportion of males observed on the treatment that reduced availability of forbs and shrubs was greater than in other treatments. The treatment that reduced forbs and resprouts of shrubs received the greatest proportional use by males and had the greatest biomass of graminoids and low biomass of forbs and shrubs. The gastrocentric hypothesis for sexual segregation proposes that differing nutritional requirements between sexes result in males consuming a larger quantity, but lower quality, of forage than females. Thus, reducing forbs and shrubs likely created a plot that benefited males more than females. Wildlife and land managers should consider that mechanical manipulation of habitat and forage availability has the potential to benefit one sex to the possible detriment of the other.
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756. **Sharp-tailed grouse and range management practices in western rangelands.**
Kessler, W. B. and Bosch, R. P.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 133-146; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: sharp-tailed grouse/ range management/ livestock

757. **Short- and long-term changes in elk use and forage production in sagebrush communities following prescribed burning.**
Van Dyke, Fred and Darragh, Jeffrey A.
Biodiversity and Conservation 15(14): 4375-4398. (2006)
NAL Call #: QH75.A1B562; ISSN: 0960-3115
Descriptors: Cervidae/ Artiodactyla/ Cervus canadensis/ terrestrial ecology/ forage production/ nutritional quality/ prescribed burning/ seasonal availability/ wapiti/ dispersion/ habitat/ forest/ fire/ productivity/ vegetation/ diversity/ nitrogen-protein/ food/ Montana
Abstract: Burning shrub and grassland communities often leads to increases in plant production and nutritional quality that benefit herbivores, resulting in increased herbivore use of burned areas. Increased use has been ascribed more specifically to changes in plant community structure, community composition and diversity, nutritional quality, and seasonal availability. These hypotheses can be evaluated more precisely if changes in plant communities following burning are monitored concurrently with changes in herbivore use, especially in longer-term studies. From 1988 to 1999, we examined responses of elk (Cervus elaphus) following prescribed burning of areas burned in 1984 and 1988 that had been formerly dominated by mountain big sagebrush (Artemisia tridentata ssp. vaseyana) in south-central Montana (USA), with concurrent monitoring of changes in plant production, nutritional quality, and community composition. Elk made increased use of burned sites up to 15 years after burning. Burning transformed big sagebrush-dominated communities into native herbaceous communities that persisted for 15 years without sagebrush reinvasion. Forage biomass and protein content remained higher on burned sites for 15 years, although differences were not significant in every year and declined as time elapsed after burning. Forage production, forage protein, and elk use were temporally correlated, suggesting the possibility that grazing by elk might have contributed to persistence of elevated plant production and protein levels on burned sites.
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758. **Short- and longer-term effects of fire and herbivory on sagebrush communities in south-central Montana.**
Van Dyke, Fred and Darragh, Jeffrey A.
Environmental Management 38(3): 365-376. (2006)
NAL Call #: HC79.E5E5 ; ISSN: 0364-152X
Descriptors: Artiodactyla/ Cervidae/ Cervus elaphus/ environmental factors/ behavior/ conservation/ wildlife management/ diets/ foods-feeding/ habitat use/ environmental management/ fires-burns/ foraging site selection/ ecosystems/ habitat management/ herbivorous grazing/ land zones/ Line Creek Plateau/ Gold Creek/ methods and techniques/ Montana/ nutrition/ prescribed burning/ sagebrush habitat/ sagebrush habitat management/ sagebrush habitat use/ shrub grasslands/ terrestrial ecology/ Artemisia spp.
Abstract: To better understand the role of herbivory and fire as potential disturbance processes in sagebrush communities, we examined responses of a grazing ungulate, elk (Cervus elaphus), following prescribed burning of sagebrush (Artemisia tridentata ssp. vaseyana) in south-central Montana (USA.) with concurrent monitoring of changes in plant production, nutritional quality, and community diversity from 1989-1999. Burning transformed low-diversity, sage-brush-dominated communities into high-diversity, graminoid-forb communities that persisted for 10 years without significant reestablishment of sagebrush. Elk increased use of burned sites one year after burning, but elk use returned to pre-burn levels over the next two to nine years. Forage biomass and nutritional quality declined after initial increases that coincided with increased elk use. Increases in elk use appeared to be influenced by increases in combined graminoid and forb production and changes in structural vegetation characteristics that permitted greater foraging efficiency, Declines in use were associated with loss of nutritional enhancement and declines in combined graminoid and forb production. Managers may observe only short-term responses from grazing ungulates to prescribed fire in sagebrush communities, but can expect longer-term increases in plant diversity and establishment of graminoid-forb communities.
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759. **Short-term grazing exclusion effects on riparian small mammal communities.**
Giuliano, W. M. and Homyack, J. D.
Journal of Range Management 57(4): 346-350. (2004)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X
Descriptors: riparian areas/ grazing intensity/ small mammals/ species diversity/ plant litter/ ground vegetation/ height/ Pennsylvania
Abstract: Grazing of livestock in streams and associated riparian habitats (hereafter referred to as riparian zones) may affect small mammal communities by influencing vegetation, water quality, and other site characteristics. To better understand these effects, we compared vegetation structure, and abundance and richness of small mammals in grazed riparian zones and similar areas where livestock had recently (1-2 years) been excluded in southwest Pennsylvania, 1998 and 1999. Mammalian species richness and abundance (all species combined, meadow voles [Microtus pennsylvanicus Ord], and meadow jumping mice [Zapus hudsonius Zimmermann]) were greater on sites where livestock had been excluded than grazed areas. These findings are likely the result of greater litter cover and increased vertical vegetation obstruction observed on these sites. Because small mammal communities respond quickly to relaxation of grazing in riparian zones, subsidy programs exist to partially pay for fencing, and landowners may potentially benefit from fencing these areas through improved water quality, erosion control, and livestock health, fencing may be an effective wildlife and grazing management tool.
This citation is from AGRICOLA.

760. **Short-term temporal effects on community structure of lepidoptera in restored and remnant tallgrass prairies.**
Summerville, Keith S.; Bonte, Anson C.; and Fox, Lena C.
Restoration Ecology 15(2): 179-188. (2007)
NAL Call #: QH541.15.R45R515; ISSN: 1061-2971
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Heterocera: habitat management/ tallgrass prairie restoration/ community structure/ grassland/ tallgrass prairie habitat/ restored and remnant habitats/ Iowa/ short term variations/ restored and remnant tallgrass prairie/ Insecta, Lepidoptera/ arthropods/ insects/ invertebrates/ Lepidopterans
Abstract: Understanding the degree to which species assemblages naturally vary over time will be critically important when assessing whether direct management effects or contingency is responsible for species gain or loss. In this study, we tested three predictions related to short-term variation in prairie moth communities: (1) communities would only exhibit significant temporal variation in newly restored sites (1-3 years old); (2) prairie size and age would positively influence community reassembly, with larger, older restorations sampling a greater proportion of the regional species pool; and (3) older restorations (7-10 years old) would have yet to converge on the community composition of prairie remnants. Moths were sampled from 13 Tallgrass prairie restorations and remnants in central Iowa in 2004-2005. Repeated measures analysis of variance revealed significant effects of sampling year on moth species richness and abundance as well as on the richness of two functional groups, but difference among prairie types was only observed in 2005. Rarefaction analysis revealed that older restorations and prairie remnants supported higher species richness compared to recently planted sites, and nonmetric, multidimensional scaling ordination indicated that restorations older than 7 years were clearly converging on the species composition of remnants. These results suggest that moth communities in restorations and remnants are highly variable in time but that as restorations age, they appear to reaccumulate moth species found in prairie remnants. The long-term persistence of a particular species assemblage within a given site, however, might be a difficult endpoint to attain in central Iowa prairies because of significant annual variation in species occurrence.
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761. **Should heterogeneity be the basis for conservation? Grassland bird response to fire and grazing.**
Fuhlendorf, S. D.; Harrell, W. C.; Engle, D. M.; Hamilton, R. G.; Davis, C. A.; and Leslie, D. M.
Ecological Applications 16(5): 1706-1716. (2006)
NAL Call #: QH540.E23; ISSN: 10510761
Descriptors: conservation biology/ disturbance/ diversity/

grassland birds/ Henslow's sparrow/ heterogeneity/ Oklahoma/ rangelands/ tallgrass prairie preserve/ upland sandpiper
Abstract: In tallgrass prairie, disturbances such as grazing and fire can generate patchiness across the landscape, contributing to a shifting mosaic that presumably enhances biodiversity. Grassland birds evolved within the context of this shifting mosaic, with some species restricted to one or two patch types created under spatially and temporally distinct disturbance regimes. Thus, management-driven reductions in heterogeneity may be partly responsible for declines in numbers of grassland birds. We experimentally altered spatial heterogeneity of vegetation structure within a tallgrass prairie by varying the spatial and temporal extent of fire and by allowing grazing animals to move freely among burned and unburned patches (patch treatment). We contrasted this disturbance regime with traditional agricultural management of the region that promotes homogeneity (traditional treatment). We monitored grassland bird abundance during the breeding seasons of 2001-2003 to determine the influence of altered spatial heterogeneity on the grassland bird community. Focal disturbances of patch burning and grazing that shifted through the landscape over several years resulted in a more heterogeneous pattern of vegetation than uniform application of fire and grazing. Greater spatial heterogeneity in vegetation provided greater variability in the grassland bird community. Some bird species occurred in greatest abundance within focally disturbed patches, while others occurred in relatively undisturbed patches in our patch treatment. Henslow's Sparrow, a declining species, occurred only within the patch treatment. Upland Sandpiper and some other species were more abundant on recently disturbed patches within the same treatment. The patch burn treatment created the entire gradient of vegetation structure required to maintain a suite of grassland bird species that differ in habitat preferences. Our study demonstrated that increasing spatial and temporal heterogeneity of disturbance in grasslands increases variability in vegetation structure that results in greater variability at higher trophic levels. Thus, management that creates a shifting mosaic using spatially and temporally discrete disturbances in grasslands can be a useful tool in conservation. In the case of North American tallgrass prairie, discrete fires that capitalize on preferential grazing behavior of large ungulates promote a shifting mosaic of habitat types that maintain biodiversity and agricultural productivity. © 2006 by the Ecological Society of America.
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762. **Shrub-grassland small mammal and vegetation responses to rest from grazing.**
Rosenstock, S. S.
Journal of Range Management 49(3): 199-203. (1996)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume49/Number3/azu_jrm_v49_n3_199_203_m.pdf
Descriptors: small mammals/ grazing/ microhabitats/ canopy/ species diversity/ habitats/ grasses/ shrubs/ plant communities/ Utah
Abstract: Between 1989-1991, I studied the effects of livestock grazing on vegetation and small mammals in semiarid shrub-grassland habitats of south-central Utah. Responses were measured at 2 spatial habitat scales; patches and macrohabitats. Patch-scale data were obtained from 4 small (<1 ha) livestock exclosures and nearby grazed areas. Macrohabitat-scale data were collected at 4 actively grazed sites and 4 comparable, excellent condition sites, ungrazed for 30+ years. Ungrazed patch and macrohabitat sites had more surface litter, greater perennial grass cover, and taller perennial grass plants, but treatment response varied among sites. Small mammal responses were apparent only at the macro-habitat scale, where ungrazed sites had 50% greater species richness and 80% higher abundance. Small mammal reproductive activity and biomass were not affected by rest from grazing at either scale. Small mammal community composition varied greatly among sites and within treatments. This variability has important implications for ecological monitoring efforts involving these species. This citation is from AGRICOLA.

763. **Shrubsteppe bird response to habitat and landscape variables in eastern Washington, USA.**
Vander Haegen, W. M.; Dobler, F. C.; and Pierce, D. J.
Conservation Biology 14(4): 1145-1160. (2000)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1046/j.1523-1739.2000.99293.x.
http://wdfw.wa.gov/wlm/research/papers/shrub/shrubsteppe.pdf
Descriptors: avifauna/ habitat fragmentation/ landscape structure/ plant community/ soil type/ United States/ Amphispiza belli/ Lanius ludovicianus/ Spizella breweri
Abstract: The landscape of the intermountain west has changed dramatically in the last 150 years, particularly in the state of Washington, where over half the native shrubsteppe ecosystem has been converted to agricultural lands, resulting in a fragmented landscape with few extensive tracts of shrubsteppe. We examined the historical and current distribution of shrubsteppe on different soil types in eastern Washington, and we censused bird communities at 78 sites in shrubsteppe from 1991 to 1993. We compared abundance of species among soil types and range conditions and developed models of species occurrence using site-specific vegetation and landscape variables. The pattern of shrubsteppe conversion has resulted in a disproportionate loss of deep soil communities. Eight bird species showed strong relationships with soil type and three with range condition. These associations likely resulted from the influence of soil type and range history on the vegetation of these communities. Brewer's Sparrows (Spizella breweri) and Sage Sparrows (Amphispiza belli) reached their highest abundances in deep, loamy soils, whereas Loggerhead Shrikes (Lanius ludovicianus) were most abundant in deep, sandy soils. Sage Sparrows occurred more frequently in landscapes dominated by shrubsteppe, indicating a negative relationship with fragmentation. Our results suggest that fragmentation of shrubsteppe and the pattern of agricultural conversion among soil types have had detrimental effects on numerous shrubsteppe species. The landscape for species with an affinity for deep, loamy soil communities has changed considerably more than the overall loss of shrubsteppe would indicate. Conservation practices that emphasize retention of shrubsteppe communities on deep soils and that reduce further fragmentation will be critical to the maintenance of avian biological diversity in this system.
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764. **Small mammal populations in a grazed and ungrazed riparian habitat in Nevada.**
Medin, D. E. and Clary, W. P.
Ogden, UT: Intermountain Research Station, Forest Service, U.S. Department of Agriculture; Research Paper-INT 413, 1989. 6p.
Notes: 0886-7380 (ISSN).
NAL Call #: A99.9 F764U
http://www.fs.fed.us/rm/pubs_int/int_rp413.pdf
Descriptors: mammals/ Populus tremuloides/ Salix/ population dynamics/ riparian buffers/ grazing/ Nevada
Abstract: Community composition and relative abundance of small mammal populations were compared between an aspen (Populus tremuloides)lwillow (Salix spp.) riparian habitat seasonally grazed by cattle and a comparable adjoining habitat protected from grazing for the previous 11 years by an exclosure. The exclosure, constructed in 1977, is on the West Fork of Deer Creek in northeastern Nevada. Small mammal populations were compared by removal trapping over a 5-day period in late summer 1988. Four species accounted for 82 percent of the total number of individual animals trapped. These were deer mouse (Peromyscus maniculatus), western jumping mouse (Zapus princeps), least chipmunk (Tamias minimus), and Great Basin pocket mouse (Perognathus parvus). Other small mammals trapped either irregularly or in smaller numbers on the study site included golden-mantled ground squirrel (Spermophilus lateralis), vagrant shrew (Sorex vagrans), long-tailed vole (Microtus longicaudus), montane vole (Microtus montanus), Townsend's ground squirrel (Spermophilus townsendi), northern pocket gopher (Thomomys talpoides), and bushy-tailed woodrat (Neotoma cinerea). Estimated density of small mammals was over a third higher in the ungrazed habitat as compared to the grazed area. Small mammal standing crop biomass, species richness, and species diversity were 3.24, 1.83, and 1.25 times higher, respectively, on the ungrazed site. Each of the 11 species recorded during the study was trapped inside the protected area. Only six species were trapped in the grazed habitat. The grazed study site did not appear to have received excessive use by cattle in recent years compared to nearby riparian habitats.
This citation is from AGRICOLA.

765. **Small mammal response to the introduction of cattle into a cottonwood floodplain.**
Samson, F. B.; Knopf, F. L.; and Hass, L. B.
In: Management of amphibians, reptiles, and small mammals in North America.Flagstaff, Ariz. Szaro, R. C.; Severson, K. E.; and Patton, D. R. (eds.);
Vol. GTR-RM-166.
Fort Collins, Colo.: U.S. Department of Agriculture Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 432-438; 1988.
Notes: ISSN: 0094-4823.
NAL Call #: aSD11.A42 no. 166
Descriptors: ecology/ terrestrial habitat/ land and freshwater zones/ Mammalia: community structure/ comparisons of grazed and ungrazed grassland/ community comparisons/ habitat exploitation/ comparison/ grassland/ grazed and ungrazed grassland communities/ Colorado/ Logan County/ South Platte State Wildlife Area/ comparison of grazed and ungrazed grassland/ small taxa/ chordates/ mammals/ vertebrates
© Thomson Reuters Scientific

766. **Small mammal responses to tallgrass prairie restoration from fescue pastures (Kansas).**
Keller, Amber D. and Cully, Jack F.
Ecological Restoration 20(4): 279-280. (2002);
ISSN: 1522-4740
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Mammalia: habitat management/ habitat restoration/ small taxa community responses/ community structure/ small taxa responses to habitat restoration/ grassland/ tallgrass prairie/ small taxa community responses to habitat restoration/ Kansas/ Labette County/ Kansas Army Ammunition Plant/ Mammalia/ chordates/ mammals/ vertebrates
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767. **Small mammals in tall-grass prairie: Patterns associated with grazing and burning.**
Clark, Bryon K.; Kaufman, Donald W.; Finck, Elmer J.; and Kaufman. Glennis A.
Prairie Naturalist 21(4): 177-184. (1989)
NAL Call #: QH540.P7; ISSN: 0091-0376
Descriptors: Blarina hylophaga/ Microtus ochrogaster/ Peromyscus maniculatus/ Peromyscus leucopus/ ecosystems/ grasslands/ fires-burns/ grazing/ habitat alterations/ prairies/ wildlife-livestock relationships/ Kansas: Geary County/ Kansas: Riley County
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768. **Society for Range Management issue paper: Ecology and management of sage-grouse and sage-grouse habitat - A reply.**
Schroeder, M. A.; Connelly, J. W.; Wambolt, C. L.; Braun, C. E.; Hagen, C. A.; and Frisina, M. R.
Rangelands 28(3): 3-7. (2006)
NAL Call #: SF85.A1R32; ISSN: 01900528
Descriptors: habitat management/ sage grouse/ commentary
Abstract: A critique to the 2005 issue paper of the Society for Range Management (SRM) entitled "Ecology and Management of Sage-Grouse and Sage-Grouse Habitat" and based on Crawford et al's compilation of the 2001 SRM symposium on sage-grouse is presented. Focus is on issues and concerns regarding sage-grouse distribution, habitat relationships, habitat management practices, factors other than habitat that affect sage-grouse populations and landscape issues. It is shown that by focusing only in one paper, the issue paper authors may provide an inaccurate and/or incomplete assessment of sage-grouse populations and habitat.
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769. **Soil dwelling macro-invertebrates in intensively grazed dairy pastures in Pennsylvania, New York and Vermont.**
Byers, R. A. and Barker, G. M.
Grass and Forage Science 55(3): 253-270. (2000)
NAL Call #: 60.19 B773; ISSN: 0142-5242
Descriptors: macroinvertebrates/ dairy/ pasture/ grazing/ northeastern United States
Abstract: This study estimates the relative contributions of environment and farm management strategies in influencing soil faunal assemblages and attempts to identify the species with potential to affect sustainability of intensive grazing management systems in the north-eastern USA. It arises because of the change from confinement feeding of

dairy cattle, consequent upon concerns about negative environmental effects, the rising costs for machinery and housing, and reduced profit margins, together with the absence of data from which the consequences of such change on the soil fauna may be predicted. Macro-invertebrates were sampled in soil from seventy-eight grazed pastures on twenty-one dairy farms in Pennsylvania, USA, in the spring of 1994. On five of these farms, macro-invertebrates were sampled (four pastures per farm) in the spring, summer and autumn seasons of 1994, 1995 and 1996. In 1997, macro-invertebrates were sampled in soil during spring, summer and autumn from (four pastures per farm) on three farms in New York, and during spring and summer on three farms in Vermont. Species richness ranged from two to twelve species (mean 6.4) per pasture site in Pennsylvania and five to eighteen species (mean 10.7) in New York and Vermont. The communities were dominated at most sites by earthworms. Earthworms were correlated with soil basal and substrate-induced respiration/carbon ratio, and soil moisture, but were negatively correlated with cows per hectare and herbage biomass in Pennsylvania. Sitona larvae were recorded at nineteen of the twenty-one farms during the spring of 1994 across Pennsylvania and occurred at populations >5 m-2 in 68% of the sampled pastures. Sitona larvae were less abundant in New York and Vermont. Elaterid larvae comprised a complex of seven species of which Aeolus melillus (Say) and Melanotus communis (Gyllenhal) comprised 35% and 39%, respectively, of the elaterids collected in Pennsylvania. Agriotes mancus (Say) and Ctenicera destructor (Brown) comprised 41% and 26%, respectively, of four species collected in New York and Vermont. Scarabaeid larvae, comprising a complex of eight species, were detected at only 27% of the seventy-eight pastures sampled in spring 1994 in Pennsylvania. Five species were collected in ten of the twelve New York pastures and four species in nine of the twelve Vermont pastures. Populations of scarabaeid larvae averaged <25 m-2 in all three states, except in three Pennsylvania pastures in spring 1994. Detrended canonical correspondence analysis (DCCA) showed pasture standing biomass, legume diversity, pre-winter stubble height, white clover pasture content, and soil phosphorus levels influenced numbers of invertebrate species more than climatic factors, such as temperature, rainfall, altitude, latitude and seasonal water table. DCCA also showed most pastures to be dose to the average of environmental factors. The extremely low density of herbivorous macro-invertebrates in soil and the absence of pest outbreaks may indicate a stable soil ecosystem.
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770. **Soil macrofauna under two grazing systems.**
Rodriguez, I.; Crespo, G.; Torres, V.; and Fraga, S.
Cuban Journal of Agricultural Science 33(4): 415-422. (1999)
NAL Call #: S1.R4; ISSN: 0864-0408
Descriptors: biomass/ ferrallitic soils/ grassland soils/ grazing intensity/ grazing systems/ rotational grazing/ soil fauna/ soil types/ species diversity
Abstract: The soil macrofauna of an 18 ha Cynodon nlemfuensis sward was studied for three years (September 1993-96) on a red ferrallitic soil in Cuba to compare an intensive rotational grazing system with 72 paddocks (Voisin's rational grazing) and 260 large cattle (LC) units (equivalent to liveweight of 500 kg), and a less intensive rotational grazing system with 12 paddocks and an intensity of 51 LC. Three paddocks were selected from each system in which three areas of 0.065 m^2 each were sampled at 0-20 depth once each trimester to determine the number of macrofauna individuals, the biomass and soil humidity. Data were statistically analysed through a linear model and also the principal component method was used to analyse the influence of climatic factors on the variables studied and their relationship. There were no significant differences between the two grazing systems in the number of individuals (mean 4.37/m^2) or in their biomass (19.9 g/m^2). Results showed differences (P<0.01) between trimesters with the highest values in September-October-November and March-April-May. Annual performance of the macrofauna showed that in the first year there was a greater number of individuals (8.86 vs 2.26 and 1.96) and higher biomass (39.3 vs 2.43 and 11.07 g/m^2) compared to the following years. Among the diversity of individuals there were earthworms, coleopterous larvae and other insects. The first two groups made up most of the total biomass. Results indicate that diversity and biomass of macrofauna will not increase in the short term under similar soil and climatic conditions in the grazing systems used in this study.
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771. **Soil microarthropods as indicators of exposure to environmental stress in Chihuahuan Desert rangelands.**
Kay, F. R.; Sobhy, H. M.; and Whitford, W. G.
Biology and Fertility of Soils 28(2): 121-128. (1999)
NAL Call #: QH84.8.B46; ISSN: 0178-2762
Descriptors: bulldozing/ desert grassland/ desertification/ environmental stress indicators/ grazing/ habitat/ microclimate/ rainfall/ soil communities/ vegetation damage
Abstract: We studied soil microarthropod communities along livestock grazing disturbance gradients, inside and outside grazing exclosures, and on areas subjected to restoration efforts (herbicide and bulldozing) in order to test the suitability of mites as indicators of rangeland soil quality. We found that mite numbers generally increased with decreased grazing disturbance. Soil microarthropods appeared to respond to a complex of factors including soil compaction, depth to an impervious soil layer, below-ground vegetative biomass, and residual effects of herbicide. All of our study plots, except those that had been herbicide treated, were dominated by microbivorous mites of the family Nanorchestidae. The numerical responses of mites, especially nanorchestids, appeared to provide a sensitive indicator of ecosystem health in a Chihuahuan Desert grassland.
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772. **Songbird abundance and parasitism differ between urban and rural shrublands.**
Burhans, D. E. and Thompson, F. R.
Ecological Applications 16(1): 394-405. (2006)
NAL Call #: QH540.E23; ISSN: 10510761
Descriptors: brood parasitism/ brown-headed cowbird/ landscape/ nest predation/ nesting success/ shrubland/ songbirds/ urban
Abstract: Many studies have examined differences in avian community composition between urban and rural habitats, but few, if any, have looked at nesting success of urban

shrubland birds in a replicated fashion while controlling for habitat. We tested factors affecting nest survival, parasitism by the Brown-headed Cowbird (Molothrus ater), and species abundance in shrubland habitat in rural and urban landscapes. We found no support for our hypothesis that nest survival was lower in urban landscapes, but strong support for the hypothesis that survival increased with nest height. We found strong support for our hypothesis that cowbird parasitism was greater in urban than rural landscapes; parasitism in urban sites was at least twice that of rural sites. We found strong support for an urban landscape effect on abundance for several species; Northern Cardinal (Cardinalis cardinalis) and Brown-headed Cowbirds were more abundant in urban landscapes, whereas Field Sparrow (Spizella pusilla) and Blue-winged Warbler (Vermivora pinus) were more abundant in rural sites. There was support for lower abundances of Blue-gray Gnatcatcher (Polioptila caerulea) and Indigo Bunting (Passerina cyanea) with increased housing density. For six other species, edge and trail density or vegetation parameters best explained abundance. Lower abundances and greater parasitism in habitat patches in urban landscapes are evidence that, for some species, these urban landscapes do not fulfill the same role as comparable habitats in rural landscapes. Regional bird conservation planning and local habitat management in urban landscapes may need to consider these effects in efforts to sustain bird populations at regional and local scales. © 2006 by the Ecological Society of America.

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773. **Songbird community composition and nesting success in grazed and ungrazed pinyon-juniper woodlands.**

Goguen, Christopher B. and Mathews, Nancy E.
Journal of Wildlife Management 62(2): 474-484. (1998)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Bos taurus/ Fringillidae/ Passeriformes/ Molothrus ater/ Aves/ behavior/ birds/ communities/ ecosystems/ habitat alterations/ habitat use/ interspecies relationships/ juniper/ nest parasitism/ nests-nesting/ pinyon pine/ productivity/ wildlife-livestock relationships/ wild birds/ reproduction/ woodlands/ land use/ neotropical migrant songbirds/ breeding success/ livestock grazing/ natural resources/ animal ecology and behavior/ plant production/ range and pasture grasses/ abundance/ birds, passerines/ blackbirds and cowbirds/ cattle/ grazing/ habitat/ livestock/ nests and nesting/ parasitic habits/ sampling/ surveys/ vegetation/ agriculture/ prairie/ forest/ nest/ brood-egg/ fertility-recruitment/ brown-headed cowbird/ songbird/ biotop/ vegetation/ New Mexico/ Colfax County/ Sangre de Cristo Mountains
Abstract: Liverstock grazing is a dominant land use of pinyon-juniper habitats in the western United States, yet the effects of grazing on breeding bird communities in this habitat have been poorly studied. The authors compared habitat structure, songbird abundance, and nesting productivity within pinyon-juniper woodlands on an actively grazed site and a site experiencing long-term relief from livestock grazing in northeastern New Mexicon. From 1992 to 1995, they performed vegetation sampling, conducted songbird point counts, and located and monitored nests on 8.35-ha study plots. Four of these plots experienced moderate cattle grazing and four were ungrazed since 1973. They found no differences in habitat or vegetation features between grazed and ungrazed plots. Bird communities were similar, with only one of the 11 species they tested more abundant on the ungrazed treatment (western scrub-jay; Aphelocoma californicus). They detected no differences in nesting success or cause-specific rates of nest failure for seven common bird species ($P<0.05$), and detected no differences in brown-headed cowbird (Molothrus ater) parasitism rates for the major hosts between grazed and ungrazed areas. Greater than 75% of the nests of the solitary vireo (Vireo solitarius), western tanager (Piranga ludoviciana), and blue-gray gnatcatcher (Polioptila caerulea) were parasitized on both treatments. These high parasitism rates may be the result of high densities of local cowbirds because of abundant feeding sites (i.e., livestock), the high mobility of cowbirds, and the close proximity of ungrazed plots to grazed areas (all < 4 km). The results suggest that 20 years of relief from grazing had little influence on the habitat structure or bird species composition of the pinyon-juniper woodlands on the study site. However, livestock grazing has indirectly affected the nesting success of some songbird species via the influence of grazing on cowbird abundance. The authors' findings highlight the need for studies that incorporate nest monitoring and landscape-scale approaches to better understand the relation between cowbirds, livestock, and songbirds and the time required for recovery from grazing effects.
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774. **Spatial components of plant-herbivore interactions in pastoral, ranching, and native ungulate ecosystems.**

Coughenour, M. B.
Journal of Range Management 44(6): 530-542. (1991)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume44/Number6/azu_jrm_v44_n6_530_542_m.pdf
Descriptors: ungulates/ spatial distribution/ spatial variation/ grazing
Abstract: The spatial component of herbivory remains enigmatic although it is a central aspect of domestic and native ungulate ecosystems. The effects of ungulate movement on plants have not been clearly established in either range or wildlife management. While livestock movement systems have been implemented to cope with increases in livestock density, restrictions on movement, and overgrazing, a large number of studies have disputed the effectiveness of different livestock movement patterns. Traditional pastoralism, particularly nomadism, has been perceived as irrational and even destructive, but many studies have documented features of traditional pastoral land use that would promote sustainability. Disruptions of wild ungulate movements have been blamed for wildlife overgrazing and population declines, but actual patterns and mechanisms of disrupted movement and population responses have been poorly documented. Models that integrate plant growth, ungulate movement, and foraging are suggested as a way to improve analyses of spatial plant-herbivore systems. Models must give due attention to nonforage constraints on herbivore distribution, such as topography. Models should assess the significance of movement as a means of coping with local climatic variation (patchy rainfall). Models that distribute an aggregate population over a landscape in relation to the distribution of habitat features deemphasize aspects of

ungulate movements and population responses that inevitably cause nonideal distributions, particularly in natural ecosystems. Individual based models describe movement and foraging processes more accurately, but these models are difficult to apply over large areas. Both top-down and bottom-up approaches to spatial herbivory are needed. To model plant responses to movement, it is important to account for small scale phenomena such as tiller defoliation patterns, patch grazing, and grazing lawns as well as large scale patterns such as rotation and migration. Herbivory patterns at these different scales are interrelated.
This citation is from AGRICOLA.

775. **Spatial distribution of upland beetles in relation to landform, vegetation and grazing management.**
Dennis, Peter; Aspinall, R. J.; and Gordon, Iain J.
Basic and Applied Ecology 3(2): 183-193. (2002)
NAL Call #: QH540.B37; ISSN: 1439-1791
Descriptors: principle component analysis: mathematical and computer techniques/ climate change/ distance statistics/ grazing intensity/ grazing management/ land use changes/ landform management/ soil management/ soil moisture/ spatial distribution/ structural heterogeneity/ vegetation management
Abstract: We applied a novel analysis based on distance statistics to investigate how patterns of habitat heterogeneity affected the distribution of representative ground and rove beetle species (Coleoptera: Carabidae, Staphylinidae), sampled at an upland site of varied landform, soil and vegetation structure. The structural heterogeneity of the Nardus stricta-dominated grassland was further modified by varying grazing intensity with sheep, or sheep and cattle. We collected pitfall trap data from 120 sample points across the study area. Ground and rove beetle species were selected to represent the major trends in the species-trap abundance data, determined by the extent of their correlation with the main components of a factor analysis (Principal Components Analysis). The novel statistical analytical method, calculation of the Getis and Ord distance statistic, G, was applied to the distribution data of each selected species of ground and rove beetle. The distance statistic was calculated for the smallest distance to ensure that each sample point had at least one neighbour (73 m) and this distance was used to detect local spatial association and to explore the location and spatial scale of aggregations of each beetle species over the hillside. Clusters of high and low G(z) values were mapped to indicate the species' functional heterogeneity compared with habitat heterogeneity determined by landform, soils or grazing management. The small number of large aggregations indicated the sensitivity of certain species to patterns of landform (Calathus melanocephalus and Pterostichus adstrictus). More aggregations of smaller size, coinciding with the pattern of particular grazing regimes indicated species sensitive to grazing intensity and species of mammalian herbivore (Carabus problematicus and Olophrum piceum). The aggregations of Othius angustus and Philonthus decorus related to landform, and suggested these species may have been directly responding to soil moisture and patterns of trampling by grazers. The method distinguished between those species that are sensitive to land use change and those that may be affected more by climate change.
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776. **Spatial dynamics of source-sink habitats: Effects on rare grassland birds.**
Perkins, D. W.; Vickery, P. D.; and Shriver, W. G.
Journal of Wildlife Management 67(3): 588-599. (2003)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: Bachman's sparrow/ core/ dry prairie/ edge/ Florida grasshopper sparrow/ grassland birds/ habitat fragmentation/ nest success/ reproductive success/ edge effect/ endangered species/ passerines/ source-sink dynamics/ United States/ Aimophila aestivalis/ Ammodramus savannarum/ Pinus palustris
Abstract: Fragmentation and edge effects adversely affect passerines in North America, primarily by reducing territory density, reproductive success, and survival. As natural landscapes become increasingly altered and fragmented by human development, understanding the demographic parameters of remaining subpopulations is important. We wanted to determine whether remaining dry prairie fragments in central Florida, USA, were acting as population sources or sinks for 2 rare and declining sparrows: the federally endangered Florida grasshopper sparrow (Ammodramus savannarum floridanus) and the regionally threatened Bachman's sparrow (Aimophila aestivalis). We obtained sparrow survival estimates from 2 sites in central Florida and combined these with productivity, estimates from 3 sites (1996-1998) to determine whether each site was acting as a source or sink. We also explored whether subunits within a site consistently functioned as sources. For Florida grasshopper sparrows, we found that core areas >400 m from edge were consistently sources. We think that the only way Florida grasshopper sparrows can persist at these sites is if the core source areas produce enough surplus young to compensate for the sink habitat along the wide borders of these prairie fragments. In contrast to grasshopper sparrows, we found no consistent source areas for Bachman's sparrows. Dry prairie seems to be sink habitat for Bachman's sparrows, and this species is likely to persist in this habitat only through continued recruitment from adjacent long-leaf pine (Pinus palustris) stands. We think that large prairie fragments, possibly >4,000 ha, are necessary for maintaining source habitat for Florida grasshopper sparrows and possibly other grassland bird species.
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777. **Spatial heterogeneity of low-density populations of Melanoplus sanguinipes (Orthoptera: Acrididae) associated with grazing and vegetation treatments.**
Fielding, Dennis J.; Brusven, M. A.; Shafii, Bahman; and Price, William J.
Canadian Entomologist 133(6): 843-855. (2001)
NAL Call #: 421 C16; ISSN: 0008-347X
Descriptors: commercial activities/ ecology/ population dynamics/ terrestrial habitat/ abiotic factors/ physical factors/ land and freshwater zones/ Melanoplus sanguinipes (Saltatoria): farming and agriculture/ livestock grazing/ population density/ low density populations/ distribution within habitat/ spatial heterogeneity of low density populations/ grassland/ climate and weather/ Idaho/ spatial distribution of low density populations/ effects of grazing and vegetation/ rangelands/ Saltatoria/ Orthoptera/ Insecta/ arthropods/ insects/ invertebrates

Abstract: The objectives of this study were to determine whether the spatial distribution of Melanoplus sanguinipes F., the most abundant species of grasshopper on rangeland in southern Idaho, varied annually in response to changing patterns of grazing and to investigate how vegetation affects the spatial distribution of low-density populations of M. sanguinipes at scales relevant to most rangeland-management activities. A lattice of 72 sites was established across nine pastures, covering approximately 5000 ha. At each site, densities of M. sanguinipes, percent canopy coverage by plant species, and percent forage utilization by livestock were estimated twice per year, in June when M. sanguinipes was in the nymphal stage and in August during the adult stage, for 4 years, 1991-1994. Spatial analyses of variance were used to evaluate the influence of grazing and vegetation type on densities of M. sanguinipes. In August of each year, densities of M. sanguinipes were lower on heavily grazed sites than on lightly grazed sites, except in 1993, when the opposite trend was observed. Above-normal precipitation in 1993 resulted in abundant growth of annual forbs and regrowth of grazed plants. The distribution of nymphs in June of 1993 and 1994 reflected the grazing patterns of the previous summer. Densities of M. sanguinipes were lower on crested wheatgrass habitats than on annual grasslands for every sampling period from June 1991 to June 1993, after which no differences were observed. We interpret the results to suggest that grazing effects on low-density populations of M. sanguinipes were contingent on weather conditions; under dry conditions, grazed habitats were less favorable to M. sanguinipes but, during relatively cool wet summers, grazing created conditions that were more favorable to M. sanguinipes.
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778. **Spatial models of northern bobwhite populations for conservation planning.**
Twedt, D. J.; Wilson, R. R.; and Keister, A. S.
Journal of Wildlife Management 71(6): 1808-1818. (Aug. 2007)
NAL Call #: 410 J827
Descriptors: simulation models/ conservation areas/ Colinus virginianus/ wild birds/ quails/ spatial data/ conservation programs/ wildlife management/ wildlife habitats/ population dynamics/ land use change/ habitat conservation/ spatial distribution/ surveys/ grasslands/ agricultural land/ prediction/ population ecology/ remote sensing/ Louisiana/ Arkansas/ Texas/ Oklahoma/ natural resources, environment, general ecology, and wildlife conservation/ animal ecology and behavior
This citation is from AGRICOLA.

779. **Spatial responses of bobolinks (Dolichonyx oryzivorus) near different types of edges in northern Iowa.**
Fletcher, R. J. and Koford, R. R.
Auk 120(3): 799-810. (2003)
NAL Call #: 413.8 AU4 ; ISSN: 00048038
Descriptors: edge effect/ habitat fragmentation/ hypothesis testing/ passerines/ spatial distribution/ United States/ Dolichonyx oryzivorus
Abstract: Habitat edges are well-studied components of fragmented landscapes, yet factors mediating edge effects remain unclear. We report how different types of edges surrounding patches may affect spatial distributions of Bobolink (Dolichonyx oryzivorus), a declining, area-sensitive songbird that breeds in grasslands. We expected Bobolinks to be less abundant near edges, and we investigated a set of alternative hypotheses for explaining that spatial pattern: (1) passive displacement, in which individuals do not avoid edges but use edges as boundaries for territories; (2) habitat gradients, in which individuals respond to habitat structure gradients near edges; (3) territory size, in which size of territories increases near edges; and (4) active avoidance, in which individuals actively avoid edges by positioning territory boundaries away from edges. To examine those hypotheses, we surveyed Bobolinks in grassland habitats near 34 edges of three different edge types (agriculture, road, and woodland) in northern Iowa, 1999-2000. Bobolink density was lower near woodland edges than near other edge types, and density increased as a function of distance from edge for all edge types. There was no evidence for a habitat gradient close to edges, but there was some evidence for habitat structure differing among edge types. Territory size increased near roads, decreased near woodlands, but did not change near agricultural edges. Territory positioning was consistent with active avoidance near woodland edges, and to a lesser extent road edges, but positioning was only consistent with passive displacement near agriculture edges. We conclude that land use surrounding patches can have variable effects on territorial dynamics and habitat use of this area-sensitive species. Linking edge avoidance with fitness is needed to understand the demographic consequences of those responses for species in fragmented landscapes.
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780. **Species diversity and habitat of grassland passerines during grazing of a prescribe-burned, mixed-grass prairie.**
Danley, Robert F.; Murphy, Robert K.; and Madden, Elizabeth M.
Western North American Naturalist 64(1): 72-77. (2004)
NAL Call #: QH1.G7; ISSN: 1527-0904
Descriptors: prescribed burning: applied and field techniques/ rotation grazing: applied and field techniques/ grazing/ habitat management/ mixed grass prairie: prescribe burned/ species diversity/ stocking rates
Abstract: No published data exist on responses of grassland passerines and their habitat to combined grazing and burning treatments in northern mixed-grass prairie. At Lostwood National Wildlife Refuge (LNWR) in northwestern North Dakota, we monitored breeding bird occurrence, abundance, and habitat during successive annual grazing treatments (1998-2000) on 5 prescribe-burned, mixed-grass prairie management units (range=50-534 ha, each burned 3-6 times in the previous 10-20 years). All breeding passerine species characteristic of upland, northern mixed-grass prairie were common (>10% occurrence) during at least 1 of 3 years on burned and grazed units, except Chestnut-collared Longspur (Calcarius ornatus), which was uncommon. Vegetation was generally shorter and sparser than that found on 4 nearby units treated by fire only (1999; density, visual obstruction, and height, all P<0.01). Regardless, occurrences of individual bird species resembled those previously documented on prairie units at LNWR with similar fire histories but no grazing; however, Brown-headed Cowbird (Molothrus ater) occurred 2.4 times more frequently on burned and grazed units studied. Our data suggest that species diversity of breeding grassland

passerines changes little during initial years of rotation grazing at moderate stocking rates in fire-managed, northern mixed-grass prairie at LNWR.
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781. **Species richness and California voles in an annual and a perennial grassland.**
Fehmi, Jeffrey S. and Bartolome, James W.
Western North American Naturalist 62(1): 73-81. (2002)
NAL Call #: QH1.G7; ISSN: 1527-0904
Descriptors: Microtus californicus/ Cricetidae/ Rodentia/ Muridae/ grazing/ California vole/ grasslands/ California
Abstract: Populations of a common burrowing rodent, Microtus californicus (the California vole), thrive in ungrazed or lightly grazed grasslands in coastal California. Two sites ungrazed by livestock, one dominated by native perennial grasses and another dominated by invasive annuals, were evaluated over 2 consecutive years for the relationship between plant species richness and location of M. californicus burrow entrances (burrows). Plant species and burrows were sampled as present or absent in contiguous 1-m^2 quadrats on a 100-m^2 grid. Quadrats with burrows averaged significantly more plant species than quadrats without them (11.3 vs. 9.9 species, $P < 0.001$). Burrows found in 1996 were not correlated with species richness in 1995, suggesting that voles affect richness rather than seek it out. Vole burrow locations showed significant clumping on the annual site and trended toward clumping on the perennial site in both 1995 and 1996. Because voles seem to create a clumped pattern with their burrow entrances, the associated increase in plant species richness may have a strong effect on the overall structure of the plant community. A quantitative comparison of the 2 sites showed that the plant matrix of the perennial site contained flora of the annual site. This similarity in plant species composition may allow for similar treatment of our 2 types of sites and potentially other California grass-lands. Undetected increases in vole populations with livestock grazing reduction may account for the erratic results from grasslands management research and the inconsistent success of derived management practices.
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782. **Species traits as predictors of lepidopteran composition in restored and remnant tallgrass prairies.**
Summerville, Keith S.; Conoan, Christopher J.; and Steichen, Renae M.
Ecological Applications 16(3): 891-900. (2006)
NAL Call #: QH540.E23 ; ISSN: 1051-0761
Descriptors: conservation measures/ terrestrial habitat/ land zones/ Lepidoptera: habitat management/ habitat restoration/ tallgrass prairies/ species trait analysis use/ community structure/ restored and remnant tallgrass prairies/ species trait analysis and conservation significance/ grassland/ restored and remnant habitats/ Iowa/ Insecta/ arthropods/ insects/ invertebrates/ Lepidopterans
Abstract: Restoration ecologists are increasingly turning to the development of trait-filter models, which predict how evolved traits limit species membership within assemblages depending on existing abiotic or biotic constraints, as a tool to explain how species move from a regional species pool into a restored community. Two often untested assumptions of these models, however, are that species traits can reliably predict species' broadscale distribution and that the effects of traits on community membership do not vary between restored and remnant habitats. The goals of this study were to determine whether combinations of ecological traits predispose moth species toward recolonization of restored prairies and to assess the degree to which restored prairies contain moth assemblages comparable with prairie remnants. In 2004, we collected 259 moth species from 13 tallgrass prairie remnants and restorations in central Iowa. Principal components analysis (PCA) was used to identify significant combinations of ecological traits that were shared by groups of moth species. Logistic regression was then employed to test for significant effects of the trait combinations on the frequency of prairie sites occupied by moth species. PCA partitioned moth traits into four axes that explained a total of 81.6% of the variance. Logistic regression detected significant effects for all four PCA axes on the fraction of sites occupied by moths. Species frequently filtered from the regional species pool into prairies were those that had long flight periods and were multivoltine, displayed a feeding preference for legumes but not other forb families, and were regionally abundant but relatively small in body size. Ordination revealed significant differences in moth communities among prairies, suggesting that species traits and habitat characteristics likely interact to create observed patterns of species recolonization of restorations. Thus, the optimal approach to restoring the lepidopteran fauna of tallgrass prairies may involve locating prairie plantings adjacent to habitat remnants.
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783. **Spring livestock grazing affects crested wheatgrass regrowth and winter use by mule deer.**
Austin, D. D.; Urness, P. J.; and Fierro, L. C.
Journal of Range Management 36(5): 589-593. (1983)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume36/Number5/azu_jrm_v36_n5_589_593_m.pdf
Descriptors: Utah/ grazing/ mule deer/ forage/ livestock
This citation is from AGRICOLA.

784. **Status, ecology, and conservation of the southwestern willow flycatcher.**
Finch, Deborah M. and Stoleson, Scott H.; U.S. Forest Service Rocky Mountain Research Station General Technical Repor RMRS-GTR 60, 2000.
http://www.fs.fed.us/rm/pubs/rmrs_gtr60.pdf
Descriptors: southwestern willow flycatcher/ endangered species/ riparian/ Southwest/ exotic woody plants/ rivers/ recovery/ habitat restoration/ neotropical migratory birds/ brown-headed cowbird
Abstract: The goal of this document is to describe the current status, ecology, habitat, and threats of the southwestern willow flycatcher (Empidonax traillii extimus); to offer guidance for managing and protecting this Neotropical migrant and its habitats; and to identify gaps in our knowledge of the bird and its requirements.
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785. **The status, habitat, and response to grazing of water vole populations in the Big Horn Mountains of Wyoming, U.S.A.**
Klaus, Marion
Arctic Antarctic and Alpine Research 35(1): 100-109. (2003)
NAL Call #: GB395.A73; ISSN: 1523-0430
Descriptors: USDA Forest Service/ altitude/ bank structure/ channel types/ conservation status/ creeks/ dry weight biomass/ grazing responses/ habitat profiles/ habitat requirements/ historical records/ percent plant cover/ precipitation/ riparian environments/ soils/ species abundance/ stream depth/ temperature
Abstract: Microtus richardsoni, the water vole, was listed as a sensitive species in Region 2 of the USDA Forest Service in 1994. Historical records indicate water voles were found in the Big Horn Mountains, but little was known about their current status. The purpose of this study was to locate water voles in the Big Horn Mountains of Wyoming, develop a habitat profile, and evaluate the extent to which livestock grazing affects them. Accessible creeks with habitat requirements for water voles were surveyed. Water voles were not captured below 2440 m. Grazed and ungrazed sites occupied by water voles were matched and analyzed for percent plant cover, dry weight biomass, riparian classification, mean stream depth, channel type, elevation, precipitation, and temperature. Capture success was significantly greater in ungrazed areas. Percent cover by ferns and thallophytes was significantly greater in areas where water voles were more abundant, and bare ground was significantly greater at grazed locations. Water voles were most abundant on Rosgen B or E streams with a willow/wet Carex riparian class that is found on relatively undisturbed sites with stable, well-developed soils and bank structure. In the Big Horn Mountains, water vole captures were low in comparison to the Beartooth Mountains and synergistic effects of grazing and drying might negatively impact this species.
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786. **Status of the regal fritillary (Speyeria idalia) and effects of fire management on its abundance in northeastern Kansas, USA.**
Powell, Alexis F.; Busby, William H.; and Kindscher, Kelly
Journal of Insect Conservation 11(3): 299-308. (2007)
NAL Call #: QL362.J68; ISSN: 1366-638X
Descriptors: conservation measures/ ecology/ population dynamics/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Speyeria idalia: habitat management/ fire management effect on distributional status/ endangered status/ Conservation status/ fire management relationships/ population density/ grassland/ prairie habitat/ distributional status in relation to fire management/ fire/ Kansas/ Insecta, Lepidoptera, Glossata, Heteroneura, Papilionoidea, Nymphalidae/ arthropods/ insects/ invertebrates/ Lepidopterans
Abstract: The Regal Fritillary (Speyeria idalia), which once occupied prairies and meadows in North America from the upper Great Plains to the Atlantic coast, has disappeared in recent decades from nearly the entirety of the eastern half of its range and has declined westward. In the Great Plains, where the species is limited to native prairie remnants, several large populations are thought to exist, but patterns of occurrence and abundance in the region have not been described in detail. We surveyed prairies within a three county area of northeastern Kansas using distance-sampling along line transects and found Regal Fritillaries present at 70 of 87 sites. Population density varied considerably among sites but was generally much higher at those that had not been burned in the past year. Despite the loss of >99% of its original prairie landcover and the small sizes of remnants ($\bar{x}$ = 7.1 ha) we estimate that our study area supports a globally significant population of ≃12,000 adult individuals. Given the rapidity of decline of Regal Fritillary populations elsewhere, this study establishes important population benchmarks and a practical protocol for future monitoring efforts.
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787. **A stewardship approach to grassland bird habitat conservation in Saskatchewan, Canada.**
Davis, Stephen K; Springer, Bob; Lohmeyer, Jennifer; Hall, Lesley; and Harrison, Tom
In: Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference, General Technical Report-PSW 191/ Ralph, C. J. and Rich, T. D.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2005. pp. 1198-1200.
Notes: Volume 2; Responsibility: Pacific Southwest Research Station; U.S. Forest Service General Technical Report series; ISSN: 0196-2094; Conference held 2002 March 20-24 in Asilomar, California.
http://www.fs.fed.us/psw/publications/documents/psw_gtr191/Asilomar/pdfs/1198-1200.pdf
Descriptors: conservation measures/ terrestrial habitat/ land zones/ Canada/ Aves/ habitat management/ grassland conservation/ grassland/ stewardship/ habitat conservation/ Saskatchewan/ birds/ chordates/ vertebrates
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788. **Study looks at small mammal populations in restored fields.**
Schottler, Shawn
Grasslands 12(2): 4-5. (2002); ISSN: 1540-6857
Descriptors: wildlife management: conservation/ restored field habitat: small mammal populations/ tallgrass prairie
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789. **Suppression of grasshoppers in the Great Plains through grazing management.**
Onsager, J. A.
Journal of Range Management 53(6): 592-602. (2000)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X.
http://jrm.library.arizona.edu/Volume53/Number6/azu_jrm_v53_n6_592_602_m.pdf
Descriptors: Melanoplus sanguinipes/ insect control/ rotational grazing/ canopy/ rain/ heat sums/ biomass/ prairies/ Agropyron cristatum/ population density/ Acrididae/ mortality/ life cycle/ range management/ North Dakota
This citation is from AGRICOLA.

790. **Survey of CRP and other grasslands in the northeastern USA.**
Adler, Paul R; Sanderson, Matt A.; and Goslee, Sarah C.
In: 88th Annual Meeting of the Ecological Society of America. Savannah, GA.; Vol. 88: 6.; 2003.
Notes: Conference held jointly with the International Society for Ecological Modeling - North American Chapter.

Descriptors: conservation/ terrestrial ecology: ecology, environmental sciences/ Whittaker plot technique/ applied and field techniques/ Conservation Reserve Program [CRP]/ Wildlife Habitat Incentives Program [WHIP]/ biomass yield/ crop production potential/ grassland ecosystems/ intersite variability/ mine reclamation/ resource management/ soil properties/ spatial scales/ species composition/ species richness/ switchgrass fields
Abstract: Grassland ecosystems are important wildlife habitat and have the potential to be a significant component of the new biobased economy. Most currently established grasslands in the Northeastern USA are on land with marginal crop production potential. Little is known about the plant composition or amount of biomass produced on these grasslands. To assemble a database for the resource assessment of warm season grasslands in the Northeastern USA we determined plant species composition at multiple scales using the modified Whittaker plot technique, measured various soil properties, and quantified biomass yield on CRP, WHIP, mine reclamation, and other grasslands. A total of 22 grasslands were sampled in New York, Pennsylvania, New Jersey, Maryland, and Virginia during September and October 2002. We identified over 180 different plant species across the study region. Species richness was about 35 and biomass was about 6000 kg/ha, but both were quite variable by site. Although biomass yields were substantially lower than have been reported for monotypic switchgrass fields, minimal inputs may substantially increase the yields.
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791. **Surveys and investigations projects as required by federal aid in Wildlife Restoration Act, Missouri.**
Kurzejeski, E. W.
Columbia, MO: Missouri Dept. of Conservation; PB97170112XSP, 1996. 64 p.
Notes: Final Report; Includes Study No. 1, Job No. 1, and Job No. 2; Sponsored by Fish and Wildlife Service, Washington, DC.
http://www.monwtf.org/attitudesurvey.pdf
Descriptors: grasses/ population/ reproduction biology/ birds/ vegetation/ Missouri/ Conservation Reserve Program/ medicine/ biology/ ecology/ zoology/ natural resources and earth sciences/ natural resource management
Abstract: During 1993-1995, we monitored vegetative conditions and avain abundance, composition, and productivity on 8 blocked sites in northern Missouri containing CP1 (cool-season grass), CP2 (warm-season grass), and rowcrop fields. Total bird abundance (P less than 0.0001 in 1994), grassland bird abundance (P less 0.05 in 1994 and 1995), nest density (P less than 0.001 each year), and number of nesting species (P less than 0.05 each year) were all lower on crop fields than on CRP fields. The bird community using crop fields markedly differed from that of CRP fields, with short-grass and open-ground feeding birds predominant on crop fields. Grassland bird species richness (P equals 0.057 in 1993, P less than 0.0001 each year), Henslow's sparrows (Ammodramus henslowii) (P less than 0.001 in 1993 and 1995), meadowlarks (Sturnella spp.) P less than .01 in 1993 and 1995, and American goldfinches (Carduelis tristis) (P less than 0.01 in 1994 and 1995) were higher on the structurally diverse than on CP2 fields. CP2 fields were tall, dense warm-season grass monocultures having higher abundances of red-winged blackbirds (Agelaius phoeniceus) (P less than 0.05 in 1994) and common yellowthroats (Geothylpis trichas) P less than 0.001 each year than CP1 fields. Difference in nesting success and nest densities of species between CP1 and CP2 fields, although rarely significant, were similar to those of relative abundance. The conservation value of CRP fields for declining grassland bird species was higher for CP1 fields than for CP2 fields; species of concern were either more abundant in both CP types. Monotypic stands of both warm-season and cool-season grasses should be avoided to increase the potential wildlife benefits of CRP and other idle grassland habitats.

792. **Tallgrass prairie amphibian and reptile assemblage. Fire mortality.**
Frese, Paul W.
Herpetological Review 34(2): 159-160. (2003); ISSN: 0018-084X
Descriptors: Thamnophis sirtalis/ Terrapene ornata/ Terrapene carolina/ Ophisaurus attenuatus/ Opheodrys aestivus/ Lampropeltis calligaster/ Elaphe obsoleta/ Coluber constrictor/ Bufo americanus/ wildlife-habitat relationships/ prairies/ mortality/ habitat management/ habitat alterations/ grasslands/ fires-burns/ ecosystems/ amphibians and reptiles/ American toad/ box turtle/ ornate box turtle/ slender glass lizard/ racer/ rat snake/ prairie kingsnake/ rough green snake/ common garter snake/ Missouri: Dade County
Abstract: The tallgrass prairie in Dade County, Missouri was surveyed for evidence of vertebrate mortality resulting from a prescribed burn conducted on 28 October 1999. A total of 72 individual herps, consisting of eight species of reptiles and one species of amphibian were observed. Twenty-nine individuals were found alive and 43 dead. Several T. carolina and T. ornata were found in formerly brushy draws after the burn. Higher reptile mortality was caused due to stimulated reptile activity because of four days of warm weather preceding the burn date and temperatures >20 degrees on 28 October. It was observed that to avoid high reptile mortality the prescribed burns should be implemented during cool and overcast periods.
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793. **Tallgrass prairie management and bird nest success along roadsides.**
Shochat, E.; Wolfe, D. H.; Patten, M. A.; Reinking, D. L.; and Sherrod, S. K.
Biological Conservation 121(3): 399-407. (2005)
NAL Call #: S900.B5; ISSN: 00063207.
Notes: doi: 10.1016/j.biocon.2004.05.012.
Descriptors: livestock grazing/ nest placement/ Oklahoma/ prescribed fire/ survival analysis/ habitat conservation/ nesting/ prairie/ roadside environment/ wildlife management/ Arthropoda/ Aves
Abstract: The attributes of roadside vegetation, an important bird habitat in grassland ecosystems, have been shown to affect bird abundance, distribution composition, and diversity, yet there are relatively few works on reproductive success of birds nesting along roadsides. Because roadsides are linear habitats, management at the landscape scale can affect nest success in roadsides through bottom-up and top-down effects. In northeastern Oklahoma tallgrass prairie is subjected annually to prescribed spring fires. In the short term fires can alter both arthropod abundance and predator access to nests. We

explored effects of burning on bird nest success with a five-year study along roads that traversed tallgrass prairie habitat. Using data from ~1400 nests of 23 species, we generated nest survival curves for groups of altricial species defined by nest substrate (ground, shrub, tree, or culvert). We then determined if these curves were affected by management practice (spring burning), food abundance (arthropod biomass), and habitat attributes (tree density and height). Nest substrate had a large effect on nest success: despite their shorter nest exposure period, ground nests were least successful and culvert nests were most successful. An increase in arthropod biomass following burning was possibly the cause for the increased nest success in burned plots, regardless of substrate, suggesting bottom-up control. Tree height and nest height were correlated positively with nest success, whereas tree density had no effect. Conversely, nest predation rates were correlated negatively with nest success, with ground nests experiencing the highest predation, culvert nests the lowest. Our results suggest that burning may increase nest success through bottom-up processes, but some species may not benefit from the increase in food abundance as a result of a concomitant increase in predation.
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794. **Tallgrass Prairie Restoration in southeast Kansas.**
Cully, A. C.; Cully, J. F.; and Hynek, A.
Kansas Wildlife and Parks (2001); ISSN: 0898-6975
Descriptors: tall grass prairie/ habitat management/ fescue/ grassland grazing/ cattle/ fertilization, soil and water/ burning/ transect survey/ abundance/ exotic species/ plants, miscellaneous/ land, military/ vegetation/ sampling/ Kansas
Abstract: Cattle were removed from allotments as leases expired, and a program of spring burning was implemented. Vascular plant species composition of these experimental treatment pastures were compared to currently grazed pastures and ungrazed but mowed pastures. Objectives were to determine if a combinatioin of cessation of fertilizer application, grazing removal, and burning would result in the reestablishment of tallgrass prairie plant species over a relatively short period of time. Study was conducted at the Kansas Army Ammunition Plant in southeast Kansas.
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795. **The technology of bobwhite management: The theory behind the practice.**
Guthery, F. S.
Ames, IA: Iowa State Press; 215 pp. (2002)
Descriptors: animal ecology/ animal husbandry/ animal physiology/ endangered species/ game birds/ habitats/ mathematical models/ population dynamics/ reference works/ wild animals/ wildlife conservation/ wildlife management/ Colinus virginianus
Abstract: This book elaborates on the management of northern bobwhites (Colinus virginianus), stressing theory-based management technologies. Population declines that started in the 1880s prevail over approximately three-fourths of the original range of C. virginianus in the United States, indicating the threat of extinction. The different chapters discuss the bioenergetic and biophysical properties of bobwhites as well as their water requirements, a mathematical model to determine energy-based carrying capacity for subsequent application in the theory of habitat management, population dynamics of the species from a continental perspective, and demographic aspects in relation to the theory and practice of harvest management and population viability. Theories of habitat and habitat management are addressed.
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796. **Teetering on the edge or too late? Conservation and research issues for avifauna of sagebrush habitats.**
Knick, S. T.; Dobkin, D. S.; Rotenberry, J. T.; Schroeder, M. A.; Vander Haegen, W. M.; and Van Riper, C.
Condor 105: 611-634. (2003)
NAL Call #: QL671.C6.
http://sagemap.wr.usgs.gov/docs/Condor_105p611-634.pdf
Descriptors: birds/ sagebrush/ habitats/ land use/ agriculture/ environmental impact
Abstract: Degradation, fragmentation, and loss of native sagebrush (Artemisia spp.) landscapes have imperiled these habitats and their associated avifauna. Historically, this vast piece of the Western landscape has been undervalued: even though more than 70% of all remaining sagebrush habitat in the United States is publicly owned, <3% of it is protected as federal reserves or national parks. We review the threats facing birds in sagebrush habitats to emphasize the urgency for conservation and research actions, and synthesize existing information that forms the foundation for recommended research directions. Management and conservation of birds in sagebrush habitats will require more research into four major topics: (1) identification of primary land-use practices and their influence on sagebrush habitats and birds, (2) better understanding of bird responses to habitat components and disturbance processes of sagebrush ecosystems, (3) improved hierarchical designs for surveying and monitoring programs, and (4) linking bird movements and population changes during migration and wintering periods to dynamics on the sagebrush breeding grounds. This research is essential because we already have seen that sagebrush habitats can be altered by land use, spread of invasive plants, and disrupted disturbance regimes beyond a threshold at which natural recovery is unlikely. Research on these issues should be instituted on lands managed by state or federal agencies because most lands still dominated by sagebrush are owned publicly. In addition to the challenge of understanding shrubsteppe bird-habitat dynamics, conservation of sagebrush landscapes depends on our ability to recognize and communicate their intrinsic value and on our resolve to conserve them.

797. **Temporal-spatial distribution of American bison (Bison bison) in a tallgrass prairie fire mosaic.**
Schuler, Krysten L.; Shaw, James H.; Maichak, Eric J.; and Leslie, David M.
Journal of Mammalogy 87(3): 539-544. (2006)
NAL Call #: 410 J823; ISSN: 0022-2372
Descriptors: Artiodactyla/ Bovidae/ Bison bison/ age distribution/ behavior/ distribution/ habitat use/ floral richness/ grasslands/ ecosystems/ land zones/ Oklahoma/ Pawhuska/ population composition/ status/ prairie vegetation/ social behavior/ structural complexity/ tall grass prairie/ tallgrass prairie fire mosaic/ temporal spatial distribution/ terrestrial ecology/ fire/ patch-burn mosaic/ season/ dispersion/ habitat/ prairie/ group size

Abstract: Fire and bison (Bison bison) are thought to be historically responsible for shaping prairie vegetation in North America. Interactions between temporal-spatial distributions of bison and prescribed burning protocols are important in current restoration of tallgrass prairies. We examined dynamics of bison distribution in a patch-burned tallgrass prairie in the south-central United States relative to bison group size and composition, and burn age and temporal distribution. Bison formed larger mixed groups during summer and smaller sexually segregated Groups the rest of the year, and bison selected dormant-season bum patches in the 1st postfire growing season most often during spring and summer. Large bison herds selecting recently burned areas resulted in seasonally variable and concentrated grazing pressure that may substantially alter site-specific vegetation. These dynamics must be considered when reintroducing bison and fire into tallgrass prairie because variable outcomes of floral richness and structural complexity are likely depending on temporal-spatial distribution of bison.
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798. **Texas landowner perceptions regarding ecosystem services and cost-sharing land management programs.**
Olenick, Keith L.; Kreuter, Urs P.; and Conner, J. Richard
Ecological Economics 53(2): 247-260. (2005)
NAL Call #: QH540.E26 ; ISSN: 0921-8009
Descriptors: terrestrial ecology: ecology, environmental sciences/ agriculture/ economics/ wildlife habitat/ carbon sequestration/ ecosystem service/ water yield/ landowner perception/ cost sharing land management program
Abstract: Publicly funded management programs can enhance important ecological services including watershed functions, wildlife habitat, and carbon sequestration. A mail survey was conducted in 2003 in the Western Edwards Aquifer area of Texas to assess landowner perceptions regarding the supply of ecological services from rangelands and their willingness to participate in various land management programs aimed at enhancing such services, which are receiving increasing public consideration. In general, landowners favorably viewed programs that would reduce woody plant (brush) cover in an effort to increase water yields or to improve wildlife habitat, but they disapproved of programs that would encourage the proliferation of woody plants in an attempt to increase atmospheric carbon sequestration. In addition, whether land management programs were voluntary or mandatory had a much greater influence on the level of landowner willingness to participate in programs than the availability of publicly funded cost-sharing. Three-fourths of respondents indicated they would be willing to enroll in cost-sharing brush management programs, and most viewed short-term (5-10 year) performance contracts as the most acceptable legal instrument for participating. To deal with ecosystem trade-offs resulting from woody plant management, we recommend that publicly funded programs aimed at enhancing ecosystem services through effective woody plant management should be flexible. In addition, we recommend the promotion of ecosystem level planning for such programs and cooperative management strategies for landowners participating in such program in order to maximize the effectiveness of associated public investments. © 2004 Elsevier B.V. All rights reserved.
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799. **Total plasma protein and renesting by greater sage-grouse.**
Gregg, M. A.; Dunbar, M. R.; Crawford, J. A.; and Pope, M. D.
Journal of Wildlife Management 70(2): 472-478. (2006)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: age/ blood chemistry/ Centrocercus urophasianus/ dietary protein/ greater sage-grouse/ maternal condition/ nest initiation date/ nest predation/ nutrition/ renesting/ total plasma protein
Abstract: Greater sage-grouse (Centrocercus urophasianus) population declines have been attributed to reduced productivity. Although renesting by sage-grouse may contribute significantly to annual productivity during some years, little information is available on this aspect of sage-grouse reproductive ecology. We investigated the relationship between total plasma protein, age of hen, time of first nest initiation, and time of first nest loss on occurrence of renesting. We captured, assigned age, extracted blood, and radiomarked prelaying, female sage-grouse on 4 study areas during 1999-2004. We monitored radiomarked females from mid-April through June to identify period of nest initiation (early, mid, or late), nest loss (early or late), and renesting activity. We only considered hens that were available to renest (n = 143) for analysis, and we censored those that nested successfully or died during their first nest attempt. Depredation and abandonment accounted for 85% (122/143) and 15% (21/143) of the unsuccessful first nests, respectively. The proportion of hens renesting was 34% (48/143) across all study areas and years. Akaike's Information Criterion model selection indicated that occurrence of renesting varied by age, nest initiation period, nest loss period, and total plasma protein. The best model had low predictive power for any given hen (r^2 = 0.296), but validation of the best model indicated that our predictor variables were important for distinguishing renesting status and likely explained substantial temporal and spatial variation in renesting rates. A greater proportion of adults than yearlings renested, and hens that nested early in the nesting season and lost nests early during incubation were the most likely to renest. Hens that renested had greater total plasma protein levels than non-renesting hens independent of age, nest initiation period, and nest loss period. Because sage-grouse depend on exogenous sources of protein for reproduction, land management practices that promote high-quality, prelaying hen habitat could increase dietary protein intake and sage-grouse renesting rates.
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800. **Trap-revealed microhabitat use by small mammals in monoculture grasslands.**
Davis, S. S.; Mitchell, R. B.; and Demarais, S.
Texas Journal of Science 52(3): 195-200. (2000)
NAL Call #: 470 T31; ISSN: 00404403.
Notes: Address: Mitchell, R.B.; Department of Range; Wildlife and Fisheries Management; Texas Tech University Lubbock, TX 79409-2125, United States; email: rob.mitchell@ttu.edu.
Descriptors: Chaetodipus hispidus/ Eragrostis curvula/ Peromyscus maniculatus/ Reithrodontomys megalotis
Abstract: This study was conducted to determine if microhabitat differences in canopy cover of weeping lovegrass (Eragrostis curvula) monoculture grasslands influenced presence of small mammals. Canopy cover of

weeping lovegrass was measured at 12 trapping grids of 100 traps each. Traps were pooled and separated into four categories (0 to 25%, 26 to 50%, 51 to 75% and 76 to 100%) based on percentage of weeping lovegrass canopy cover at each trap location. First captures of small mammals were analyzed using the chi square test statistic. Four species, cotton rat (Sigmodon hispidus; n = 100), western harvest mouse (Reithrodontomys megalotis; n = 173), hispid pocket mouse (Chaetodipus hispidus; n = 28), and deer mouse (Peromyscus maniculatus; n = 41) were captured in sufficient numbers for statistical comparison. Captures for P. maniculatus and C. hispidus differed from the expected distribution of captures (X^2, 3 df, $P \leq 0.01$) with more captures in open trap sites and fewer captures in sites with increased cover. In contrast, captures for and hispidus and R. megalotis differed from the expected distribution (X2, 3 df, $P \leq 0.001$) with more captures in densely vegetated trap sites and fewer captures in open trap sites. Canopy cover appears to influence small mammal microhabitat selection during the spring in weeping lovegrass monocultures. Land management decisions which affect microhabitat characteristics may impact small mammal community structure.
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801. **Tree and shrub invasion in northern mixed-grass prairie: Implications for breeding grassland birds.**
Grant, Todd A.; Madden, Elizabeth; and Berkey, Gordon B.
Wildlife Society Bulletin 32(3): 807-818. (2004)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Populus tremuloides/ Aves/ communities/ grasslands/ ecosystems/ habitat management/ J. Clark Salyer National Wildlife Refuge/ North Dakota/ conservation/ wildlife management/ habitat use/ land zones/ aspen woodland/ fragmentation/ grassland birds/ mixed-grass prairie/ woody vegetation/ birds/ prairie/ vegetation/ exotic species/ change in vegetation/ habitat change/ brood-egg/ forest
Abstract: North American grasslands continue to decline in quantity and quality. In the northern mixed-grass prairie, potential edge and fragmentation effects on grassland birds are poorly understood and conclusions are based largely on data from outside the region. Lands in and adjacent to J. Clark Salyer National Wildlife Refuge in north-central North Dakota comprise one of the largest contiguous patches of northern mixed-grass prairie remaining in North America. However, within the region, aspen (Populus tremuloides), willow (Salix spp.), and other woody species have increased, such that continued existence of grasslands is threatened. We examined how breeding grassland birds responded to habitat that has been variably fragmented by encroaching woody vegetation. The probability of occurrence decreased markedly for 11 of 15 bird species (including 3 endemic to the northern Great Plains) as percent woodland, tall shrub, or brush cover increased. Bird species were increasingly affected as the height of woody plants increased from brush to tall shrubs to trees. Grasslands became largely unsuitable for 9 species as woodland cover exceeded 25%. Derived models can be used by land managers to predict the outcome of management actions that alter plant community succession or that restore grasslands degraded by woody invasion.
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802. **Tree invasion constrains the influence of herbaceous structure in grassland bird habitats.**
Chapman, R. N.; Engle, D. M.; Masters, R. E.; and Leslie, D. M.
Ecoscience 11(1): 55-63. (2004)
NAL Call #: QH540.E366; ISSN: 11956860
Descriptors: Eastern redcedar/ grassland birds/ Great Plains/ habitat structure/ hierarchy/ plant invasions/ woody plant encroachment/ avifauna/ biological invasion/ ecological impact/ grassland/ habitat structure/ vegetation structure/ woody plant/ Great Plains/ North America/ Juniperus virginiana
Abstract: Trees and other woody plants threaten grassland obligate birds, as well as the biological integrity of grasslands around the world. Bird species associated with grasslands of southern mixed-grass prairie of North America have declined in abundance, whereas species associated with shrub-stage and woodland habitats have increased. Recent increases in the extent of eastern redcedar (Juniperus virginiana) in the southern Great Plains of North America explain some of the change in bird assemblages in landscapes composed of patches of grassland fragmented by cropland and stands of eastern redcedar. In this study, we determined the influence of eastern redcedar, relative to the influence of structural attributes of the herbaceous layer, on bird assemblages within individual patches of grassland habitat. We indexed bird abundance within the breeding season with point counts on grassland patches with varying levels of invasion of eastern redcedar. Canopy cover of eastern redcedar explained a greater proportion of the composition of bird communities in these grasslands than structure of herbaceous vegetation. Species associated with grassland habitats generally declined in abundance, whereas species associated with shrub and woodland habitats increased as cover of eastern redcedar increased. Perhaps more important to conservation ecology, our data indicate that as canopy cover of eastern redcedar increased, variation in abundance of grassland birds decreased, indicating that canopy cover of eastern redcedar may constrain the local influence of herbaceous habitat structure on bird assemblages.
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803. **Treelines between fields reduce the density of grassland birds.**
O'Leary, Charles H. and Nyberg, Dennis W.
Natural Areas Journal 20(3): 243-249. (2000)
NAL Call #: QH76.N37; ISSN: 0885-8608
Descriptors: conservation measures/ behavior/ ecology/ population dynamics/ terrestrial habitat/ man-made habitat/ land and freshwater zones/ Aves: disturbance by man/ habitat management/ field connection/ field enlargement/ treelines/ spatial patterns/ territoriality/ spatial patterns/ population decline/ treelines between fields/ population density/ nests/ distribution within habitat/ grassland/ spatial analysis/ cultivated land/ habitat fragmentation/ Illinois/ Cook County/ Poplar Creek Preserve/ grassland species/ birds/ chordates/ vertebrates
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804. **Trends in abundance of grassland birds following a spring prescribed burn in southern Arizona.**
Kirkpatrick, Chris; DeStefano, Stephen; Mannan, R. William; and Lloyd, John
Southwestern Naturalist 47(2): 282-292. (2002)
NAL Call #: 409.6 So8 ; ISSN: 0038-4909
Descriptors: Zenaida macroura/ Columbiformes/ Aimophila botterii/ Aimophila cassinii/ Campylorhynchus brunneicapillus/ Pooecetes gramineus/ Passeriformes/ Picoides scalaris/ Piciformes/ Aves/ terrestrial ecology/ prescribed burning/ breeding ecology/ desert grasslands/ Arizona/ Buenos Aires National Wildlife Refuge/ communities/ fires-burns/ grasslands/ ecosystems/ habitat management/ environmental factors/ conservation/ wildlife management/ habitat use/ land zones/ birds/ habitat/ prairie/ fire/ abundance/ mourning dove/ Botteri's sparrow/ Cassin's sparrow/ cactus wren/ vesper sparrow/ ladder-backed woodpecker
Abstract: We examined short-term trends in relative abundance and species richness of breeding and wintering grassland birds before (1996) and after (1997, 1998) a prescribed burn in a mesquite-invaded, desert grassland at Buenos Aires National Wildlife Refuge, Arizona. We surveyed birds and sampled vegetation along 1-km line transects bisecting 14 (7 control, 7 burn) 25-ha plots located randomly within a burn and adjacent control unit. Following a spring burn that was moderate in intensity and patchy in areal extent, we observed that ground cover was affected more strongly by burning than mesquite (Prosopis) cover, smaller mesquite were affected more strongly by burning than larger mesquite, and mortality of mesquite was low. No change in total abundance of birds was detected on the burn unit following fire for either wintering or breeding birds; however, species richness of breeding birds decreased in the first year post-burn. During the breeding season, mourning doves (Zenaida macroura) increased, whereas Botteri's sparrows (Aimophila botterii), Cassin's sparrows (Aimophila cassinii), and cactus wrens (Campylorhynchus brunneicapillus) decreased in relative abundance following fire. During the wintering season, ladder-backed woodpeckers (Picoides scalaris) and vesper sparrows (Pooecetes gramineus) increased and cactus wrens decreased in relative abundance following fire. Beyond species-level trends, we found stronger evidence of trends and greater magnitudes of relative change for breeding species associated with open grasslands compared to those associated with shrubs. The use of spring burns on the Refuge will likely improve conditions for open-grassland species that were historically more abundant by killing smaller mesquite and reducing mesquite recruitment. However, more intense and extensive fires will be required to reduce the presence of larger mesquite. Such fires would likely have a greater impact on birds associated with shrubs, and consequently, a greater impact on the avian community as a whole.
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805. **Trends in grassland bird abundance following prescribed burning in southern Arizona.**
Kirkpatrick, Christopher Kreitler. University of Arizona, 2000.
Notes: Degree: MS; Advisor: Destefano, Stephen and Mannan, R. William
Descriptors: algarrobo/ aves/ procreando/ Prosopis spp./ ecology/ agriculture/ range management
Abstract: I examined trends in relative abundance and species richness of breeding and wintering grassland birds before (1996) and after (1997, 1998) a spring prescribed burn in a mesquite-dominated desert grassland at Buenos Aires National Wildlife Refuge, Arizona. The burn was moderate in intensity, patchy in extent, and affected ground cover more strongly than shrub cover, smaller shrubs more strongly than larger shrubs, and killed 1% of velvet mesquite (Prosopis velutina). Species richness of breeding birds decreased in the first year post-burn. Of breeding species, black-throated sparrows (Amphispiza bilineata) and mourning doves (Zenaida macroura) increased; whereas Botteri's sparrows (Aimophila botterii), Cassin's sparrows (Aimophila cassinii), and pyrrhuloxias (Cardinalus sinuatus) decreased in relative abundance. Breeding species characterized as not shrub-dependent exhibited changes that were more pronounced than those for shrub-dependent species. Of wintering birds, ladder-backed woodpeckers (Picoides scalaris) and vesper sparrows (Pooecetes gramineus) increased, and cactus wrens (Campylorhynchus brunneicapillus) decreased in relative abundance.
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806. **Understanding relationships between greater sage-grouse habitat and population dynamics in eastern Montana.**
Moynahan, Brendan J.; Lindberg, Mark; and Thomas, Jack Ward
Intermountain Journal of Sciences 8(4): 258-259. (2002); ISSN: 1081-3519
Descriptors: Centrocercus urophasianus/ birds/ population ecology/ status/ habitat use/ ecosystems/ sagebrush/ habitat management/ wildlife management/ habitat surveys/ study methods/ greater sage grouse/ Artemisia spp./ Aves/ Montana
Abstract: The long-term decline of greater sage grouse (Centrocercus urophasianus) over much of their historic range is of concern to managers of sagebrush (Artemisia spp.) habitats. A petition has been submitted to list the Washington population of sage grouse under the Endangered Species Act (ESA) and a range-wide listing petition is expected in the near future. That habitat quality is related to demographics of populations is a fundamental assumption of the practice of managing species via managing habitat. However, few studies explicitly acknowledge this relationship, and still fewer explicitly attempt to define this relationship on a species-specific basis. There currently is no way to reliably determine the nature of the interaction between sage grouse population status (as indicated by estimated vital rates) and habitat condition. This research will use a combination of well-establish population demography tools and state-of-the-art analysis methods to elucidate relationships between Sage-Grouse populations and habitat at six sites in eastern Montana. Mark-resight and radio telemetry methods will be employed to estimate vital rates of sage grouse populations. Sensitivity analysis will identify which rate(s) has the greatest influence on population growth rate (λ) under different habitat conditions. Habitat condition at each site will be assessed by several critical habitat characteristics. A regression approach will quantify the relationship between individual vital rates and each of the measured habitat characteristics. The research will provide

crucial information to federal and state wildlife professionals charged with managing for sage grouse and will be of particular use in the event of a petition to list sage grouse under the ESA.
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807. **Upland bird research: Evaluation of livestock grazing and residual herbaceous cover on sage grouse nest success.**
Giesen, K. M. Colorado Division of Wildlife, 1995. 16 pp. Job Final Report.
Notes: Period Covered: 1 Jan. 1993 –31 Dec. 1994.
Descriptors: telemetry/ habitat/ female/ vegetation/ size/ sagebrush/ predation/ trapping/ marking/ Colorado/ Jackson County
Abstract: Six strutting grounds in North Park, Colorado (Boettcher Junction, Coalmont, Delaney Butte, Lost Creek, Raven, and Spring Creek) were selected for documentation of hen movements to nests. Nesting habitat adjacent to each study lek was identified, and nest success and causes of failures were ascertained. Vegetative structure at nest sites was measured to determine possible selection for specific nesting habitats. Grazing from a portion of the nesting habitat associated with each strutting ground studied was experimentally excluded, and subsequent nest success between nests in grazing exclosures and control areas was compared.
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808. **The use of cattle as a management tool for wildlife in shrub-willow riparian systems.**
Krueger, H. O. and Anderson, S. H.
In: Riparian ecosystems and their management: Reconciling conflicting uses, General Technical Report-RM 120/ Johnson, R. Roy; Ziebell, Charles D.; Patton, David R.; Ffolliott, Peter F.; and Hamre, R. H.; Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1985. pp. 300-304.
Notes: Conference held April 16-18, 1985 in Tuscon, Ariz.
NAL Call #: aSD11.A42
Descriptors: cattle/ grazing/ wildlife/ habitats/ resource management
This citation is from AGRICOLA.

809. **Use of riparian corridors and vineyards by mammalian predators in northern California.**
Hilty, J. A. and Merenlender, A. M.
Conservation Biology 18(1): 126-135. (2004)
NAL Call #: QH75.A1C5; ISSN: 08888892
Descriptors: habitat corridor/ habitat fragmentation/ predation/ riparian zone/ vineyard/ California/ Sonoma County
Abstract: To address increasing fragmentation, conservation biologists have focused on protecting core habitat areas and maintaining connectivity among protected areas. Wildlife corridors, strips of relatively intact habitat designed to connect habitat fragments, may enhance connectivity, but little empirical evidence supports the idea that large mammals prefer to use corridors rather than the surrounding developed landscape. In Sonoma County, a premium wine-grape-growing region in California, we examined mammalian predator use of 21 riparian corridors classified as denuded, narrow, or wide according to the width of the remaining natural vegetation adjacent to the creek. We used unbaited, remotely triggered cameras to determine occurrence of predator species. We also monitored predator use of six vineyards, three close to core habitat and three far from core habitat, with unbaited cameras. Mammalian predator detection rates were 11-fold higher in riparian study areas than in vineyards. More native mammalian predator species were found in wide corridors than in narrow or denuded creek corridors. The number and activity level of native predators was higher in vineyards adjacent to core habitat than in vineyards farther away, where the number and activity level of non-native predators was higher. Maintaining wide and well-vegetated riparian corridors may be important in maintaining the connectivity of native predator populations to ensure their long-term survival.
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810. **Using short duration grazing to accomplish wildlife habitat objectives.**
Guthery, F. S.; DeYoung, C. A.; Bryant, F. C.; and Drawe, D. L.
In: Can livestock be used as a tool to enhance wildlife habitat?, General Technical Report-RM 194/ Severson, Kieth E., ed.; Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1990. pp. 41-55.
Notes: Literature review; 43rd Annual Meeting of the Society for Range Management, Reno, Nev., February 13, 1990.
NAL Call #: aSD11.A42 no. 194
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ Aves/ Mammalia: farming and agriculture/ short duration grazing use as habitat management tool/ habitat management/ short duration grazing use/ population dynamics/ short duration grazing effects/ habitat management aspects/ grassland/ habitat management by short duration grazing/ aridity/ desertification reversal due to livestock watering/ conservation aspects/ birds/ chordates/ mammals/ vertebrates
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811. **Variation in grasshopper (Acrididae) densities in response to fire frequency and bison grazing in tallgrass prairie.**
Joern, A.
Environmental Entomology 33: 1617-1625. (Dec. 2004)
NAL Call #: QL461.E532
Descriptors: bison grazing/ prairies/ Orthoptera/ population dynamics/ prescribed burning
Abstract: While weather can contribute significantly to grasshopper population dynamics in North American grasslands, local environmental conditions resulting from land use practices may be equally important. In this study, significant differences in grasshopper density were detected among adjacent watersheds from Kansas Flint Hills tallgrass prairie that differed in fire frequency and especially bison grazing treatments. Grasshopper densities were approximately equal to 2.5 times greater in grazed watersheds compared with ungrazed ones. Grasshopper densities also varied somewhat in response to fire frequency, mostly in species-specific ways. No treatment interactions on overall grasshopper density were detected. The effects of fire frequency and bison grazing were

implemented in part through their combined effect on the structural heterogeneity of vegetation, and other habitat characteristics. Individual grasshopper species responded uniquely to combinations of fire frequency and bison grazing. Grazing resulted in significant increases in density for seven of the nine most abundant species; fire frequency affected two species; and one species did not respond to either fire or grazing. Understanding effects of habitat on grasshopper densities provides opportunities to manage these populations for economic or conservation needs. This citation is from AGRICOLA.

812. **Vegetation and deer response to mechanical shrub clearing and burning.**
Rogers, James O.; Fulbright, Timothy E.; Ruthven, Donald C.; and Ruthven D.C.
Journal of Range Management 57(1): 41-48. (2004)
NAL Call #: 60.18 J82 ; ISSN: 0022-409X
Descriptors: Artiodactyla/ Cervidae/ Odocoileus virginianus/ brushland habitat/ burning/ burning and mechanical clearing/ fire/ food availability/ habitat management/ habitat utilization/ scrub/ Texas/ abiotic factors/ conservation/ conservation measures/ ecology/ land zones/ nutrition/ physical factors/ terrestrial habitat/ white-tailed deer/ experiment/ vegetation/ productivity/ food
Abstract: Prescribed burning is a recommended maintenance treatment following mechanical treatments of south Texas brushlands, but it is unknown whether it is preferable to additional mechanical treatments to improve habitat for white-tailed deer (Odocoileus virginianus Raf.). We tested the hypotheses that prescribed burning of aerated (top-growth removal of woody plants) plots during late summer would decrease protein-precipitating tannins in browse, increase forb biomass, and increase deer utilization compared to a second aeration. Ten patches of brush, ranging in size from 2.8-8.1 ha, were aerated during spring 1999. In late summer 2000, maintenance treatments were applied; 5 patches were burned and 5 were aerated a second time. Standing crop, nutritional quality, and tannin concentrations (browse only) of deer forages were estimated. Deer tracks crossing bulldozed lanes surrounding each patch were counted to estimate deer use. Standing crop of browse, forbs, grass, succulents, protein-precipitating tannins in browse, and track density did not differ between treatments. Based on deer use and forage biomass response, burning and a second aeration 16-17 months following an initial aeration appear to have similar effects on habitat characteristics and use of cleared patches by white-tailed deer. Because of lower cost, we recommended prescribed burning as a maintenance treatment of aerated shrublands.
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813. **Vegetation cover and forb responses to cattle exclusion: Implications for pronghorn.**
Loeser, Matthew R.; Mezulis, Sharon D.; Sisk, Thomas D.; and Theimer, Tad C.
Rangeland Ecology and Management 58(3): 234-238. (2005)
NAL Call #: SF85.J67; ISSN: 1550-7424
Descriptors: commercial activities/ nutrition/ diet/ ecology/ land zones/ Antilocapra americana (Bovidae): farming and agriculture/ cattle exclusion/ fawn hiding cover/ forb availability/ food plants/ food availability/ habitat utilization/ terrestrial habitat/ rangeland habitat/ Arizona/ Anderson Mesa/ Bovidae/ Artiodactyla/ chordates/ mammals/ ungulates/ vertebrates
Abstract: Cattle grazing is often implicated as a factor that reduces vegetative cover and the abundance of important forage plants for wildlife. Recent declines in northern Arizona populations of pronghorn (Antilocapra americana Ord) have focused public and scientific attention on the factors contributing to low fawn recruitment and the potential benefits of cattle removal. To further understand the effects of cattle grazing, we studied the potential hiding cover provided by standing live and dead herbaceous matter as well as forb richness and canopy cover following 5 years of cattle removal. Cattle removal increased horizontal hiding cover by 8% at a distance of 5 in (P = 0.025), but had no statistically significant effect on the potential hiding cover at distances of 10 in (P = 0.105) or 25 in (P = 0.746). Forb species richness was 16% lower in exclosures than in an adjacent grazed pasture in 2001 (P = 0.036), but no differences were observed in 2002 (P = 0.636). The canopy cover of forbs was generally unaffected by cattle removal. These results suggest that curtailing or removing cattle is unlikely, by itself, to lead to rapid improvements in the hiding cover or forb availability for pronghorn on similar rangelands in northern Arizona. In this region, where immediate improvements in fawn survival and recruitment are important to population persistence, additional management actions should be considered.
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814. **Vegetation trends in tallgrass prairie from bison and cattle grazing.**
Towne, E. G.; Hartnett, D. C.; and Cochran, R. C.
Ecological Applications 15(5): 1550-1559. (2005)
NAL Call #: QH540.E23; ISSN: 10510761
Descriptors: bison/ cattle/ grazing effects/ herbivory/ Konza Prairie (Kansas, USA)/ plant community/ species richness/ temporal heterogeneity
Abstract: Comparisons between how bison and cattle grazing affect the plant community are understood poorly because of confounding differences in how the herbivores are typically managed. This 10-year study compared vegetation changes in Kansas (USA) tallgrass prairie that was burned and grazed season-long at a moderate stocking rate by either bison or cattle. We held management practices constant between the herbivores and equalized grazing pressure by matching animals so that the total body mass in all pastures was similar each year. Trends in species cover and diversity indices in the bison and cattle pastures were compared with ungrazed prairie that also was burned annually. We found that little bluestem (Schizachyrium scoparium) cover decreased over time in bison pastures, and big bluestem (Andropogon gerardii) cover increased over time in cattle pastures. Grazing by either herbivore increased the canopy cover of annual forbs, perennial forbs, and cool-season graminoids, but both annual and perennial forb cover increased at a greater rate in bison pastures than in cattle pastures. Missouri goldenrod (Solidago missouriensis) and heath aster (Symphyotrichum ericoides) were primarily responsible for the increased forb cover in grazed pastures. Species richness at both small (10 m^2) and large (200 m^2) spatial scales increased at a greater rate in bison pastures than in cattle pastures, but richness did not change through time in ungrazed prairie. The number of annual forb species was significantly higher in bison pastures than in pastures

grazed by cattle. Residual graminoid biomass at the end of the grazing season was lower in bison pastures than in cattle pastures, whereas forb residuum increased over time at a greater rate in pastures grazed by bison than in pastures grazed by cattle. Although bison and cattle differentially altered some vegetation components, the plant communities in bison and cattle pastures were 85% similar after 10 years of grazing. We conclude that most measurable differences between bison-grazed and cattle-grazed pastures in tallgrass prairie are relatively minor, and differences in how the herbivores are typically managed may play a larger role in their impact on prairie vegetation than differences between the species. © 2005 by the Ecological Society of America.
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815. **Viewpoint: The ecological value of shrub islands on disturbed sagebrush rangelands.**
Longland, William S. and Bateman, Sheryl L.
Journal of Range Management 55(6): 571-575. (2002)
NAL Call #: 60.18 J82; ISSN: 0022-409X.
Notes: Literature review.
Descriptors: conservation measures/ habitat utilization/ land zones/ comprehensive zoology: habitat management/ Disturbed sagebrush rangelands/ ecological value of shrub vegetation islands/ community structure/ biodiversity and succession in shrub vegetation islands/ implications for recovery of rangelands/ succession in habitats/ role of shrub vegetation islands/ terrestrial habitat/ sagebrush rangelands/ ecological value of shrub vegetation islands in disturbed landscapes/ conservation implications/ ecological value of shrub vegetation islands in disturbed sagebrush rangelands/ Mammalia/ chordates/ mammals/ vertebrates
© Thomson Reuters Scientific

816. **Vole herbivory shapes vegetation in experimental tallgrass prairie restorations (Illinois and Wisconsin).**
Howe, Henry F.
Ecological Restoration 20(4): 278-279. (2002);
ISSN: 1522-4740
Descriptors: nutrition/ ecology/ terrestrial habitat/ land zones/ Microtus pennsylvanicus: feeding behavior/ herbivory/ plant community restoration/ Illinois/ Wisconsin/ grasslands/ tallgrass prairie/ Chicago/ Morton Arboretum/ Viola/ Mammalia, Rodentia, Muridae/ chordates/ mammals/ rodents/ vertebrates
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817. **A VSA-based strategy for placing conservation buffers in agricultural watersheds.**
Qiu, Z.
Environmental Management 32(3): 299-311. (2003)
NAL Call #: HC79.E5E5; ISSN: 0364152X
Descriptors: Benefit-cost analysis/ conservation buffers/ landscape planning/ variable source areas/ agriculture/ biodiversity/ environmental engineering/ flood control/ soils/ water quality/ wetlands/ agricultural landscapes/ wildlife habitats/ watersheds/ buffer/ agricultural land/ buffer zone/ landscape planning/ nonpoint source pollution/ watershed/ agriculture/ environmental protection/ watershed/ agriculture/ Conservation of natural Resources/ environment Design/ models, theoretical
Abstract: Conservation buffers have the potential to reduce agricultural nonpoint source pollution and improve terrestrial wildlife habitat, landscape biodiversity, flood control, recreation, and aesthetics, Conservation buffers, streamside areas and riparian wetlands are being used or have been proposed to control agricultural nonpoint source pollution. This paper proposes an innovative strategy for placing conservation buffers based on the variable source area (VSA) hydrology. VSAs are small, variable but predictable portion of a watershed that regularly contributes to runoff generation. The VSA-based strategy involves the following three steps: first, identifying VSAs in landscapes based on natural characteristics such as hydrology, land use/cover, topography and soils; second, targeting areas within VSAs for conservation buffers; third, refining the size and location of conservation buffers based on other factors such as weather, environmental objectives, available funding and other best management practices. Building conservation buffers in VSAs allows agricultural runoff to more uniformly enter buffers and stay there longer, which increases the buffer's capacity to remove sediments and nutrients. A field-scale example is presented to demonstrate the effectiveness and cost-effectiveness of the within-VSA conservation buffer scenario relative to a typical edge-of-field buffer scenario. The results enhance the understanding of hydrological processes and interactions between agricultural lands and conservation buffers in agricultural landscapes, and provide practical guidance for land resource managers and conservationists who use conservation buffers to improve water quality and amenity values of agricultural landscape.
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818. **Waterfowl use of dense nesting cover in the Canadian parklands.**
Arnold, Todd W.; Craig-Moore, L. E.;
Armstrong, Llwellyn M.; Howerter, David W.;
Devries, James H.; Joynt, Brian L.; Emery, Robert B.; and Anderson, Michael G.
Journal of Wildlife Management 71(8): 2542-2549.
(Nov. 2007)
NAL Call #: 410 J827
Descriptors: waterfowl/ nesting/ habitat management/ ducks/ wetlands/ Anas/ prairie
Abstract: Dense nesting cover (DNC) has been a conspicuous component of habitat management for upland-nesting ducks for >30 years, but its benefits for nesting ducks have been contentious. During 1994-1999 we monitored 3,058 dabbling duck (Anas spp.) nests in 84 DNC fields located throughout the Canadian Parklands to examine sources of among-field variation in nest density and nesting success. Nest density averaged 1.51 (SE = 0.15) nests/ha and overall nesting success was 20.4%, but there was pronounced annual variation in both estimates. Nesting success increased with increasing field size (range = 6-111 ha), but nest density remained constant. Nest density increased with percent wetland habitat within DNC fields and declined with percent perennial cover in the surrounding 2.4 X 2.4-km landscape, but these variables were not important for predicting nesting success. Nest abundance and nesting success roughly doubled in fields seeded with alfalfa (Medicago sativa) or sweet clovers (Melilotus spp.), but there was no benefit from using native as opposed to tame grasses. We recommend that waterfowl managers in the Canadian Parklands establish DNC with alfalfa in large fields in landscapes with abundant wetlands but minimal competing cover.
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819. **What factors determine where invertebrate-feeding birds forage in dry agricultural grasslands?**
Atkinson, Philip W.; Buckingham, David; and Morris, Antony J.
Ibis 146(Suppl. 2): 99-107. (2004); ISSN: 0019-1019
Descriptors: mowing: applied and field techniques/ agricultural grassland/ foraging behavior/ grazing
Abstract: Increases in the intensity of the management of agricultural grasslands over the past 50 years have reduced plant species diversity in swards and increased uniformity in structure through changes in fertilizer regimes, grazing and mowing practices. These factors, as well as increased disturbance and trampling, have reduced the number and diversity of forbs and thus the diversity and abundance of invertebrates, in particular of foliar species. Associated with these changes in management, there has been a large decline in the abundance of many species of farmland birds in pastoral areas and more local extinctions compared with arable areas. To understand the impact of these management changes on bird populations, and design measures to reverse the declines, it is necessary to identify the key factors influencing bird usage of fields. We review results from five studies, which have related fertilizer and grazing management to bird usage of grass fields. Species that fed on soil invertebrates tended to show a positive response to the amount of nitrogen fertilizer added and increased grazing pressure, although there was a high degree of correlation between these two variables. In summer, many species, including corvids, Common Blackbird Turdus merula, Common Starling Sturnus vulgaris, Pied Wagtail Motacilla alba and Hedge Accentor Prunella modularis, showed a negative relationship with sward height, and in winter more species showed a positive relationship with bare ground. Taller sward heights are associated with a greater abundance and diversity of bird invertebrate food resources, and accessibility of food items or a lower risk of predation (actual or perceived) are likely to be the reasons for birds choosing to forage on shorter swards and in areas with more bare ground. Birds feeding on soil invertebrates were found to be generally tolerant of modern management practices that maintain short swards short, as accessibility to the soil has been increased. Species that feed on foliar invertebrates or forb seeds have been affected negatively by modern grassland agricultural practices.
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820. **Where should buffers go? Modeling riparian habitat connectivity in northeast Kansas.**
Bentrup, G. and Kellerman, T.
Journal of Soil and Water Conservation 59(5): 209-215. (2004)
NAL Call #: 56.8 J822 ; ISSN: 0022-4561
Descriptors: fragmentation/ geographical information systems/ habitats/ indicators/ riparian vegetation/ riverbank protection/ vegetated strips/ water quality/ watersheds/ Ambystoma/ Glaucomys/ Papilio glaucus/ Zapus hudsonius
Abstract: Through many funding programmes, riparian buffers are being created on agricultural lands to address significant water quality problems. Society and landowners are demanding many other environmental and social services (e.g., wildlife habitat and income diversification) from this practice. Resource planners therefore need to design riparian buffer systems in the right places to provide multiple services. However, scientific guidance for this is lacking. We developed a geographic information system (GIS)-based assessment method for quickly identifying where buffers can be established to restore connectivity of riparian areas for the benefit of terrestrial wildlife. An area in northeastern Kansas, USA, was selected to evaluate this tool. Species with limited dispersal capabilities were used as indicators for riparian connectivity. These include meadow jumping mouse (Zapus hudsonius), tiger salamander (Ambystoma tigrinum), southern flying squirrel (Glaucomys volans) and eastern tiger swallowtail butterfly (Papilio glaucus). To improve connectivity, results indicated that 22% of the perennial stream length in the study area would need riparian buffers. This coarse-filter approach appears to be appropriate for large area planning and can be used singly or in combination with other GIS-guided resource assessments to guide riparian buffer design and implementation.
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821. **Where the bobolinks roam: The plight of North America's grassland birds.**
Mccracken, Jon D.
Biodiversity 6(3): 20-29. (2005); ISSN: 1488-8386
Descriptors: wildlife management: conservation/ urbanization/ habitat fragmentation/ habitat loss
Abstract: Grassland birds, in this study defined as species that are wholly or mostly dependent upon upland grasslands for their survival, have experienced the most pronounced declines of any other group of birds on the North American continent, and the declines appear to be continuing unabated. Widespread declines of farmland birds are also occurring in Great Britain and western Europe, largely due to the intensification of agricultural operations. Habitat loss has been the major driving force for declines of grassland birds up until the last 50 years when the intensification of mechanized agricultural operations, along with increased habitat fragmentation that is associated with larger "industrial" farm sizes, became strong factors Other threats to grassland birds come from invasive species and planting of exotic grasses, urbanization, residential development, oil and gas extraction, wind power development, excessive predation/parasitism, fire suppression that results in succession to shrubland, ground water depletion, development of transportation corridors, use of pesticides, and rodent eradication programs. No single management approach or conservation solution will benefit the entire suite of grassland bird species across large geographic regions. Just stabilizing populations of grassland birds at their present levels presents a huge conservation challenge.
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822. **Wild ungulate influences on the recovery of willows, black cottonwood and thin-leaf alder following cessation of cattle grazing in northeastern Oregon.**
Case, Richard L. and Kauffman, J. Boone
Northwest Science 71(2): 115-126. (1997)
NAL Call #: 470 N81; ISSN: 0029-344X
Descriptors: biomass/ black cottonwood/ crown volume/ ecosystem restoration/ grazer/ grazing/ habitat degradation/ herbivore/ salmonid habitat recovery/ seedling establishment/ thin leaf alder/ tree recovery
Abstract: Restoration of degraded riparian ecosystems is of great importance for the recovery of declining and

endangered stocks of Columbia River salmonids as well as riparian-obligate wildlife species. Willows (Salix spp.), thin-leaf alder (Alnus incana), and black cottonwood (Populus trichocarpa) are important features of western riparian ecosystems having multiple functional roles that influence biological diversity, water quality/quantity, and aquatic/terrestrial food webs and habitats. Removal of domestic livestock and the construction of big game enclosures have been hypothesized to be effective restoration techniques for riparian ecosystem as well as for salmonid habitat recovery. Following more than a century of livestock grazing, cattle were removed from Meadow Creek in 1991 and the rates of riparian shrub recovery were measured for the two years following. Elk and deerproof enclosures were constructed to quantify the browsing influences of native large ungulates. The initial mean height of 515 deciduous trees and shrubs (14 species) was 47 cm. After two years in the absence of livestock, significant increases in height, crown area, crown volume, stem diameter and biomass were measured both outside and inside of the enclosures. Mean crown volume of willows increased 550% inside of wild ungulate exclosures and 195% outside. Black cottonwood increased 773% inside and 808% outside, while thin-leaf alder increased 1046% inside and 198% outside. Initial shrub densities on gravel bars were low averaging 10.7 woody plants/100m-2. Shrub numbers significantly increased apprxeq 50% (to 15.8 plants/100m-2 m or one new shrub for every 9 meters of transect length) outside of elk and deer proof enclosures through both clonal and seedling establishment. At the beginning of the study (1991), catkin production on willows was low (i.e., only 10% produced catkins). Wild herbivores had a significant influence on the reproductive output of willows; in 1993 catkins were produced by 34% of the tagged willows within enclosures but only 2% outside of enclosures. Wild herbivores were found to have significant influences on the rate of height growth of black cottonwood. For willows, wild herbivores had a significant influence on the rate of growth for the parameters of height, crown area, crown volume, and standing biomass. Nevertheless, due to the inherent resilience and adaptions to natural disturbance processes displayed by the riparian species, there was a rapid and positive response to cessation of those land use activities (i.e, cattle grazing) that caused habitat degradation and/or were preventing recovery.
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823. **Wildlife and livestock grazing alternatives in the Sierra Nevada.**
Kie, John G.
Transactions of the Western Section of the Wildlife Society 27: 17-29. (1991)
NAL Call #: SK351.W523; ISSN: 0893-214X.
Notes: Literature review.
Descriptors: conservation measures/ land and freshwater zones/ Strix nebulosa (Strigidae)/ Molothrus ater (Icteridae)/ Empidonax traillii (Tyrannidae)/ Mammalia: farming and agriculture/ alternative livestock grazing strategies/ habitat conservation benefit/ habitat management/ benefit of alternative livestock grazing strategies/ conservation benefit of alternative livestock grazing strategies/ California/ Sierra Nevada/ habitat conservation benefit of alternative livestock grazing strategies/ Strigidae/ Strigiformes/ Aves/ birds/ chordates/ mammals/ vertebrates
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824. **Wildlife on ungrazed and grazed bottomlands on the South Platte River, northeastern Colorado: Habitats, land management, adverse effects.**
Crouch, G. L.
In: Proceedings of the Wildlife-Livestock Relationships Symposium. Coeur D'alene, Idaho. Peek, James M. and Dalke, P. D. (eds.)
Moscow, Idaho: Forest, Wildlife and Range Experiment Station, University of Idaho; pp. 186-197; 1982.
NAL Call #: SF84.84.W5 1981
Descriptors: Colorado/ lowlands/ wildlife/ livestock/ grazing/ South Platte River
This citation is from AGRICOLA.

825. **Wildlife responses to grazing management and habitat manipulation: The Welder Wildlife Refuge experience.**
Drawe, D. L.
In: Proceedings of a conference on multispecies grazing. Baker, Frank H. and Jones, R. Katherine (eds.)
Morrilton, Ark.: Winrock International Institute for Agricultural Development; pp. 93-108; 1985.
NAL Call #: SF85.3.P76
Descriptors: range management/ objectives/ United States
This citation is from AGRICOLA.

826. **Wildlife use of livestock water under short duration and continuous grazing.**
Prasad, N. L. and Guthery, F. S.
Wildlife Society Bulletin 14(4): 450-454. (1986)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Odocoileus virginianus/ Procyon lotor/ Canis latrans/ Meleagris gallopavo/ Zenaida macroura/ Tayassu tajacu/ Molothrus ater/ cattle/ grazing management/ Texas
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827. **Willow flycatcher and yellow warbler response to cattle grazing.**
Taylor, D. M. and Littlefield, C. D.
American Birds 40(5): 1169-1173. (1986)
NAL Call #: QL671.A32; ISSN: 0004-7686
Descriptors: Empidonax traillii/ Dendroica petechia/ human activity/ habitat protection
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828. **Winter foraging habitat of greater sandhill cranes in northern California.**
Littlefield, Carroll D.
Western Birds 33(1): 51-60. (2002)
NAL Call #: QL684.C2; ISSN: 0160-1121
Descriptors: nutrition/ feeding behavior/ ecology/ habitat utilization/ man-made habitat/ land and freshwater zones/ Grus canadensis tabida (Gruidae): foraging/ habitat preference/ cultivated land habitat/ California/ Sacramento Valley/ Upper Butte Basin/ winter foraging habitat/ Gruidae/ Gruiformes, Aves/ birds/ chordates/ vertebrates
Abstract: In the upper Butte basin (Butte, Colusa, Glenn, and Sutter counties) of California's Sacramento Valley, wintering Greater Sandhill Cranes select unaltered harvested rice stubble most consistently for foraging. They feed in burned and flooded rice stubble for brief periods; their use of such fields decreases dramatically by January and remains low thereafter. Few cranes forage in rice stubble disked in autumn. Recently planted winter wheat attracts large numbers of cranes from the time of planting

until shortly after seedling emergence but not after early January. Disked corn stubble is used sporadically, primarily in late January and February just before cranes migrate in spring. Grazed grasslands also support cranes, mostly after the onset of winter rains. Foraging habitat for cranes in the basin is currently ample, but continuing changes in agricultural practices may result in future food shortages.
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829. **Words from the woods: Bobwhite.**
Overcott, Nancy
Minnesota Birding 40(6): 20-21. (2003)
Descriptors: Colinus virginianus/ vocalization/ pastures/ mortality/ hedgerows/ habits-behavior/ habitat use/ farmland/ environmental factors/ ecosystems/ distribution/ climate/ census-survey methods/ birdwatching/ birds/ bobwhite/ Minnesota: Fillmore County
Abstract: The author discusses the sighting of bobwhites (northern bobwhite quail) in Fillmore County, south of Canton near the Iowa border. The bird's calls and songs were heard. These birds were familiar across southern Minnesota where small family farms with hedgerows, windbreaks, and pastures provided ideal habitat until the mid 1900s. As farms became larger with fewer hedgerows and pastures, the bobwhite population declined. Only a small number remained in the southeastern counties by 1950. Research indicates that because of a high mortality rate and low life expectancy, up to 4000 birds may be required for a self-sustaining population. Climate also plays a part. Bobwhites in southeastern Minnesota are on the fringes of their northern range. The entire state may eventually become suitable for the species due to regional warming. An increased number of bobwhite sightings in neighboring Houston County were observed. Wisconsin also shows an increasing trend in bobwhites numbers on breeding bird surveys. The species have a tendency to make seasonal movements to food sources, so it seems an expanding population of bobwhite from Wisconsin may occasionally expand into Minnesota.
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830. **Abundance and attributes of wildlife trees and coarse woody debris at three silvicultural systems study areas in the interior cedar-hemlock zone, British Columbia.**
Stevenson, Susan K.; Jull, Michael J.; and Rogers, Bruce J.
Forest Ecology and Management 233(1): 176-191. (2006)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ land zones/ North America/ Canada/ comprehensive zoology: forestry/ trees and coarse woody debris used by wildlife/ implications/ forest/ habitat management/ logged forest/ forest and woodland/ logging/ British Columbia/ northern interior wetbelt
Abstract: Unmanaged cedar (Thuja plicata)-hemlock (Tsuga heterophylla) forests of the northern Interior Wetbelt of British Columbia support standing and dead trees with a variety of structural features that provide habitat for wildlife. We describe the pre-harvest abundance and characteristics of wildlife trees (standing trees with special characteristics that provide habitat for wildlife) and coarse woody debris (CWD) at three silvicultural systems trials in cedar-dominated stands, and the short-term effects of forest harvesting on the abundance and attributes of CWD. The treatments were clearcut, group retention (70% volume removal), group selection (30% volume removal), and unlogged control. We measured standing trees in 75 0.125-ha plots and CWD along 225 24-m transects, using a functional classification system to characterize habitat attributes of trees and logs. CWD assessments were repeated on the same transects after the harvest. The relationship between tree size and occurrence of habitat features was strong for both standing trees and logs. Each of the four major tree species in the study area was associated with specific habitat features that occurred more often in that species than in any other. Large concealed spaces at the bases of trees, providing den sites and escape cover, were associated with hybrid white spruce (Picea engelmannii x glauca). We suggest that these trees had originated on nurse logs that subsequently rotted away; if that supposition is correct, there may be shortages of these structures in future stands that originate from plantations. Forest harvesting had little effect on the volume of CWD, but did affect the decay class distribution, reduce the proportion of pieces having structural habitat attributes, and reduce piece lengths; these effects were generally proportional to the level of harvest removal. Partial-cut silvicultural systems have the potential to mitigate anticipated deficits in large wildlife trees and logs in managed stands, if components of the stand are managed on longer rotations than those planned for timber production alone. © 2006 Elsevier B.V. All rights reserved.
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831. **Abundance and richness of neotropical migrants during stopover at farmstead woodlots and associated habitats in southeastern South Dakota.**
Swanson, D. L.; Carlisle, H. A.; and Liknes, E. T.
American Midland Naturalist 149(1): 176-191. (2003)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: abundance/ avifauna/ migratory species/ species richness/ stopover/ woodland/ United States/ Ambrosia trifida/ Catharus ustulatus/ Coccyzus/ Dendroica striata/ Icterus/ Mimidae/ Pheucticus/ Troglodytes/ Vermivora celata/ Vermivora ruficapilla/ Wilsonia pusilla
Abstract: Woodland habitats are scarce in the northern Great Plains and were historically concentrated along river corridors. Over the past century, riparian habitats in this area have been much reduced, but new woodland habitats in the form of farmstead woodlots and shelterbelts have appeared. We used mist net sampling and point counts to document richness and abundance of Neotropical migrant birds in farmstead woodlot habitats during spring and fall migrations (1996-1997) in southeastern South Dakota. A total of 668 individuals of 30 Neotropical migrant species (excluding the taxa Coccyzus, Troglodytes, Mimidae, Icterus and Pheucticus, in which migratory and non-migratory individuals were difficult to distinguish) was captured in 4342 net hours (using 9-m. rather than the standard 12-m mist nets) in spring. The corresponding fall totals (again using 9-m nets) were 3250 net h, 231

individuals and 29 species. If fall captures in a ragweed (Ambrosia trifida) patch occurring within the woodlot are included, however, the fall totals were 5107 net h. 1211 individuals and 29 species. Overall densities of Neotropical migrants from point counts were 1302 birds km^{-2} in spring and 898 birds km^{-2} in fall. Capture and point count data followed similar phenologies, with peak abundance during mid-May in spring and late August-early September in fall. Both methods indicated seasonal abundance differences for some species, with Swainson's thrush (Catharus ustulatus) and blackpoll warbler (Dendroica striata) more abundant in spring. Orange-crowned (Vermivora celata). Nashville (V. ruficapilla) and Wilson's (Wilsonia pusilla) warblers were more abundant in fall. Captures within the woodlot were evenly distributed among different microhabitats during spring migration, but fall captures occurred disproportionately in scrubby edge-related microhabitats, especially in ragweed, suggesting that seasonal shifts in microhabitat selection may occur within woodlots. Density and capture rate data were similar to previously reported values for riparian habitats in this area. Thus, a diverse assemblage of Neotropical migrants occurs in woodlots during migration, suggesting that woodlots are regularly used as stopover sites and supplement available natural woodland habitats along river corridors.
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832. **Abundance and species composition of amphibians, small mammals, and songbirds in riparian forest buffer strips of varying widths in the boreal mixedwood of Alberta.**
Hannon, S. J.; Paszkowski, C. A.; Boutin, S.; DeGroot, J.; Macdonald, S. E.; Wheatley, M.; and Eaton, B. R.
Canadian Journal of Forest Research 32(10): 1784-1800. (2002)
NAL Call #: SD13.C35; ISSN: 00455067.
Notes: doi: 10.1139/x02-092.
Descriptors: aquaculture/ biodiversity/ water quality/ species composition/ forestry/ amphibians/ avifauna/ buffer zone/ forest management/ riparian forests/ silviculture/ small mammals/ Canada/ Amphibia/ Aves/ Mammalia/ Passeri/ Passeriformes/ Riparia/ Vertebrata
Abstract: Forested buffer strips are left along water bodies after forest harvesting to protect water quality and fish stocks, but little is known about their utility as reserves for forest species in managed landscapes. We report on changes in terrestrial vertebrate communities from pre- to post-harvest in experimentally created buffer strips (20, 100, 200, and 800 m wide) in a boreal mixedwood forest in Alberta, Canada. We trapped anuran amphibians and small mammals and spot-mapped bird territories around 12 lakes (4 treatment levels, 3 replicates) before and after harvesting. Changes in small mammal or amphibian abundance were not detected for any treatment relative to controls; however, these species are habitat generalists that used and even bred in clearcuts. Total bird abundance did not change after harvesting, with the exception of crowding in 20-m buffers 1 year post-harvest. Species composition did not change for amphibians and small mammals after harvest, but forest-dependent bird species declined as buffer width narrowed from 200 to 100 m and narrower. We concluded that 20-100 m buffers would not serve as reserves for forest songbirds in managed landscapes, but that 200 m wide stripsconserved the pre-harvest passerine bird community, at least up to 3 years post-harvest.
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833. **Abundance of green tree frogs and insects in artificial canopy gaps in a bottomland hardwood forest.**
Horn, Scott; Hanula, James L.; and Ulyshen, Michael D.
American Midland Naturalist 153(2): 321-326. (2005)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: Anura/ Hylidae/ Lissamphibia/ Hyla cinerea/ Aiken/ bottomland hardwood forest/ canopy/ habitat use/ forests/ ecosystems/ land zones/ population ecology/ status/ South Carolina/ terrestrial ecology
Abstract: We found more green tree frogs (Hyla cinerea) in canopy gaps than in closed canopy forest. Of the 331 green tree frogs observed, 88% were in canopy gaps. Likewise, higher numbers and biomasses of insects were captured in the open gap habitat. Flies were the most commonly collected insect group accounting for 54% of the total capture. These data suggest that one reason green tree frogs were more abundant in canopy gaps was the increased availability of prey and that small canopy gaps provide early successional habitats that are beneficial to green tree frog populations.
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834. **Active and passive forest management for multiple values.**
Carey, Andrew B.
Northwestern Naturalist 87(1): 18-30. (Apr. 2006)
NAL Call #: QL671.M8
Descriptors: forest management/ wildlife habitat/ management techniques/ habitat fragmentation/ biodiversity
Abstract: Comparisons of natural and managed forests suggest that single-focus management of 2nd growth is unlikely to achieve broad conservation goals because biocomplexity is important to ecosystem capacity to produce useful goods and services. Biocomplexity includes species composition, the absolute and relative abundances of those species, and their arrangement in space (for example, trees and shrubs of various species, sizes, vigor, and decay states). Key to high biocomplexity is patchiness at the appropriate spatial scale (for example, 0.1 to 0.5 ha). Passive management (benign neglect) does not necessarily remedy whatever degradation might have occurred under past management or neglect (for example, lack of biological legacies, artificial homogeneity, loss of biodiversity, missing keystone species, presence of diseases, or increased vulnerability to disturbance). Furthermore, not all management is equal. Purposefully managing processes of forest development and landscape dynamics is more likely to be successful in maintaining ecosystem and landscape function (and adaptiveness) than just providing select structural elements in stands and select structural stages in landscapes, as is often suggested for conservation. Deliberate simplification of ecosystems (for example, even-aged, single-species plantations harvested every 15 to 40 y to maximize wood production) runs counter to conservation, even if rotations are extended slightly and conventional thinning is applied. Recent experiments support the importance of biocomplexity to soil organisms, vascular plants, fungi, invertebrates, birds, small mammals, and vertebrate predators. These studies suggest that various techniques used purposefully over time are more likely to

be successful than any 1-time intervention, passive management, or traditional timber management. Biocomplexity is promoted by variable-retention harvest systems, planting and precommercial thinning for species diversity, variable-density thinning to create spatial heterogeneity and foster species diversity, managing decadence processes to provide cavity trees and coarse woody debris, and long to indefinite rotations. At the landscape scale, passive management (reserves and riparian corridors) that does not take into account restoration needs may be self-fulfilling prophecies of forest fragmentation and landscape dysfunction. Restoring landscape function entails restoring function to both 2nd growth and riparian areas. Intentional (integrated, holistic, and collaborative) systems management seems to offer the best hope for meeting diverse objectives for forests, including conservation of biodiversity, a sustained yield of forest products, and economic, social, and environmental sustainability.
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835. **Active vs. passive management for biodiversity and other forest values.**
Carey, Andrew B.
Northwestern Naturalist 86(2): 87. (2005)
NAL Call #: QL671.M8; ISSN: 1051-1733
Descriptors: birds/ corridors/ biodiversity/ ecosystem function/ habitat restoration/ wildlife conservation
Abstract: Comparisons of natural and managed forests suggest that neither single-species management nor conventional forestry is likely to be successful in meeting broad and diverse conservation goals. Biocomplexity is important to ecosystem function and capacity to produce useful goods and services; biocomplexity includes much more than trees of different sizes, species diversity, and individual habitat elements. Managing multiple processes of forest development, not just providing selected structures, is necessary to restore biocomplexity and ecosystem function. Experiments in inducing heterogeneity into 2nd-growth forest canopies not only support the importance of biocomplexity to various biotic communities including soil organisms, vascular plants, fungi, birds, small mammals, and vertebrate predators, but also suggest that management can promote biocomplexity. At the landscape scale, strategies emphasizing reserves and riparian corridors that do not take into account ecological restoration of 2nd-growth forest ecosystems and degraded streams may be self-fulfilling prophecies of forest fragmentation and landscape dysfunction. Restoring landscape function entails restoring function to 2nd-growth forest. Intentional management can reduce the need for wide riparian buffers, produce landscapes dominated by late-seral stages that are hospitable to wildlife associated with old-growth forests, provide a sustained yield of forest products, and contribute to economic, social, and environmental sustainability.
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836. **Adequacy of roost locations for defining buffers around Mexican spotted owl nests.**
Ward, J. P. and Salas, D.
Wildlife Society Bulletin 28(3): 688-698. (Fall 2000)
NAL Call #: SK357.A1W5
Descriptors: Strix occidentalis/ nesting/ wildlife management/ geographic information systems/ New Mexico/ habitat selection/ habitat buffers/ conservation planning/ natural resources, environment, general ecology, and wildlife conservation/ forestry related/ animal ecology and behavior
This citation is from AGRICOLA.

837. **Amphibian and reptile habitat relationships in forest stands scheduled for disturbance: Pre-treatment results.**
Sutton, W. B.; Wang, Y.; and Schweitzer, C. J.
Southeastern Biology 53(2): 228. (2006); ISSN: 1533-8436
Descriptors: forest habitats/ forests/ habitat alterations/ anthropogenic disturbances/ habitats/ habitat management/ reptiles/ amphibia/ reptiles/ forest environments/ Alabama
Abstract: Understanding habitat influences upon amphibian and reptile communities is essential for forests currently under a disturbance regime. This study presents pre-treatment analysis of habitat factors and the roles they play in constructing amphibian and reptile communities. Pre-treatment habitat and herpetofaunal variables were collected from eighteen experimental forest stands located within the William B. Bankhead National Forest, Alabama. These plots represent forest stands that are scheduled for forest disturbance. Experimental design for this study consists of a three by two factorial randomized complete block design. Disturbance factors included three thinning levels (no thin, 11 sq m per ha residual basal area (BA), and 17 sq m per h residual BA) and two burn treatments (no burn and burn). Ten habitat variables were assessed along three random line transects within each plot (54 total habitat plots). Amphibians and reptiles were collected by drift fences from April-November 2005. Canonical correspondence analysis (CCA) was used to determine and evaluate habitat features responsible for structuring herpetofaunal communities. Thirty-five total species (17 amphibian species and 18 reptile species) were captured throughout the sampling period. Pre-treatment evaluation of habitat factors is necessary to determine long term effects of forest disturbance on amphibian and reptile communities.
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838. **Amphibians in managed, second-growth Douglas-fir forests.**
Aubry, Keith B.
Journal of Wildlife Management 64(4): 1041-1052. (2000)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Ambystoma gracile/ Plethodon vehiculum/ Ascaphus truei/ Ensatina eschscholtzii/ Rana aurora/ Douglas fir/ amphibians and reptiles/ distribution/ habitat management/ ecosystems/ forests, coniferous/ forestry practices/ wildlife-habitat relationships/ amphibia/ species diversity/ clearcutting/ Pseudotsuga menziesii/ secondary forests/ Washington/ species richness/ natural resources/ forest management
Abstract: Few studies have been conducted on amphibian communities in managed, second-growth Douglas-fir (Pseudotsuga menziesii) forests in the Pacific Northwest. The author's objectives were to investigate patterns of amphibian species richness, biomass, and abundance, and explore habitat relationships in different age classes of second-growth Douglas-fir forests primarily for timber production. He sampled terrestrial amphibian populations occurring in four distinct age classes of managed forest in western Washington with pitfall traps from 1992 to 1994. Although these forests were devoid of residual old growth, and all stands were at least in their second rotation, they

contained the same assemblage of amphibian species occurring in unmanaged Douglas-fir forests in this region. Terrestrial amphibian communities in managed forests were structured differently than in unmanaged forests, however, with higher proportions of northwestern salamanders (Ambystoma gracile) and western redback salamanders (Plethodon vehiculum), and a much lower proportion of tailed frogs (Ascaphus truei). Contrary to several previous studies, he found no evidence that variation in amphibian abundances was strongly influenced by the amount of coarse woody debris on the forest floor. Further research is needed to elucidate the effects of intensive timber management on coarse woody debris and its role in the persistence of terrestrial amphibian populations in managed forests. Because rotation-age stands (the oldest age class) had the highest amphibian species richness, total biomass, and total abundance, and contained significantly higher abundances of the ensatina (Ensatina eschscholtzii) and red-legged frog (Rana aurora) than all younger age classes, silvicultural strategies that increase the percentage of rotation-age forest conditions within managed landscapes are likely to enhance the long-term habitat quality of intensively managed forest landscapes for terrestrial amphibians.
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839. **An analysis of late-seral forest connectivity in western Oregon, U.S.A.**
Richards, William H.; Wallin, David O.; and Schumaker, Nathan H.
Conservation Biology 16(5): 1409-1421. (2002)
NAL Call #: QH75.A1C5; ISSN: 0888-8892
Descriptors: Mammalia/ Aves/ mammals/ birds/ silviculture/ loss of habitat/ dispersal/ ecological requirements/ territory/ home-range/ simulation/
habitat management/ landscape
Abstract: Habitat loss and fragmentation due to timber harvest in western Oregon has put wildlife species reliant on late-seral forest under demographic pressure as available habitat shrinks and local populations become isolated. Few studies have examined the effects of habitat removal and fragmentation on the ability of wildlife to disperse over large areas. We used a spatially explicit population model to examine the effects of landscape patterns on the dispersal success of territorial wildlife species with different dispersal capabilities and home-range sizes. Simulations of dispersal were conducted on 8.3 million ha of forested landscape in western Oregon, based on forest conditions derived from satellite imagery. We compared dispersal success for baseline conditions of land cover with two alternative landscape patterns: late-seral forest habitat systematically converted to a younger forest class based on (1) public ownership and (2) the Northwest Forest Plan reserve system. Dispersal success increased with larger dispersal distances and with smaller home ranges ($p < 0.01$). Results indicate that the reserve system will not maintain habitat connectivity throughout the landscape for species with relatively short dispersal distances. Patches showing the greatest decrease in dispersal activity following the systematic removal of late-seral forest habitat were identified as important areas of connectivity.
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840. **An appraisal of biological diversity 'standards' for forest plantation.**
Spellerberg, I. F. and Sawyer, J. W. D.
In: Assessment of biodiversity for improved forest planning: Proceedings of the Conference on Assessment of Biodiversity for Improved Planning. Monte Verita, Switzerland. Bachmann, P.; Kohl, M.; and Paivinen, R. (eds.)
Dordrecht: Kluwer Academic Publishers; pp. 361-365; 1998.
Notes: Literature review.
NAL Call #: SD1.F627-v.51; ISBN: 0792348729
Descriptors: forest plantations/ biodiversity/ evaluation/ forest management/ standards/ nature conservation/ land use/ wildlife/ forest ecology/ objectives
This citation is from AGRICOLA.

841. **Approaches to investigate effects of forest management on birds in eastern deciduous forests: How reliable is our knowledge?**
Thompson, F. R.; Brawn, J. D.; Robinson, S.; Faaborg, J.; and Clawson, R. L.
Wildlife Society Bulletin 28(4): 1111-1122. (2000)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: experimental design/ forest management/ research/ songbirds/ avifauna/ deciduous forest/ forest management/ reproductive success
Abstract: We reveiw some key features of scientific inquiry and experimental design and apply them to studies of the effects of forest management on songbirds. We use examples from contemporary studies in eastern deciduous forests. Scientific methods, observational versus experimental studies, replication and randomization, choice of factors and models, and response variables are important elements in designing research approaches that address effects of forest management. There are significant gaps in our knowledge on the effects of forest management on birds. Many studies have addressed effects of management on species abundance, but we can make only limited inferences from most of these. The design of studies is complicated because of the range of forest management practices, variation in bird species responses, differences among forest types, and the effects of confounding factors such as landscape effects. Few studies have addressed effects of forest management on the reproductive success of forest songbirds. We believe the reliability of our knowledge in this area will be improved most quickly if we use current knowledge to generate hypotheses, use a mix of well-designed observational and manipulative experiments to test them, and more frequently measure reproductive success in addition to bird abundance.
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842. **Arboreal squirrel response to silvicultural treatments for dwarf mistletoe control in northeastern Oregon.**
Bull, E. L.; Heater, T. W.; and Youngblood, A.
Western Journal of Applied Forestry 19(2): 133-141. (2004)
NAL Call #: SD388.W6; ISSN: 0885-6095
Descriptors: habitats/ mistletoes/ responses/ silvicultural systems/ silviculture/ thinning/ witches' brooms/ Arceuthobium/ Glaucomys/ Pseudotsuga menziesii/ Tamiasciurus hudsonicus

Abstract: Various silvicultural treatments are commonly used to sanitize stands by removing trees infected with dwarf mistletoe (Arceuthobium spp.), yet witches' brooms in trees infected with dwarf mistletoe often provide structures used by many wildlife species. We compared relative abundance, habitat use, and area of use of red squirrels (Tamiasciurus hudsonicus) and northern flying squirrels (Glaucomys sabrinus) before and after two different treatments designed to remove a range of dwarf mistletoe-caused witches' brooms in northeastern Oregon in 1998-2002. Dwarf mistletoe sanitation treatments included: (1) an island treatment, with retention of up to 0.5 ha groups of trees containing witches' brooms in evenly distributed uncut islands, and all harvest activity confined to thinning from below outside these islands to eliminate trees containing witches' brooms; and (2) a total removal treatment, which consisted of removing all trees that contained a witches' broom estimated to be >25 cm in diameter. Before treatment, over half of the red squirrels and northern flying squirrels in the treatment area occupied summer rest sites in witches' brooms on large Douglas-fir (Pseudotsuga menziesii). Live trapping indicated a pretreatment abundance of 1.0 per 100 trap/nights for red squirrels and 0.4 per 100 trap/nights for northern flying squirrels, and a posttreatment abundance of 2.1 per 100 trap/nights for red squirrels and 0.2 per 100 trap/nights for northern flying squirrels. Type of rest site and amount of red squirrel reuse did not change after the island treatment, although the number of red squirrels located in rest sites increased with the island treatment. Most of the red squirrel locations occurred within the islands. Area of use by red squirrels did not change with island treatment. Type of rest site used by red squirrels and northern flying squirrels shifted after the total removal treatment from mostly witches' brooms to predominantly tree cavities. Area of use by red squirrels increased from 1.8 to 7.6 ha after the total removal treatment. Results suggest that retention of trees containing witches' brooms in small groups or islands offers an opportunity to retain rest site habitat, although northern flying abundance declined with both treatments.
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843. **Are temperate mixedwood forests perceived by birds as a distinct forest type?**

Girard, Caroline; Darveau, Marcel; Savard, Jean Pierre L.; and Huot, Jean

Canadian Journal of Forest Research 34(9): 1895-1907. (2004)
NAL Call #: SD13.C35; ISSN: 0045-5067
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ North America/ Canada/ Aves: habitat management/ temperate mixedwood forests significance as distinct habitat/ occurrence data implications/ habitat utilization/ forest and woodland/ temperate mixedwood forests/ perception as distinct habitat/ occurrence data analysis and management implications/ Quebec/ Aves/ birds/ chordates/ vertebrates

Abstract: Forestry practices used in mixedwood forests have led to a reduction of the availability of mixedwood stands and to a simplification of the forest mosaic, with unknown consequences on wildlife. We assessed bird occurrences at different spatial scales (50-, 100-, and 1000-m radius) in response to coniferous, deciduous, and mixedwood stands within the Quebec balsam fir-yellow birch domain. Our objective was to evaluate whether birds perceive temperate mixedwood forests as distinct from deciduous and coniferous forests. We quantified bird occurrence at 57 observation points and determined habitat composition from forest maps. At the 50-, 100-, and 1000-m scales, the occurrence of two, four, and four species, respectively, was positively related to mixedwood stands. Among them the Blackburnian Warbler, the Northern Parula, the Black-throated Blue Warbler, and the Ovenbird responded at more than one scale. Some species were also influenced by coniferous and deciduous stands at the three spatial scales. Mixedwood stands were positively associated with the occurrence of many species and moreover were preferred over coniferous or deciduous stands by some species. These results support our hypothesis that mixedwood forests are distinct habitats and provide a new justification for preserving this forest type.
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844. **Area sensitivity and edge avoidance: The case of the three-toed woodpecker (Picoides tridactylus) in a managed forest.**

Imbeau, Louis and Desrochers, Andre

Forest Ecology and Management 164(1-3): 249-256. (2002)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: Picoides tridactylus/ Piciformes/ Picidae/ forestry practices/ habitat alterations/ terrestrial ecology/ area sensitivity/ boreal forestry/ edge avoidance/ industrial forestry/ old-growth forest specialization/ distribution/ foods-feeding/ ecosystems/ forest management/ habitat management/ habitat use/ Lac Saint-Jean area/ Quebec/ wildlife-human relationships/ Canada/ commercial enterprises/ conservation/ wildlife/ disturbances/ land zones/ nutrition/ northern three-toed woodpecker/ silviculture/ forest fringe/ boundary

Abstract: Given the extensive progression of industrial forestry in boreal regions that reduces the area of old-growth forests and considerably increases the amount of sharp edges, important declines are to be expected among old-forest specialists area-sensitive or edge-avoiding boreal birds. The Three-toed Woodpecker (Picoides tridactylus) is likely to be one of the species most negatively affected by boreal forestry and is possibly sensitive to forest area and edges. In this study, we quantify the area sensitivity and edge-avoidance of the Three-toed Woodpecker by analyzing its pattern of occurrence at 100 playback stations that had from 8 to 100% forest cover within a 300 m radius. Behavioral observations were also conducted to further investigate its response to edges in logged forests using foraging locations in relation to the nearest clear-cut border. Moreover, we document their foraging movement patterns in two contrasting landscapes (continuous versus shredded forests after logging). Although the occurrence of Three-toed Woodpeckers was highly related to the area of suitable habitat around the playback station, this relationship was quasi-linear and no critical threshold was found within the range of forest cover sampled. The amount of edge did not provide additional information on woodpecker occurrence. Individual woodpeckers in shredded forests did not select foraging trees further away from clear-cut edges than available ones. However, based on the results of the movement path analysis, continuous forests might provide better nesting habitat than residual, shredded forests. Indeed, spatial configuration of residual forest seemed to highly constrain foraging movements of this species because of its strong avoidance of open areas.

Considering other studies conducted on forest birds, such modified movement patterns could be particularly harmful while both adults must feed their nestlings and behave as central place foragers. Therefore, even if no pattern of area-sensitivity or edge-avoidance were found, harmful consequences of forest shredding following forest logging may still occur for boreal species such as the Three-toed Woodpecker. However, residual forests strips are essential to maintain this species within managed areas, its population density within such residual forests being comparable to the one obtained in continuous forests.
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845. **Area sensitivity in grassland passerines: Effects of patch size, patch shape, and vegetation structure on bird abundance and occurrence in southern Saskatchewan.**
Davis, S. K.
Auk 121(4): 1130-1145. (2004)
NAL Call #: 413.8 AU4 ; ISSN: 00048038
Descriptors: abundance/ habitat fragmentation/ passerines/ patch dynamics/ patch size/ prairie/ vegetation structure/ Canada/ North America/ Saskatchewan/ Ammodramus/ Ammodramus bairdii/ Ammodramus savannarum/ Anthus/ Anthus spragueii/ Aves/ Calcarius/ Calcarius ornatus/ Eremophila/ Eremophila alpestris/ Molothrus/ Molothrus aeneus/ Molothrus ater/ Passerculus sandwichensis/ Passeri/ Passeriformes/ Spizella pallida/ Sturnella neglecta
Abstract: Information on area sensitivity and effects of habitat fragmentation has come largely from forest and tallgrass-prairie habitats. Research from other ecosystems is required to determine whether the fragmentation paradigm derived from those studies is applicable to passerine communities elsewhere. I examined the effects of habitat fragmentation on abundance and occurrence of nine species of mixed-grass prairie passerines in southern Saskatchewan. I conducted 190 point-counts in 1996 and 1997 on 89 pastures ranging in size from 8 to 6,475 ha. Sprague's Pipit (Anthus spragueii), Baird's Sparrow (Ammodramus bairdii), Grasshopper Sparrow (A. savannarum), and Chestnut-collared Longspur (Calcarius ornatus) were found to be area-sensitive, in that they were more abundant or occurred more frequently, or both, in larger patches of mixed-grass prairie. However, the ratio of edge to interior habitat was a better predictor of area sensitivity than patch size in most cases. Horned Lark (Eremophila alpestris), Savannah Sparrow (Passerculus sandwichensis), Clay-colored Sparrow (Spizella pallida), Western Meadowlark (Sturnella neglecta), and Brown-headed Cowbird (Molothrus ater) were insensitive to patch size, though occurrence of Clay-colored Sparrow and Western Meadowlark tended to be greater in smaller pastures. Vegetation structure was also found to be an important predictor of grassland songbird abundance and occurrence, in that it explained additional variation not accounted for by patch size or the ratio of edge to interior habitat. Although protection of large contiguous tracts of habitat is essential to conservation of native species, small native-prairie patches with minimal edge habitat also play a vital role in conservation of grassland birds.
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846. **Arthropod responses to harvesting and wildfire: Implications for emulation of natural disturbance in forest management.**
Buddle, Christopher M.; Langor, Dauid W.; Pohl, Greg R.; and Spence, John R.
Biological Conservation 128(3): 346-357. (2006)
NAL Call #: S900.B5; ISSN: 0006-3207
Descriptors: commercial activities/ conservation measures/ land zones/ North America/ Canada/ Araneae/ Carabidae/ Staphylinidae: forestry/ habitat management/ community structure/ wildfire/ forest and woodland/ forest litter/ litter habitat/ Alberta/ arachnids/ arthropods/ beetles/ Chelicerates/ insects/ invertebrates
Abstract: Although natural disturbance has been widely adopted as a template for forest management that protects biodiversity, this hypothesis has not been adequately tested. We compared litter-dwelling arthropod assemblages (Coleoptera: Carabidae and Staphylinidae; Araneae) in aspen-dominated stands originating as clear-cuts or wildfires across three age classes (1-2, 14-15, and 28-29 years old) to test whether the post-harvest and post-fire assemblages converged following disturbances, and to compare faunal succession. These findings were compared to data about epigaeic arthropods in old and mature pyrogenic aspen stands (>70 years old) to determine whether diversity and community composition of arthropods from the younger age-classes approached what may have been typical predisturbance conditions. The resulting data-set of almost 27,000 arthropods and 230 species showed convergence in most taxa, and some general similarities between 28- and 29-year-old stands and old and mature stands. However, not all taxa responded similarly, and faunal succession following clear-cutting appeared to progress more rapidly than following wildfire. Rarefaction-estimated diversity was elevated in 1-2-year-old stands, compared to unharvested stands, reflecting a mix of closed-canopy and open-habitat species. Nonmetric multi-dimensional scaling ordinations showed that samples from young wildfire disturbed stands (1-2 years old) included more variable assemblages than all other study sites, and contained species that may depend on unique post-fire habitat characteristics. The fauna of old and mature stands exhibited low diversity, but contained species with limited dispersal abilities, and species tied to old-growth habitats such as dead wood. Harvesting systems that do not allow adequate recovery following a first harvesting pass, or do not maintain microhabitat features associated with older fire-origin forests, may threaten persistence of some elements of boreal arthropod faunas. © 2005 Elsevier Ltd. All rights reserved.
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847. **Artificial inoculation of decay fungi into Douglas-fir with rifle or shotgun to produce wildlife trees in western Oregon.**
Filip, G. M.; Parks, C. G.; Baker, F. A.; and Daniels, S. E.
Western Journal of Applied Forestry 19(3): 211-215. (2004)
NAL Call #: SD388.W6; ISSN: 08856095
Descriptors: cavity-nester habitat/ Fomitopsis cajanderi/ internal decay/ rifle and shotgun inoculation/ tree topping/ Trichaptum abietinum
Abstract: A total of 188 Douglas-fir trees were treated to determine whether fungal inoculation with rifle or shotgun promoted stem decay and subsequent use by cavity-nesting birds in the Coast Range in Oregon. Inoculated

trees were either live or killed by topping. Topped trees were climbed and severed just below the lowest whorl of live branches. Fungal inoculum was delivered by either a 0.45-70 caliber rifle or a 12-gauge shotgun to tree trunks at a height of about 8 m aboveground. Inoculum of either Phellinus pini or Fomitopsis cajanderi was grown on small wooden dowels or sawdust and fitted into the rifle slug (dowels) or behind the shotgun slug (sawdust). Sterile dowels or sawdust were used as a control. After 5 years, all topped trees had died, and at least 50% had sap rot as indicated by the presence of conks of Trichaptum abietinum. Conks of Crytoporus volvatus, Fomitopsis pinicola, or P. pini were sometimes observed on topped (dead) trees. Almost half of the topped trees had evidence of wildlife activity including foraging holes, nest cavities, or bark removal. There was no difference in sap rot incidence or subsequent wildlife activity among three treatments (rifle, shotgun, or not shot) or among three inoculum types (P. pini, F. cajanderi, or sterile). None of the untopped (live) but artificially inoculated trees had conks or evidence of wildlife use. Of seven live and shot trees that were destructively sampled, there was an average of 68.7 cm^2 of decay area on each wood disc that was associated with each bullet. There was no apparent difference in internal decay area between sterile and viable inoculum, but sample size was small. It appears that tree killing by topping below the live crown is a faster method of creating wildlife habitat than ballistic inoculation of live Douglas-fir trees in the Oregon Coast Range. Topped and dead trees had more avian foraging holes, deep cavities, and bark removed than did live inoculated trees. Based on the seven live shot trees that we sampled for internal decay, it appears that shooting trees with a shotgun or rifle is effective in creating internal decay within 5 years, but it may take several more years to form a decay column large enough to be used by cavity-nesting birds.
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848. **Assessing and monitoring forest biodiversity: A suggested framework and indicators.**
Noss, R. F.
Forest Ecology and Management 115(2/3): 135-146. (1999)
NAL Call #: SD1.F73; ISSN: 0378-1127.
Notes: Literature review.
Descriptors: biodiversity/ forest management/ biological indicators/ assessment/ planning/ nature conservation/ methodology/ protection of forests/ wildlife communities/ old growth forests/ virgin forests/ forest fragmentation/ forest fires/ road construction/ forest ecology/ North America
Abstract: Enlightened forest management requires reliable information on the status and condition of each forest (interpreted from a broad context) and of change in forest conditions over time. The process of forest planning must begin with a clear statement of goals, from which detailed objectives and management plans follow. Goals and objectives for forest management should reflect the conservation value of a forest relative to other forests of the same general type. This paper reviews some recent assessments (with emphasis on North America), presents a framework for forest assessment and monitoring, and suggests some indicators of biodiversity in forests. Among the broad assessments of forest status and conservation value are a global 'forest frontiers' assessment by the World Resources Institute, gap analysis projects that assess the level of representation of forests and other communities in protected areas, and ecoregion-based conservation assessments conducted by the World Wildlife Fund. Also important is information on change in forest area and condition over time. Among the common changes in forests over the past two centuries are loss of old forests, simplification of forest structure, decreasing size of forest patches, increasing isolation of patches, disruption of natural fire regimes, and increased road building, all of which have had negative effects on native biodiversity. These trends can be reversed, or at least slowed, through better management. Progress toward forest recovery can be measured through the use of ecological indicators that correspond to the specific conditions and trends of concern. Although there is a wealth of indicators to choose from, most have been poorly tested and require rigorous validation in order to be interpreted with confidence.
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849. **Assessing risks to spotted owls from forest thinning in fire-adapted forests of the western United States.**
Lee, D. C. and Irwin, L. L.
Forest Ecology and Management 211: 191-209. (June 2005)
NAL Call #: SD1.F73
Descriptors: temperate forests/ Strix occidentalis/ endangered species/ wild birds/ risk assessment/ wildlife management/ forest thinning/ forest ecology/ fire ecology/ wildfires/ fire hazard reduction/ prescribed burning/ overstory/ stand density/ stand structure/ simulation models/ California/ risk modeling/ plant ecology/ forest fire management/ mathematics and statistics
This citation is from AGRICOLA.

850. **Assessing the influence of forest management of amphibian microhabitat.**
Risenhoover, Ken L. and McBride, Tim C.
Northwestern Naturalist 82(2): 80. (2001)
NAL Call #: QL671.M8; ISSN: 1051-1733
Descriptors: amphibians/ microhabitat/ conservation/ soil temperature/ forest management/ riparian zones/
Abstract: Because of their limited mobility and apparent narrow tolerance for microhabitat conditions, there is a growing concern that amphibians may be negatively impacted by harvest activities in managed forests. Here, we summarize preliminary results from our investigations of microhabitat conditions in managed forests and relate them to patterns of amphibian occurrence. We measured fine-scale patterns in microhabitat (soil moisture, soil temperature, relative humidity, ambient air temperature, and vegetation) along transects running perpendicular from the stream edge and extending up to 60 m into the adjacent upland. We contrasted patterns of microhabitat found in mature (55 to 65 yr old) and recently harvested stands with continuous or discontinuous riparian management zones. Generally, soil temperature increased slightly with increasing distance from the stream edge, and ambient air and soil temperatures were highest in clearcuts outside of streamside buffers. Soil moisture was highly variable and showed no consistent trend in relation to distance from streams. Soil moisture was higher in clearcuts than in forested areas. Surprisingly, the range of microhabitat conditions present in clearcuts did not differ greatly from those found in riparian buffers and in unharvested stands, Although microhabitat conditions tended to be more

variable in recently harvested stands. Diel patterns of ambient temperature and relative humidity suggested that microclimatic conditions were similar between clearcut and unharvested areas with the exception of 4 to 6 hr in the mid-afternoon during dry summer months. During July to August, 90% of surface active amphibians occurred within 2 m of streams suggesting that protection of near-stream microhabitat should be the focus of conservation measures. Surface vegetation and woody debris available in recently harvested stands appears to provide suitable microclimate and refugia for the amphibians.
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851. **Association between severity of prescribed burns and subsequent activity of conifer-infesting beetles in stands of longleaf pine.**
Sullivan, B. T.; Fettig, C. J.; Otrosina, W. J.; Dalusky, M. J.; and Berisford, C. W.
Forest Ecology and Management 185: 327-340. (2003)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: bark-beetles/ forest/ silviculture/ fire/ forest damage/ population dynamics/ abundance/ South Carolina
Abstract: A randomized complete block experiment was performed to measure the effect of prescribed, dormant-season burns of three different levels of severity (measured as fuel consumption and soil surface heating) on subsequent insect infestation and mortality of mature longleaf pine (Pinus palustris Mill.). Multiple-funnel traps baited with a low release rate of turpentine and ethanol were used to monitor activity of certain coniferophagous beetles. Non-aggressive species, including the root beetles Hylastes salebrosus Eichhoff and H. tenuis Eichhoff, the ambrosia beetle Xyleborus pubescens Zimmermann, the reproduction weevil Pachylobius picivorus (Germar), and buprestid borers, were attracted to burned plots in numbers that correlated positively with burn severity. Beetle attraction to burned sites was greatest in the first weeks post-burn and disappeared by the second year. Two potential tree-killing bark beetles, Dendroctonus terebrans (Olivier) and Ips grandicollis (Eichhoff), were trapped in significant numbers but exhibited no attraction to burned plots. Tree mortality correlated significantly with the severity of the burns and amounted to 5% of stems in the hottest burn treatment after 3 years. The majority of the mortality was observed in the second and third years post-burn. Attacks of Ips and Dendroctonus bark beetles were apparent on nearly all dead or dying trees, and evidence suggested that root pathogens may have contributed to tree susceptibility to beetle attack and mortality. Our data indicate that selection of burn regimes that reduce or eliminate consumption of duff (e.g., favoring heading fires over backing fires) could significantly reduce mortality of longleaf pine managed for long rotations.
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852. **The association of small mammals with coarse woody debris at log and stand scales.**
Bowman, Jeffrey C.; Sleep, Darren; Forbes, Graham J.; and Edwards, Mark
Forest Ecology and Management 129(1/3): 119-124. (2000)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: Blarina brevicauda/ Clethrionomys gapperi/ Microtus chrotorrhinus/ Microtus pennsylvanicus/ Napaeozapus insignis/ Peromyscus maniculatus/ Sorex/ Synaptomys cooperi/ Zapus hudsonius/ Rodentia/ Insectivora/ behavior/ habitat management/ mammals/ wildlife-habitat relationships/ dead wood/ diversity/ fauna/ insectivores/ rodents/ bank vole/ red-backed mouse/ red-backed vole/ deer mouse/ woodland jumping mouse/ jumping mouse/ meadow vole/ bog lemming/ short-tailed shrew/ long-tailed shrew/ Canada/ New Brunswick
Abstract: Coarse woody debris is an important structural element in forests. The authors empirically investigated the relationships between small mammals and coarse woody debris decay stage at two different scales: individual logs and forest stands. There were no significant relationships between small mammals and individual logs of different decay classes. They investigated the stand scale using areas with contrasting management intensities (a reference area and a more intensively managed area). No significant relationships were found between small mammal abundance (any species) and either mean decay class of logs in a stand, or overall abundance of logs. There was evidence of a landscape context effect. Red-backed voles, the most abundant microtine in the region, were significantly related to the abundance of the most decayed logs. This relationship was only significant on the intensively managed landscape, where highly decayed logs were rare.
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853. **Associations between forest fire and Mexican spotted owl.**
Jenness, J. S.; Beier, P.; and Ganey, J. L.
Forest Science 50: 765-772. (Dec. 2004)
NAL Call #: 99.8 F7632
Descriptors: Strix occidentalis/ owls/ threatened species/ forest fires/ prescribed burning/ forest stands/ Pinus/ reproduction/ wildlife management/ forest wildlife relations/ Arizona/ New Mexico/ natural resources, environment, general ecology, and wildlife conservation/ forest fire management/ forestry production natural regeneration
Abstract: In 1993, the US Fish and Wildlife Service listed the Mexican spotted owl (Strix occidentalis lucida) as threatened, in part because of the rising threat to its habitat from stand-replacing wildfires. In 1997, we surveyed 33 owl sites that, in the previous four years, had burned at various levels ranging from light controlled burns to stand-replacing fires. We compared owl occupancy and reproduction in these burned sites to 31 unburned owl sites with similar habitat and topography. Although unburned sites showed higher proportions of both occupancy and reproduction, the negative relationship observed between recent fire occurrence and owl occupancy rank was statistically weak (Test for Marginal Homogeneity, P = 0.110). Owls tended not to be present where pure pine stands (Pinus spp.) comprised a large proportion (38-85%) of burned sites, but no other factors relating to habitat or fire severity had a significant, biologically interpretable influence on occupancy rank. We suspect that relatively low-intensity ground fires, including most prescribed fires, probably have little or no short-term impact on Mexican spotted owl presence or reproduction, but we have no data on long-term effects of fire. We recommend proactive fuels-management treatments in areas not currently occupied by owls as a means of reducing fire risk in areas occupied by owls. Within areas occupied by owls, judicious treatments may be appropriate after case-by-case evaluations of potential benefits and risks within those sites.
This citation is from AGRICOLA.

854. **Associations of forest-floor vertebrates with coarse woody debris in managed forests of western Oregon.**
Butts, Sally R. and McComb, William C.
Journal of Wildlife Management 64(1): 95-104. (2000)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: forests/ woody debris/ forest management/ habitat management/ vertebrates/ mammals/ amphibians/ forest floor/ Sorex trowbridgii/ Aneides ferreus/ Ensatina eschscholtzii
Abstract: Forests managed primarily for wood resources may be lacking in adequate amounts of coarse woody debris (CWD) for forest-floor vertebrates. We assessed associations between captures of forest-floor vertebrates and volume of CWD in 18 closed-canopy stands of Douglas-fir (Pseudotsuga menziesii). The volume of CWD ranged from 14 to 859 m^3/ha. Pitfall traps and timed, area-constrained ground searches were used to capture small mammals and amphibians. The abundance of ensatina (Ensatina eschscholtzii) and clouded salamanders (Aneides ferreus) increased with volume of CWD. In addition, the probability of encountering either ensatina or Trowbridge's shrew (Sorex trowbridgii) increased with cover of CWD on the forest-floor. The average distance from the nearest CWD for amphibians captured during timed, area-constrained ground searches was 0.5 m, versus 1 m between random points and the nearest CWD. Our study suggests that current management guidelines for CWD retention may not provide adequate habitat for forest-floor vertebrates that depend on this component of the habitat.
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855. **Associations of winter birds with riparian condition in the lower Calapooia Watershed, Oregon.**
McComb, B. C.; Bilsland, D.; and Steiner, J. J.
Northwest Science 79(2-3): 164-171. (2005)
NAL Call #: 470 N81; ISSN: 0029344X
Descriptors: avifauna/ community composition/ riparian vegetation/ species richness/ vegetation type/ Oregon/ Willamette River/ Aves
Abstract: We examined the association between winter bird community composition and three riparian vegetation types common in the central Willamette River basin: grass-riparian, shrub-riparian, and forest-riparian. There were 20 times more birds detected and 3 times as many species detected in forest-riparian sites than in grass-riparian sites. There were over three times as many species observed in forest-riparian sites as grass-riparian sites. Not all species were associated with trees or shrubs, and not all that were associated with trees or shrubs were riparian dependent. A significant curvilinear relationship was detected between tree cover and winter bird species richness. Based on this relationship we hypothesize that providing 10-15% of a square km in tree cover would maximize winter bird richness within the range of conditions that we sampled.
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856. **Avian nest success in Midwestern forests fragmented by agriculture.**
Knutson, M. G.; Niemi, G. J.; Newton, W. E.; and Friberg, M. A.
Condor 106(1): 116-130. (2004)
NAL Call #: QL671.C6; ISSN: 00105422
Descriptors: agriculture/ driftless area/ forest fragmentation/ functional group/ landscape/ midwestern United States/ nest success/ Contopus virens/ Molothrus ater/ Setophaga ruticilla
Abstract: We studied how forest-bird nest success varied by landscape context from 1996 to 1998 in an agricultural region of southeastern Minnesota, southwestern Wisconsin, and northeastern Iowa. Nest success was 48% for all nests, 82% for cavity-nesting species, and 42% for cup-nesting species. Mayfield-adjusted nest success for five common species ranged from 23% for the American Redstart (Setophaga ruticilla) to 43% for the Eastern Wood-Pewee (Contopus virens). Nest success was lowest for open-cup nesters, species that reject Brown-headed Cowbird (Molothrus ater) eggs, species that nest near forest edges, and Neotropical migrants. The proportion of forest core area in a 5-km radius around the plot had a weakly negative relationship with daily survival rate of nests for all species pooled and for medium or high canopy nesters, species associated with interior and edge habitats, open-cup nesters, and nests located between 75 and 199 m from an edge. The proportion of forest core area was positively related to daily survival rate only for ground and low nesters. Our findings are in contrast to a number of studies from the eastern United States reporting strong positive associations between forest area and nesting success. Supported models of habitat associations changed with the spatial scale of analysis and included variables not often considered in studies of forest birds, including the proportion of water, shrubs, and grasslands in the landscape. Forest area may not be a strong indicator of nest success in landscapes where all the available forests are fragmented.
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857. **Avian response to bottomland hardwood reforestation: The first 10 years.**
Twedt, Daniel J.; Wilson, R. Randy; Henne-Kerr, Jackie L.; and Grosshuesch, David A.
Restoration Ecology 10(4): 645-655. (2002)
NAL Call #: QH541.15.R45R515; ISSN: 1061-2971
Descriptors: conservation measures/ ecology/ habitat utilization/ terrestrial habitat/ land and freshwater zones/ Aves: habitat management/ reforestration strategies/ habitat colonization relations/ habitat colonization/ reforestration strategy relations/ Louisiana and Mississippi/ forest and woodland/ bottomland hardwood/ Louisiana/ Madison Parish/ Mississippi/ Issaquena County/ reforestation strategy relations/ Aves/ birds/ chordates/ vertebrates
Abstract: Bottomland hardwood forests were planted on agricultural fields in Mississippi and Louisiana predominantly using either Quercus species (oaks) or Populus deltoides (eastern cottonwood). We assessed avian colonization of these reforested sites between 2 and 10 years after planting. Rapid vertical growth of cottonwoods (circa 2-3 m/year) resulted in sites with forest structure that supported greater species richness of breeding birds, increased Shannon diversity indices, and supported greater territory densities than on sites planted with slower-growing oak species. Grassland birds (Spiza americana [Dickcissel] and Sturnella magna [Eastern Meadowlark]) were indicative of species breeding on oak-dominated reforestation no more than 10 years old. Agelaius phoeniceus (Red-winged Blackbird)

and Colinus virginianus (Northern Bobwhite) characterized cottonwood reforestation no more than 4 years old, whereas 14 species of shrub-scrub birds (e.g., Passerina cyanea [Indigo Bunting]) and early-successional forest birds (e.g., Vireo gilvus [Warbling vireo]) typified cottonwood reforestation 5 to 9 years after planting. Rates of daily nest survival did not differ between reforestation strategies. Nest parasitism increased markedly in older cottonwood stands but was overwhelmed by predation as a cause of nest failure. Based on Partners in Flight prioritization scores and territory densities, the value of cottonwood reforestation for avian conservation was significantly greater than that of oak reforestation during their first 10 years. Because of benefits conferred on breeding birds, we recommend reforestation of bottomland hardwoods should include a high proportion of fast-growing early successional species such as cottonwood.
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858. **Avian species richness and reproduction in short-rotation coppice habitats in central and western New York.**
Dhondt, A. A.; Wrege, P. H.; Cerretani, J.; and Sydenstricker, K. V.
Bird Study 54(1): 12-22. (2007); ISSN: 00063657
Descriptors: species richness/ wildlife habitats/ birds/ nesting/ habitat management/ coppicing/ New York
Abstract: Capsule: Species richness and density increase rapidly with coppice age, and are similar to estimates from early successional habitats. Aim: To investigate avian species richness, density and breeding success in short-rotation woody crops (SRWC) planted as potential source of renewable bioenergy. Methods: We carried out regular bird censuses and systematic nest searches in dense plantations of fast-growing willow and poplar clones coppiced at three- to five-year intervals in New York, USA. Results: Thirty-nine species regularly used SRWC plantations; of these at least 21 were confirmed breeding on study plots. A total of 63% of the variation in bird species richness was explained by the number of years since coppicing and plot area together. Both the richness and overall density of avian species in SRWC plots was similar to estimates obtained from the Breeding Bird Census for more typical shrublands and successional habitats (e.g. abandoned fields, second-growth forest, regenerating clear-cuts). Nesting success for the most common species was within the range of values from published studies in alternative nesting habitats, although often at the lower end of the range. Brood parasitism by Brown-headed Cowbirds Molothrus ater, often an important actor in nesting success, was extremely low on the study plots. Conclusion: If planted on a fairly large scale with staggered coppicing schedules, SRWC plantations would help to maintain breeding populations of birds that range from open-habitat species to woodland species. There is no evidence that conversion of substantial land area to SRWC would result in an 'ecological trap' for species common in the farmland-small woodland landscapes of the northeastern USA.
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859. **Avian use of early successional habitats: Are regenerating forests, utility right-of-ways and reclaimed surface mines the same?**
Bulluck, Lesley P. and Buehler, David A.
Forest Ecology and Management 236(1): 76-84. (2006)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: conservation measures/ ecology/ population dynamics/ terrestrial habitat/ land zones/ Aves: habitat management/ early successional habitats use/ community structure/ early successional habitats comparison/ population size/ habitat utilization/ terrestrial habitat/ utility right of way/ reclaimed surface mines/ habitat use/ comparison with other early successional habitats/ forest and woodland/ regenerating forest/ Tennessee/ Cumberland Mountains/ Aves/ birds/ chordates/ vertebrates
Abstract: The importance of early successional habitats for breeding and post-breeding birds has received recent attention. Common early successional habitats in the eastern United States are regeneration after timber harvests, utility right-of ways and reclaimed surface mines. Few studies, however, have compared the characteristics of these with regard to avian habitat use. We conducted a passive mist-netting study to assess the breeding and post-breeding avian communities associated with these land uses in the Cumberland Mountains of eastern Tennessee. We used analysis of variance to compare the vegetation structure among these habitat types and discriminant function analyses to illustrate differences in vegetation structure and bird abundance among habitats. We banded 1562 individuals of 40 species (1.08 birds/net-hour). The percent cover of saplings, forbs and grass differed among habitat types, but there was no detectable difference in shrub cover. Vegetation structure allowed good discrimination between habitat types (Wilks' $\lambda = 0.16$), specifically in differentiating clearcuts from surface mines and right-of-ways. Although the three habitat types had several avian species in common, the abundance of 12 species differed substantially among habitat types, and their species abundance patterns allowed for excellent discrimination between these habitat types (Wilks' $\lambda = 0.08$). We conclude that these three early successional habitat types are different with regard to vegetation structure and avian community assemblage. These differences are important for local and landscape-scale conservation planning for both early and late successional avian species. © 2006 Elsevier B.V. All rights reserved.
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860. **Avian use of successional cottonwood (Populus deltoides) woodlands along the middle Missouri River.**
Rumble, M. A. and Gobeille, J. E.
American Midland Naturalist 152(1): 165-177. (2004)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: Passerina cyanea/ Populus deltoides/ Toxostoma rufum/ Vireo bellii
Abstract: Cottonwood (Populus deltoides) woodlands are important habitats for birds. Yet, little is known of the relations between bird habitat and succession in these woodlands. We studied the bird community in cottonwood woodlands from early to late seral stages along the Missouri River in central South Dakota from 1990 to 1992 to describe quantitative relations between avifauna and ecological patterns of succession in cottonwood woodlands along the Missouri River. The vegetation in the early seral

cottonwood was characterized by a high density of seedlings and saplings that were restricted to narrow bands along the rivers. Late seral cottonwoods were characterized by a few large old trees that extended across the flood plain. Seventy-nine percent of the bird species were woodland obligates. Birds that nest in trees or cavities were the most common, while shrub and ground nesting birds were relatively uncommon. Total bird abundance, species diversity, species richness, richness of woodland obligates, abundance in the tree-nesting guild, abundance in the cavity-nesting guild and abundance in the shrub-nesting guild were greater (P < 0.01) in late and late intermediate seral cottonwood stands. Patterns of bird use in cottonwood seral stages by individual species were less evident. Several species were more abundant (P < 0.08) in late or late intermediate seral cottonwood and no species were more abundant (P > 0.10) in early or early intermediate seral cottonwood. Bell's vireos (Vireo belli), indigo buntings (Passerina cyanea) and brown thrashers (Toxostoma rufum) occurred predominantly in early or early intermediate seral stages, but no significant differences among seral stages were noted. Expanses of late seral cottonwood on flood plains will likely decline because controlled river flows reduce flooding that is necessary for cottonwood regeneration. Cottonwood regeneration was evident only in narrow bands along the river channels. Cavity nesting species will be the most negatively affected by loss of late seral cottonwood.
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861. **Avifauna in oak woodlands of the Willamette Valley, Oregon.**
Hagar, Joan C. and Stern, Mark A.
Northwestern Naturalist 82(1): 12-25. (2001)
NAL Call #: QL671.M8; ISSN: 1051-1733
Descriptors: birds/ communities/ ecosystems/ white oak/ forests, deciduous/ succession/ wildlife-habitat relationships/ species diversity/ conservation/ wildlife management/ habitat management/ Oregon, Central
Abstract: Oregon white oak (Quercus garryana) woodlands are an important habitat for breeding birds that is threatened by development and altered disturbance regimes. The authors described habitat characteristics and examined species composition and abundance of breeding birds in nine oak woodland sites in the Willamette Valley, Oregon during May and June, 1994 to 1996. Based on comparisons to earlier studies, their results suggest that avian community composition has changed in recent decades. Changes in species composition likely have been associated with a shift from open- to closed-canopy habitats, resulting from successional advancement in the absence of fire. Although there is some evidence that avian species composition has changed to more closely resemble that of closed-canopy, conifer-dominated habitats, oak woodlands in the Willamette Valley nonetheless support both neotropical migrant and resident bird species that are uncommon in or absent from coniferous habitats in western Oregon. The authors identified 12 species currently occurring in oak woodlands that may be negatively affected by the replacement of oak habitats with closed-canopy, conifer-dominated forest. Because conifers dominate much of the forested regions of western Oregon, Willamette Valley oak woodlands provide an important element of regional diversity and should receive priority consideration in conservation planning. The conservation and management of semi-open woodlands with large-diameter oaks may be particularly critical for some species that have declined in abundance and/or do not occur in dense forests.
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862. **Bachman's sparrow habitat in the lower Flint River Basin, Georgia.**
Perkins, Micah W. and Conner, L. Mike
Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies 57: 235-242. (2003)
NAL Call #: SK1.S6; ISSN: 0276-7929
Descriptors: conservation measures/ ecology/ habitat utilization/ terrestrial habitat/ land zones/ Aimophila aestivalis: habitat management/ habitat preference/ forest and woodland/ habitat suitability/ habitat availability/ Georgia/ Lower Flint River System/ Aves, Passeriformes, Emberizidae/ birds/ chordates/ vertebrates
Abstract: Bachman's sparrow (Aimophila aestivalis) populations are generally declining throughout much of the Southeast, and habitat loss is suspected as the principal force driving declines. Therefore, we assessed the potential effects of current land use practices on Bachman's sparrows (BACS) within the lower Flint River Basin (LFRB). We then used a previously developed habitat model to quantify current available BACS habitat and used common landscape metrics to describe fragmentation of remaining habitat. Prior to major land use changes associated with European settlement, approximately 86% of the LFRB was suitable for BACS. Of this once suitable habitat, 3.8% is now urban, 42.4% is now in agriculture, and 48.2% is now in forests unsuitable for BACS. We estimated that only 3.3% of the original upland forests within the basin re-main suitable for BACS. Today, 97.4% of suitable habitat occurs in patches <30 ha with 17.9% of patches fragmented by >1000 m. Small patch size and increased distance between patches combine to yield low proximity indices. Pine plantation management emphasizing prescribed fire and thinning may increase overall habitat availability for BACS while reducing habitat fragmentation. The recent interest in longleaf pine (Pinus palustris) restoration may similarly benefit BACS.
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863. **Bat activity is low in thinned and unthinned stands of red pine.**
Tibbels, A. E. and Kurta, A.
Canadian Journal of Forest Research 33(12): 2436-2442. (2003)
NAL Call #: SD13.C35; ISSN: 00455067.
Notes: doi: 10.1139/x03-177.
Descriptors: forestry/ insect control/ ultrasonic devices/ plantations/ ultrasonic detectors/ ecology/ bats/ forest management/ plantation forestry/ stand structure/ thinning/ Manistee National Forest/ Michigan/ Pinus resinosa
Abstract: We investigated the use of red pine (Pinus resinosa Ait.) plantations by bats in the Manistee National Forest of Michigan. Using ultrasonic detectors, we compared the activity of bats in the interior of stands of red pine and in openings within the stands, both before and after thinning (mean time after thinning = 7 years). Bat activity was more than 20 times greater in small openings within thinned and unthinned stands than within the stands themselves, and bat activity was associated with greater

insect abundance in openings. Thinning lead to a significant change in structural complexity, as shown by a 39% decrease in basal area and a 45% decline in tree density, although these changes did not lead to an increase in use of red pine stands by bats. Red pine plantations, even after thinning, most likely are too structurally complex and have low insect abundance, making them a largely unsuitable habitat for bats.
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864. **Benefits and tradeoffs of timber management for wildlife habitat on industrial and nonindustrial private landownerships (Mississippi).**
Barlow, Rebecca Jo. Mississippi State University, 2005.
Notes: Degree: PhD; Advisor: Grado, Stephen C.
Descriptors: wildlife management/ forest management/ geographic information systems/ habitat management/ Pinus spp./ bobwhite quail/ white-tailed deer/ wild turkey/ gray squirrel/ Mississippi
Abstract: Nonmarketed forest outputs such as clean air and water, recreation, and wildlife habitat need to be measured quantitatively, to allow projections of the economic gains and losses associated with varying amounts of these outputs relative to timber production. of particular importance to many landowners is the quantity and value of timber production forgone relative to varying amounts of wildlife habitat created. Scenario planning and Geographic Information Systems (GIS) were used to estimate potential economic gains or losses for Mississippi resulting from manipulations of timber growing stock to produce more or less habitat for Northern bobwhite quail (Colinus virginianus), white-tailed deer (Odocoileus virginianus), bobcat (Lynx rufus), Eastern wild turkey (Meleagris gallopavo) and eastern gray squirrel (Sciurus carolinensis). Current United States Department of Agriculture (USDA) Forest Service (USFS), Forest Inventory and Analysis (FIA) data, and 2000 USFS Resource Planning Act (RPA) data were examined using the USFS forest-planning model, SPECTRUM, and the GIS software ArcView, to determine effects of management options for wildlife habitat in the North Central Hills, Tombigbee Hills, South Central Hills, and Pine Belt physiographic regions of Mississippi. Baseline scenarios, which maximized Net Present Value (NPV), produced higher Land Expectation Value (LEV) and Equal Annual Income (EAI) values per acre and allocated fewer acres of habitat for all wildlife species in all regions versus managing for wildlife habitat quality. When high quality wildlife habitat was the management objective, improved Northern bobwhite and Eastern wild turkey habitat in the Tombigbee Hills region of the state had the most favorable opportunity costs of any species in any region when compared to Npv maximization in the same region. Low-level Northern bobwhite and white-tailed deer habitat management in the North Central Hills, Central region had the least favorable opportunity costs of all scenarios. Inclusion of fee hunting reduced the cost difference between Npv and wildlife management scenarios in all cases. Simulations that compare management regimes maximizing NPV and optimum wildlife habitat result in quantitative measures useful for land managers to evaluate tradeoffs inherent in multiple-use management, and potential impacts on both state and regional timber inventories and affected economies.
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865. **Bicknell's thrushes (Catharus bicknelli) in New Brunswick clear cuts: Their habitat associations and co-occurrence with Swainson's thrushes (Catharus ustulatus).**
Nixon, E. A.; Holmes, S. B.; and Diamond, A. W.
Wilson Bulletin 113(1): 33-40. (2001)
NAL Call #: 413.8 W692; ISSN: 00435643
Descriptors: coexistence/ habitat use/ interspecific interaction/ passerines/ population density/ Canada/ Abies balsamea/ Betula papyrifera/ Catharus bicknelli/ Catharus ustulatus/ Prunus pensylvanica
Abstract: We studied the use of regenerating clear cuts in the central highlands of New Brunswick by Bicknell's (Catharus bicknelli) and Swainson's (Catharus ustulatus) thrushes during the 1997 breeding season. Bicknell's Thrushes were found at 57 of the 90 points surveyed on six mountains. Swainson's Thrushes occupied 89 of 90 survey points. Bicknell's Thrushes had a lower probability of detection (P = 0.40) than Swainson's Thrushes (P = 0.76). Fixed-radius point counts yielded breeding density estimates for birds on individual mountains ranging from about 3-22 pairs/100 ha (average 16 pairs/100 ha) for Bicknell's Thrushes, and from about 39-69 pairs/100 ha (average 51 pairs/100 ha) for Swainson's Thrushes. White birch (Betula papyrifera), balsam fir (Abies balsamea), and pin cherry (Prunus pensylvanica) were the dominant tree species on regenerating sites. Points occupied by Bicknell's Thrushes tended to be at higher elevations than unoccupied points and to have a greater proportion of white birch stems, a greater number of stems in the 5-10 cm diameter class and a lower diversity of trees and shrubs. No attempt was made to characterize Swainson's Thrush habitat since this species was present at virtually all survey points. We believe that relatively young (average height about 4 m) mixed stands of regeneration with moderate to high stem densities provide important habitat for Bicknell's Thrushes in New Brunswick. Suggestions are made about the direction of future research needed to formulate habitat management and conservation plans for this species.
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866. **Bioassessment of silvicultural impacts in streams and wetlands of the eastern United States.**
Hutchens, J. J.; Batzer, D. P.; and Reese, E.
Water, Air and Soil Pollution 4(1): 37-53. (2004)
NAL Call #: TD172.W36; ISSN: 1567-7230
Descriptors: wetlands/ streams/ bioindicators/ environment management/ forestry/ nature conservation/ environmental policy/ logging/ conservation/ United States, eastern region/ environmental action/ water resources and supplies/ water quality control/ general environmental engineering
Abstract: Bioassessment is a useful tool to determine the impact of logging practices on the biological integrity of streams and wetlands. Measuring biota directly has an intuitive appeal for impact assessment, and biota can be superior indicators to physical or chemical characteristics because they can reflect cumulative impacts over time. Logging can affect stream and wetland biota by increasing sedimentation rates, altering hydrologic, thermal, and chemical regimes, and changing the base of food webs. Biotic impacts of logging on streams compared to wetlands probably differ, and in this paper we review some of those differences. In streams, invertebrates, fishes, amphibians, algae, and macrophytes have been used as indicators of logging impacts. In wetlands, bioassessment is just

beginning to be used, and plants and birds are the most promising indicator taxa. Various best management practices (BMPs) have been developed to reduce the impacts of logging on stream and wetland biota, and we review quantitative studies that have evaluated the efficacy of some of these techniques in streams and wetlands in the eastern United States. Remarkably few studies that address the overall efficacy of BMPs in limiting biotic changes in streams and wetlands after BMP implementation have been published in scientific journals, although some work exists in reports or is unpublished. We review these works, and compile conclusions about BMP efficacy for biota from this body of research.
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867. **Biocomplexity and restoration of biodiversity in temperate coniferous forest: Inducing spatial heterogeneity with variable-density thinning.**
Carey, A. B.
Forestry 76(2): 127-136. (2003); ISSN: 0015752X
Descriptors: biodiversity/ coniferous forest/ forest management/ restoration ecology/ thinning/ United States
Abstract: Single-species conservation and natural reserves seem insufficient for protecting biodiversity to scientists, and conventional forestry seems suspect in sustainability to much of the public. In north-western USA, comparisons of natural and managed coniferous forests support the idea that both single-species conservation and conventional forestry are unlikely to be successful because biocomplexity is more important than individual habitat elements in maintaining the diversity of forest ecosystems and their capacity to produce useful goods and services. Experiments in inducing heterogeneity into forest canopies support the importance of biocomplexity to various biotic communities including soil organisms, vascular plants, fungi, birds, small mammals and vertebrate predators. Holistic management, however, requires a suite of techniques to direct developmental processes to useful trajectories.
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868. **Biotic diversity of Natchez Trace State Forest, western Tennessee.**
Franklin, S. B.; Kupfer, J. A.; Grubaugh, J. W.; and Kennedy, M. L.
Environmental Monitoring and Assessment 93(1-3): 31-54. (2004)
NAL Call #: TD194.E5; ISSN: 01676369
Descriptors: biodiversity/ biological inventory/ eastern deciduous forest/ ecological land types/ forest management/ biodiversity/ ecology/ forestry/ biotic community/ biotic resources/ atmospheric chemistry/ forest inventory/ land type/ birds/ conservation of natural resources/ trees/ Tennessee
Abstract: We carried out a multiple-scale assessment of biotic resources within Natchez Trace State Forest (NTSF) in western Tennessee, focusing on the relation between biotic communities and seven previously developed ecological land types (ELT, based on topography and soils). We wanted to test the functional ability of ELTs for biodiversity stewardship. Woody and herbaceous flora as well as herpetofauna and avifauna communities had substantial differences between upland and lowland forests. However, none of the faunal communities distinguished among upland ELTs. In addition, herbaceous taxa also failed to distinguish upland ELTs. The results suggest the present use of ELTs at NTSF will not be a helpful guide to land stewardship focusing on biodiversity. The disturbance history of the Forest and the mobility of animals are given as potential explanations for a poor relationship between abiotic ELTs and the resident biota. © 2004 Kluwer Academic Publishers.
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869. **Bird communities are affected by amount and dispersion of vegetation retained in mixedwood boreal forest harvest areas.**
Schieck, J.; Stuart-Smith, K.; and Norton, M.
Forest Ecology and Management 126(2): 239-254. (2000)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/S0378-1127(99)00088-2.
Descriptors: bird communities/ harvest/ mixedwood boreal forest/ residual trees/ structured cut-blocks/ avifauna/ boreal forest/ community response/ dispersion
Abstract: We evaluated bird community response to type, amount, and dispersion of trees, snags, and shrubs that were retained at harvest in mixedwood boreal forests of Alberta, Canada. We also evaluated whether the degree of similarity between bird communities in harvest and old-growth areas was related to the type and amount of materials retained at harvest. We combined data from three separate studies to generate a large data set covering a wide range of cut-block structures. Birds were surveyed using point counts and line transects. Residual vegetation was surveyed partially on the ground, and partially from aerial photographs. Bird species commonly associated with parkland and open country habitats had high densities in harvest areas that contained abundant shrubs and few residual trees or snags. Within harvest areas where more trees, particularly large deciduous trees, were retained, and when those trees were retained in clumps, bird communities were more similar to those found in old-growth forests. Thus, by retaining clumps of large trees and snags in harvest areas managers may be able to create habitats that are used by old-growth forest bird species. However, for many forest birds, density was lower in cut-blocks with residual trees and snags than it was in old-growth forest. Results should be interpreted cautiously because survival and reproductive success of forest birds in cut-blocks with residual trees and snags was not determined.
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870. **Bird communities associated with harvested hardwood stands containing residual trees.**
Rodewald, A. D. and Yahner, R. H.
Journal of Wildlife Management 64(4): 924-932. (2000)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: bird community/ clearcutting/ deciduous forest/ even-aged management/ habitat management/ Pennsylvania/ residual trees/ variable retention system/ avifauna/ community structure/ forest management/ habitat structure/ harvesting/ United States/ Molothrus ater/ Vireo olivaceus
Abstract: Retention of residual trees in even-aged harvested stands is an alternative to traditional clearcutting, seed-tree, and shelterwood systems, but little is known about effects of new even-aged retention methods on bird communities. Clearcutting on Pennsylvania state forests recently has been replaced by a new forest-management practice termed even-aged reproduction stands with

reservation guidelines (hereafter, EAR stands), in which high densities of trees in multiple crown and size classes (101 live trees/ha ±28 SE on study sites) of both commercially and non-commercially important tree species are permanently reserved to maintain species and structural diversity. We compared habitat structure and breeding-bird communities between EAR stands (harvested) and reference stands (unharvested) in 2 state forests of Pennsylvania in 1997-98 and related bird abundance within harvested stands to differences in habitat characteristics among EAR stands and the surrounding landscapes. Total abundance of all bird species combined, abundances of early-successional and edge-habitat guilds, and abundances of many early-successional bird species were significantly higher in EAR stands than in reference stands, but abundances of the forest habitat guild and of 8 forest-associated species were lower in EAR stands. Although EAR stands provide suitable habitat for bird species associated with early-successional forests, abundances of species associated with mature forests were lower in EAR stands than in reference stands despite retention of residual trees. However, some species of forest birds (e.g., red-eyed vireos [Vireo olivaceus]), which usually are absent from recent clearcut stands until 12-20 years post-harvest, were often detected in EAR stands. Thus, residual trees in EAR stands provide to forest birds habitat components that are generally lacking in clearcut stands. Because abundances of both forest habitat and forest-canopy nesting guilds declined and abundance of brown-headed cowbirds (Molothrus ater) increased with size of EAR stands (especially when >20 ha), managers should consider limiting the size of EAR stands.
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871. **Bird communities associated with live residual tree patches within cut blocks and burned habitat in mixedwood boreal forests.**
Schieck, Jim and Hobson, Keith A.
Canadian Journal of Forest Research 30(8): 1281-1295. (2000)
NAL Call #: SD13.C35; ISSN: 0045-5067
Descriptors: Aves/ birds/ communities/ density/ ecosystems/ fires-burns/ forestry practices/ forests, boreal/ habitat islands/ habitat management/ wildlife-habitat relationships/ biocenosis/ fire/ Canada/ Alberta
Abstract: By retaining patches of trees in cut blocks, managers expect to retain some forest birds and create bird communities more similar to those found after fires. The authors surveyed birds from a range of patch sizes (1 to >3000 live residual trees), at four ages (2, 15, 30, 60 years), following two disturbance types (harvest, fire) in mixedwood boreal forest. Bird communities varied among patch size, forest ages, and disturbance types. Immediately post-disturbance, bird communities from large patches (>100 residual trees) were more similar to those from old forest than were communities from small patches (<or=10 residual trees). Birds that nest or forage in open or riparian habitats had highest densities in small patches two years post-harvest, whereas birds that nest in large snags had highest densities in small patches two years post-fire. Throughout the chronosequence following both disturbance types, birds from small patches became more similar to those from old forest. Birds that nest and forage in small trees and shrubs were common 15 and 30 years post-disturbance, and generalist forest birds were common 60 years post-disturbance. Birds associated with old forest were present in all patch sizes 15, 30, and 60 years post-disturbance, although larger patches had higher densities of these species.
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872. **Bird community structure across riparian buffer strips of varying width in a coastal temperate forest.**
Shirley, S. M. and Smith, J. N. M.
Biological Conservation 125(4): 475-489. (2005)
NAL Call #: S900.B5; ISSN: 00063207.
Notes: doi: 10.1016/j.biocon.2005.04.011.
Descriptors: bird communities/ habitat loss/ Pacific Northwest/ riparian forests/ species-area relationships/ avifauna/ buffer zone/ community structure/ habitat loss/ riparian forest/ species richness/ British Columbia/ Canada/ North America/ Vancouver Island/ Aves/ riparia
Abstract: Buffer strips are strips of forest retained along streamsides after harvesting to mitigate negative impacts of forestry on aquatic and riparian fauna and water quality. The capacity of riparian buffer strips of old-growth forest to maintain species richness and abundance of natural bird communities was explored in coastal montane forest on Vancouver Island, Canada. Breeding bird communities in buffer strips of varying widths along rivers were compared with controls of equivalent area in uncut old-growth riparian forest to identify shifts in species richness, diversity, abundance and composition. We observed that effects on riparian bird communities were greatest in very narrow buffers with high amounts of edge habitat. Several forest-interior species were found almost exclusively in wider buffers and abundances dropped dramatically between wide (125 m) and medium (41 m) width buffers with replacement by open-edge species in narrow buffers. Species composition of communities in wide buffers were very similar to controls while narrow buffers shared less than half of their species with controls. Species richness and diversity increased in buffers over the three years while remaining constant in controls. Increases in species richness and abundance within buffers were positively correlated with similar increases in the adjacent clearcuts, suggesting that regeneration in clearcuts may facilitate recolonization of forest in remnant buffers. For the forest-interior species found primarily in wide buffers, buffers >100 m may need to be retained.
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873. **Bird-forestry relationships in Canada: Literature review and synthesis of management recommendations.**
Wedeles, C. and Donnelly, M.
NCASI Technical Bulletin (892)(2004); ISSN: 08860882
Descriptors: avian communities/ avian populations/ bird communities/ bird conservation regions/ bird populations/ Canada/ forest age/ forest management/ forest products industry/ forest structure/ forestry practices/ natural disturbance/ timber harvest/ biodiversity/strategic planning/ vegetation/ bird-forestry relationships/ landscape-scale assessments/ natural disturbances/ operational planning/ forestry/ biodiversity/ planing/ plants/ productivity/ Aves
Abstract: The influences of forest management on birds in Canada are described. The existing knowledge on the effects of forest management on birds and bird habitat were also described. The synthesis of management recommendations is expected to provide both broad and

specific suggestions which can be of great use to forest managers in contemplating methods to take bird responses to forest management. The practical aspects of forest management with future research needs are also identified.
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874. **Bird responses to burning and logging in the boreal forest of Canada.**
Hannon, Susan J. and Drapeau, Pierre
Studies in Avian Biology 30: 97-115. (2005)
NAL Call #: QL671.S8; ISSN: 0197-9922.
Notes: Literature review.
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ abiotic factors/ land zones/ Canada/ Aves: forestry/ logging/ habitat management/ burning/ logging/ boreal forest communities/ fire/ Alberta/ Quebec/ Saskatchewan/ Aves/ birds/ chordates/ vertebrates
Abstract: We compared how bird communities differed between burned and logged stands in black spruce (Picea mariana) forests of the boreal shield in Quebec and mixed-wood forests on the boreal plain in Alberta and Saskatchewan. Bird community composition was quite different in burns and clearcuts shortly after disturbance. In burns, cavity nesters and species that forage on beetles in dead trees predominated, whereas clearcuts were dominated by open-country species. Generally, snag-dependent species decreased and shrub-breeding species increased by 25 yr postfire. Species that forage and nest in canopy trees were more common 25 yr post-logging because of the retention of live residual trees. The bird communities tended to converge over time as the vegetation in burns and logged areas became more similar. Black-backed Woodpeckers (Picoides arcticus) and Three-toed Woodpeckers (Picoides tridactylus) exploit recently burned coniferous forest to forage on wood-boring insect larvae (Cerambycidae and Buprestidae) and bark beetle larvae (Scolytidae) for a short period after fire and then decline. Black-backs were absent from mature forests and found at low density in old-growth forest. Over the long term, burns may be temporary sources for fire specialists. The major conservation issue for fire- associated species is salvage logging, because woodpecker foraging and nesting trees are removed. Maintenance of suitable amounts of postfire forests spared from salvage logging is essential for sustainable forest management. Climate change is predicted to alter fire cycles: they will be shorter in the prairies leading to a shortage of old-growth forest and will be longer in Quebec leading to a shortage of younger forest.
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875. **Bird species diversity and nesting success in mature, clearcut and shelterwood forest in northern New Hampshire, USA.**
King, David I. and DeGraaf, Richard M.
Forest Ecology and Management 129(1/3): 227-235. (2000)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: Aves/ artificial structures/ birds/ communities/ ecosystems/ forestry practices/ forests/ habitat alterations/ habitat management/ nest predation/ productivity/ species diversity/ wildlife/ wildlife-habitat relationships/ fauna/ diversity/ abundance/ mortality/ nest/ New Hampshire, northern/ New Hampshire: White Mountain National Forest
Abstract: Bird species distribution and predation rates on natural and artificial nests were compared among unmanaged mature, shelterwood, and clearcut northern hardwoods forest to evaluate the effect of these practices on bird populations. Twenty-three of the 48 bird species detected during the study differed significantly in abundance among unmanaged mature forest, shelterwoods, and clearcuts. Results of multiple regressions of bird abundance and habitat variables suggest that differences in bird species distribution among treatments were the result of differences in habitat structure among treatments. Bird species diversity and species richness were significantly higher in shelterwoods than either mature forest of clearcuts, although there were bird species that occurred exclusively, or nearly so, in each of the three treatments. Predation rates on artificial nests were lowest in mature forest, and predation rates on natural nests was highest in mature forest, although neither of these differences was statistically significant. The authors conclude that use of partial cutting exclusively would result in the decline of several species of mature forest and clearcut specialists, and, consequently, a decrease in species diversity at the landscape scale. The use of a variety of silvicultural techniques is recommended to maintain bird species diversity in forested landscapes.
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876. **Bird use of forest structural classes in grand fir forests of the Blue Mountains, Oregon.**
Sallabanks, Rex; Riggs, Robert A.; and Cobb, Lynda E.
Forest Science 48(2): 311-321. (2002)
NAL Call #: 99.8 F7632; ISSN: 0015-749X
Descriptors: Sialia currucoides/ Troglodytes aedon/ Passeriformes/ forestry practices/ habitat alterations/ terrestrial ecology/ cluster analysis/ forest structural classes/ Blue mountains/ ecosystems/ habitat management/ habitat use/ Oregon/ wildlife-human relationships/ commercial enterprises/ wildlife management/ disturbances/ land zones/ mountain bluebird/ house wren
Abstract: We sampled breeding birds in 83 stands in the Blue Mountains, northeastern Oregon, 1994-1996, to describe bird use of forest structural classes in grand fir (Abies grandis) forests. We classified stands, based on basal area in different tree-size categories, into six forest structural classes: (1) stand initiation (SI); (2) stem exclusion, open canopy (SEOC); (3) stem exclusion, closed canopy (SECC); (4) understory reinitiation (UR); (5) young forest, multistory (YFMS); and (6) old forest, multistory (OFMS). Most species were detected in all structural classes, but slightly more than one-third of species analyzed (13 of 38) differed in abundance among structural classes ($P < 0.004$). Cluster analysis, based on structural attributes measured in each stand and weighted by avian abundance, grouped birds with similar habitat associations and allowed us to identify "non-SI associates," "SI associates," "structural class generalists," and "mature forest associates." We did not identify any species that could be considered strictly "OFMS associates." With the exception of some SI associates, such as the mountain bluebird (Sialia currucoides) and house wren (Troglodytes aedon), we found little evidence of structural class specialization by birds. In grand fir forests of the Blue Mountains, ecologists and managers should focus on understanding how specific silvicultural prescriptions influence structural attributes that are correlated with avian abundance, rather than on stand age per se.
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877. **Birds of upland oak forests in the Arkansas Ozarks: Present community structure and potential impacts of burning, borers, and forestry practices.**
Smith, Kimberly G.; Mlodinow, Michael; Self, Janet S.; Haggerty, Thomas M.; and Hocut, Tamara R.
In: Proceedings of the Upland Oak Ecology Symposium: History, Current Conditions, and Sustainability, General Technical Report-SRS 73/ Spetich, M.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2004. pp. 243-252.
http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs073/gtr_srs073.pdf
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Aves: forestry/ Impact on community structure in upland oak forest/ habitat management/ burning of upland oak forest/ Impact on community structure/ community structure/ influencing factors/ forest and woodland/ upland oak forest/ fire/ Arkansas/ Ozark region/ community structure in upland oak forest/ Aves/ birds/ chordates/ vertebrates
Abstract: Based on published works, our own research, and the U.S. Forest Service's R8 Bird database, we characterize breeding bird communities in mesic and xeric upland hardwood forests of the Arkansas Ozarks. Although 59 species have been recorded as breeding, typical breeding assemblages in mesic forests are 20-25 species, with only 5 species commonly found in xeric forests. Due to changes in forest composition, the breeding assemblages of today were probably rare or absent from the Ozarks 150 years ago. Any forestry practice that opens the closed canopy increases the number of species in upland hardwood forests. Development of a shrub-layer allows a difference suite of birds to occupy the forest, which typically would be unsuitable habitat for them. Relatively few birds occur in upland forest in fall migration and especially winter, but many migrants use this habitat in spring. The recent decline in oaks due to the borer infestation may dramatically change the avifauna of this upland habitat. Prescribed burning in deciduous forests may also have positive and negative effects, which need further investigation. Cowbirds do not occur in upland forests, and their spread should be limited by the lack of feeding sites.
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878. **Black bear home-range sizes in Washington: Climatic, vegetative, and social influences.**
Koehler, Gary M. and Pierce, D. John
Journal of Mammalogy 84(1): 81-91. (2003)
NAL Call #: 410 J823; ISSN: 0022-2372
Descriptors: Ursus americanus/ Ursidae/ Euarctos americanus/ American black bear/ wildlife-habitat relationships/ classification by gender/ home-range size/ private land/ public land/ browse plants/ age-sex relationships/ habitat management/ forage availability/ land management/ social behavior/ habitat use/ aerial census/ North America/ adaptive kernels/ forest practices/ vegetative conditions/ land zones/ cover types/ error polygons/ precipitation/ climate/ female/ male/ Washington, USA/ utilization/ rain/ shrubs/ reproduction/ ecosystems/ silviculture/ cover/ food/ telemetry/ trees/ forests
Abstract: We evaluated size of home ranges for male and female black bears (Ursus americanus) at 3 study sites in Washington to determine whether home-range sizes differed between sexes, study sites, and objectives of forest management. Vegetative conditions differed among study sites as a result of differences in mean annual precipitation (52, 200, and 380 cm/year) and forest management practices. We analyzed ranked proportions of forest-cover types within error polygons for telemetry locations as measures of use, interspersion, and juxtaposition of cover types and compared these with ranks of cover types available within composite home ranges for all bears in each study site and with those available within adaptive-kernel home ranges for individual bears. Fixed-kernel estimates of home ranges for males were 3.8 times larger than those for females. Home-range size for females differed (P=0.04) between study sites but home-range size for males did not (P=0.79). In the study site with intensively managed and relatively undisturbed forestlands, home ranges for females were of similar size. Males and females occupied cover types different from that available within study sites and within individual home ranges. Differences among study sites for home-range sizes for females may be-correlated to differences in available forage plants and cover, which may be explained by differences in annual precipitation. Behavioral differences for males and females, too, may explain differential use of forest-cover types. Hence, differences in home-range sizes between males and females and among regions may result, in part, from climatic and vegetative conditions, as well as from social status.
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879. **Black-throated blue warbler and veery abundance in relation to understory composition in northern Michigan forests.**
Kearns, Laura J.; Silverman, Emily D.; and Hall, Kimberly R.
Wilson Journal of Ornithology 118(4): 461-470. (2006)
NAL Call #: QL671.W55 ; ISSN: 1559-4491
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Catharus fuscescens/ Dendroica caerulescens: habitat management/ Hardwood forests/ population dynamics/ forest and woodland/ relations with understory composition/ implications for habitat management/ Michigan/ Mackinac County/ Hiawatha National Forest/ Aves, Passeriformes, Parulidae/ birds/ chordates/ vertebrates
Abstract: Balsam fir (Abies balsamea) understory may be an important predictor of Black-throated Blue Warbler (Dendroica caerulescens) and Veery (Catharus fuscescens) distributions in northern hardwood forests that are heavily browsed by white-tailed deer (Odocoileus virginianus). We examined the abundance and age ratios of Black-throated Blue Warblers, and the abundance of Veerys, in 16 plots of hardwood forest with different understory composition within a heavily browsed region of the Hiawatha National Forest in Michigan's eastern Upper Peninsula. Four of these 36-ha plots had minimal understory and 12 had dense understory with variable amounts of balsam fir. Black-throated Blue Warbler abundance was significantly greater in plots with an average of 27% balsam fir understory cover than in plots dominated by deciduous understory; no Black-throated Blue Warblers were detected on the minimal understory plots. Age ratios did not differ significantly relative to balsam fir understory density. Veery abundance also did not vary with balsam fir understory density, but it increased with overall understory density. In forests such as these, where deer are abundant but rarely browse balsam fir,

active management of balsam fir understory could provide key habitat for sustaining populations of Black-throated Blue Warblers and Veerys. We recommend that managers consider the presence of balsam firs in the understory when planning forest harvests in deer-impacted areas, so that they leave some balsam fir and stagger the cutting of stands with balsam fir over time to create and maintain heterogeneous understory structure.
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880. **Boreal bird community response to jack pine forest succession.**
Venier, Lisa A. and Pearce, Jennie L.
Forest Ecology and Management 217(1): 19-36. (2005)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: Passeriformes/ Aves/ age ratio/ biodiversity/ bird community response/ breeding season/ Canada/ communities/ distribution/ habitat use/ forests/ ecosystems/ forest succession/ forestry practices/ habitat alterations/ habitat availability/ land zones/ North America/ White River vicinity/ Ontario/ density/ population ecology/ species composition/ succession/ birds/ Biocenosis/ fauna/ diversity/ habitat/ abundance/ dispersion/ ecological requirements/ habitat management
Abstract: The objective of this study was to examine bird communities in regenerating (5-25 years) and mature (40-100 years) jack pine (Pinus banksiana) forest in boreal Ontario. The study area was located near White River in north central Ontario with an area of 187,800 ha. We explored the response of bird community structure to stand age, and the influence of stand age on the distribution of individual species. We were interested in two principal questions. The first was how unique are the bird communities to specific age classes. If bird communities are highly specific to age classes then alterations to the age class distribution of the forest can have important impacts on the overall bird community composition and structure. The second question was how specific are individual species to age classes. Species that are highly specific to a single age class are expected to be highly sensitive to the amount and potentially the configuration of that age class on the landscape. We sampled birds for three breeding seasons. The number of bird species increased with stand age. Tree species composition did not change as stands aged, but there were distinctive changes in vegetation structure through succession. For example, the total amount of vertical vegetation structure increased significantly with age. More than half of the bird species examined were significant indicators of individual age classes. Blue-headed vireo, brown creeper, black-throated green warbler, golden-crowned kinglet, ovenbird and red-breasted nuthatch were all significant indicators of the mature age class. The bird assemblage of mature stands was significantly different from that of regenerating forest and within regenerating forest, 3-5-year-old stands contained a significantly different bird assemblage to that of 8-25-year-old regenerating forest. These results suggest that the distribution of forest age classes on the landscape is a critical element in determining habitat availability and therefore the viability of boreal bird populations in managed forests. © 2005 Elsevier B.V. All rights reserved.
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881. **Bottomland hardwood reforestation for neotropical migratory birds: Are we missing the forest for the trees?**
Twedt, Daniel J. and Portwood, Jeff
Wildlife Society Bulletin 25(3): 647-652. (1997)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: behavior/ birds/ bottomlands/ ecosystems/ forestry practices/ forests, deciduous/ habitat management/ habitat use/ management/ migration/ succession/ wildlife/ bottomland forests/ afforestation/ wild birds/ natural resources/ forest practices/ forests/ growth/ habitat management for wildlife/ hardwoods/ land, private/ oak/ plant succession/ planting/ rehabilitation/ seeding/ species diversity/ wildlife management/ neotropical migrant
Abstract: The authors identify the benefits derived by land managers and wildlife resources when fast-growing trees, such as cottonwood or sycamore, alone or mixed with oaks, are established on lands under cultivation. Reforestation with fast-growing species promotes rapid colonization of sites by forest-breeding neotropical migrants. The authors recommend silvicultural practices to promote succession from the fast-growing trees to forests dominated by heavy-seeded, slow-growing species. klf.
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882. **Breeding and post-breeding habitat use by forest migrant songbirds in the Missouri Ozarks.**
Pagen, R. W.; Thompson, F. R.; and Burhans, D. E.
Condor 102(4): 738-747. (2000)
NAL Call #: QL671.C6; ISSN: 00105422
Descriptors: early-successional/ habitat use/ Missouri Ozarks/ post-breeding/ songbirds
Abstract: We compared habitat use by forest migrant songbirds during the breeding and post-breeding periods in four Missouri Ozark habitats: mature upland forest, mature riparian forest, 9- to 10-year-old upland forest, and 3- to 4-year-old upland forest created by clearcutting. Adult forest-ground species showed a decrease in abundance in all habitats during the post-breeding period, but hatching-year birds of one of the two forest-ground species were most abundant in early-successional forest during this time. Adults of the two forestcanopy species tended to increase in abundance in 3- to 4-year-old forest from breeding season to post-breeding season. During the breeding season, some forest species were detected with mist-nets in the two early-successional habitats, but infrequently or not at all with point counts in those habitats. Forest birds captured in early-successional habitats during the breeding season may have been nonbreeding floaters, or may have been foraging there from nearby territories in mature forest. Dense shrubs or young trees in early-successional forest may provide habitat for nonbreeding and post-breeding forest migrant songbirds in the Missouri Ozarks.
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883. **Breeding biology of the yellow-billed cuckoo relative to timber harvest in a bottomland hardwood forest.**
Wilson, Jennifer Karen. University of Georgia, 2000.
Notes: Advisor: Chapman, Brian R.
Descriptors: forestry/ thinning/ birds/ yellow-billed cuckoo/ habitat management/ nesting success/ breeding/ bottomland hardwood forests

Abstract: I studied the breeding biology of the Yellow-billed Cuckoo in relation to thinning cuts and patch cuts at White River National Wildlife Refuge, from 1994-1997. Nesting success, basic nesting ecology, nest-site selection, and nest-patch selection were compared between harvested study plots and control plots before and after harvest. Yellow-billed Cuckoos were observed nesting from April-August each year. No time or treatment effect on mean clutch size was detected. Predation accounted for the majority of nest failures observed. Nests constructed on thinned plots had a lower survival probability than nests built prior to harvest. Nesting success increased within the breeding season. Unsuccessful nests located on thinned plots also had a lower mean nest height than did successful nests, suggesting that higher nests had a better survival probability. Nests of this species were located in forest tree gaps in various successional stages. I found no evidence of timber harvest or nesting outcome influencing patch characteristics. These results suggest that the thinning treatment used did impact the ability of the Yellow-billed Cuckoo to successfully breed on the refuge. Since the results reported come from a single study site, and the study was not replicated over space and time, I cannot state that the manipulations studied similarly affect the breeding biology of this species throughout its range.
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884. **Breeding bird response to riparian buffer width in managed Pacific Northwest Douglas-fir forests.**
Pearson, S. F. and Manuwal, D. A.
Ecological Applications 11(3): 840-853. (2001)
NAL Call #: QH540.E23 ; ISSN: 10510761
Descriptors: American robin/ bird species richness/ black-throated gray warbler/ breeding bird density/ Douglas-fir forest/ Pacific-slope flycatcher/ riparian bird community/ riparian buffer width/ riparian forest management/ species turnover/ winter wren/ breeding population/ community response/ forest management/ habitat selection/ riparian forest/ United States/ Alnus rubra/ Bombycilla cedrorum/ Certhia americana/ Dendroica nigrescens/ Empidonax difficilis/ Junco hyemalis/ Melospiza melodia/ Regulus satrapa/ Rubus spectabilis/ Troglodytes troglodytes/ Turdus migratorius
Abstract: We examined the relative importance of riparian vs. upland habitats to breeding birds by comparing species abundance, richness, and similarity of bird communities in managed Douglas-fir forests in western Washington State, USA. We also examined whether forested buffer strips along second- and third-order streams effectively maintain the pre-logging riparian breeding bird community by comparing species abundance, richness, and turnover among three treatments: (1) unharvested controls; (2) sites that were clear-cut, leaving a narrow (~14 m) forested buffer on both sides of the stream; and (3) sites that were clear-cut, leaving a wide (~31 m) forested buffer along both sides of the stream. Deciduous trees, berry-producing shrubs, and other deciduous shrubs less common in adjacent upland forest characterized streamside zones. Despite different vegetation features, riparian and upland habitats did not differ in any measures of bird species richness and composition. No species or species group was more abundant in the upland. Neotropical migrants, resident species, and species associated with deciduous trees and shrubs in forested habitats were more abundant in riparian habitats than in adjacent uplands. Total bird abundance and abundance of four species (American Robin [Turdus migratorius], Pacific-slope Flycatcher [Empidonax difficilis], Black-throated Gray Warbler [Dendroica nigrescens], and Winter Wren [Troglodytes troglodytes]) were higher in riparian habitats. Abundance of these riparian associates was correlated with percent cover of berry-producing shrubs and the number of deciduous trees in the canopy. We found that the number of breeding bird species on sites with narrow buffers increased from slightly fewer than controls before harvest to an average of 10 more species than controls after harvest, a change reflected in an average 20% increase in species turnover on narrow-buffer sites relative to controls. Total bird abundance did not differ between treatments and controls. Resident species, those species associated with shrubs in forested habitats and conifer trees, declined on both buffer treatments. Species associated with upland and riparian forests (Black-throated Gray Warbler, Golden-crowned Kinglet [Regulus satrapa], and Brown Creeper [Certhia americana]) decreased in abundance on riparian buffer treatments relative to controls, whereas species associated with open, shrubby habitats (Dark-eyed Junco [Junco hyemalis], Cedar Waxwing [Bombycilla cedrorum], and Song Sparrow [Melospiza melodia]) increased in abundance on one or both riparian buffer treatments. High species turnover on narrow-buffer treatments indicated that buffers <14 m on each side of the stream did not maintain the pre-logging bird community. There was little difference in species turnover or species richness between the wide-buffer treatment and the control, indicating that a 30-m buffer on both sides of second-order and third-order streams maintains most of the pre-logging bird community in the first two years postharvest. The Black-throated Gray Warbler was the only riparian associate to decline on both the narrow- and wide-buffer treatments; its abundance was positively correlated with buffer width, and a buffer ≥ 45 m wide on each side of second- and third-order streams was needed to support populations at densities found on unharvested controls. To maintain the entire breeding bird community associated with forested riparian habitats in the coastal Northwest, we recommend a minimum buffer of 45 m along both sides of second- and third-order streams. Habitat features such as deciduous trees (Alnus rubra and Acer macrophyllum) and berry-producing shrubs (especially Rubus spectabilis) appear to be important and should be maintained within forested riparian buffer strips. This study documents short-term effects of riparian treatments on the breeding bird community, which may take several years to respond to habitat manipulations. Thus, we recommend continued monitoring to assess long-term effects of buffer width reduction.
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885. **Breeding bird response to riparian forest harvest and harvest equipment.**
JoAnn Hanowski, J.; Danz, N.; Lind, J.; and Niemi, G.
Forest Ecology and Management 174(1-3): 315-328. (2003)
NAL Call #: SD1.F73
Descriptors: breeding bird communities/ buffers/ Cut-to-length/ forest/ harvest/ Minnesota/ riparian/ Principle response curves/ streams/ buffers
Abstract: We examined response of breeding bird communities to timber harvest in riparian areas using two harvest techniques (full tree harvest and cut-to-length (CTL)) along first to third order streams in northern

Minnesota, USA. Although many studies have quantified bird response to riparian buffer harvest, we are unaware of any study that examined the response of breeding birds to riparian forest harvest using different cutting practices. We compared community composition, total abundance and species richness, as well as abundance of six individual species on plots within four treatments (three plots/treatment) completed within 30 m on both sides of the stream. Treatments in the riparian area (30 m on both sides of the stream) were: (1) riparian control (no harvest); (2) reduction of basal area to an average of 7-10 m^2/ha with full tree harvest system; (3) reduction of basal area to an average of 7-10 m^2/ha with CTL harvest system; and (4) control (no harvest in riparian area or upland). For treatments 1, 2, and 3, adjacent upland forests on the plots were clearcut. Bird surveys were completed 1 year prior to, and 3 years after harvest and revealed a significant response of the bird community to timber harvest in the riparian area. Bird communities were most affected by tree removal with both harvest methods, but harvest type also affected bird communities. Early-successional species, e.g. song sparrow (Melospiza melodia), white-throated sparrow (Zonotrichia albicollis), mourning warbler (Oporornis philadelphia), and chestnut-sided warbler (Dendroica pensylvanica) were associated with harvested plots, whereas forest species, e.g. scarlet tanager (Piranga olivacea) and black-throated green warbler (Dendroica virens) were associated with riparian control and control plots. Of six individual species tested for response to riparian harvest treatment over time, only the ovenbird (Seiurus aurocapillus) showed a significant time by treatment interaction. Ovenbird numbers decreased in both the CTL and full tree harvest plots through 2000, when no individuals were observed. Two other forest-dependent species, black-throated green warbler and hermit thrush (Catharus guttatus), showed similar responses to treatment as the ovenbird. The winter wren (Troglodytes troglodytes) responded positively to the greater amount of slash that was left on-plot with the CTL harvest system. However, with the exception of the winter wren, we found that bird species and communities did not differ in their response to harvest system.

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886. **Breeding birds in forestry plantations and natural forest in the vicinity of Fundy National Park, New Brunswick.**

Johnson, G. A. M. and Freedman, B.
Canadian Field Naturalist 116(3): 475-487. (2002)
NAL Call #: 410.9 Ot8 ; ISSN: 00083550
Descriptors: breeding birds/ forestry/ Fundy National Park/ monitoring/ New Brunswick/ plantations/ abundance/ avifauna/ breeding population/ community composition/ plantation/ species diversity/ Canada

Abstract: We studied the populations of breeding birds in five reference stands of natural mixedwood forest and 11 conifer plantations up to 21-years old in southern New Brunswick, Canada. Variations of the distribution and abundance of birds were related to changes in the plant-species composition and structural attributes of their habitat. Bird species occurred in plantations in levels of abundance and diversity similar to that of reference forest, although community composition was highly dissimilar. Species of reference stands were typical of mature, mixedwood forest. Species of younger plantations were typical of open, early successional, upland habitats. Once the plantations became older than 13 years and the tree height exceeded about 5 m, birds typical of conifer forest began to invade the habitat, resulting in a mixed-species composition. Although cavity-containing snags were rare in the plantations, if they did occur in them or near their edge they were used by hole-nesting birds. Although we could not study a complete rotation, the field data and habitat trajectory suggest that the plantations will not support some elements of the avian biodiversity of the natural forest in the study area. The mature plantations will be highly depauperate in coarse-woody debris, snags, and cavities, and will not support species dependent on these critical habitat elements. In addition, birds requiring habitat containing trees of larger size and of various species, including hardwoods, will not find the mature plantations to be suitable. To accommodate the needs of species potentially at risk from the extensive development of plantations, the following changes in forestry management practices should be instituted: (1) retention of natural cavity-trees, snags, coarse-woody debris, and hardwood trees and shrubs in residual non-harvested "islands" within clear-cuts and plantations; (b) retention of a patchy angiosperm component by leaving some areas untreated during herbicide applications; and (c) setting aside large areas of natural forest as non-harvested protected areas. Although we believe that these mitigations would help sustain elements of indigenous biodiversity that are at risk in an extensive industrial forest, we stress that these predictions would have to be tested through additional research and monitoring.

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887. **Breeding birds in riparian and upland dry forests of the Cascade Range.**

Lehmkuhl, John F.; Burger, E. Dorsey; Drew, Emily K.; Lindsey, John P.; Haggard, Maryellen; and Woodruff, Kent Z.
Journal of Wildlife Management 71(8): 2632-2643. (Nov. 2007)
NAL Call #: 410 J827
Descriptors: birds/ breeding/ wildlife habitat/ forest management/ upland dry forests/ upland mesic forests/ riparian forests/ Cascade Range/ Washington

Abstract: We quantified breeding bird abundance, diversity, and indicator species in riparian and upland dry forests along 6 third- to fourth-order streams on the east slope of the Cascade Range, Washington, USA. Upland dry forest on southerly aspects was dominated by open ponderosa pine (Pinus ponderosa) and dry Douglas-fir (Pseudotsuga menziesii) plant associations. Upland mesic forest on northerly aspects was dominated by closed-canopy Douglas-fir or dry grand fir (Abies grandis) plant associations. Riparian overstory vegetation was dominated by black cottonwood (Populus trichocarpa) plant associations with a prominent hardwood tree and shrub component. We quantified bird assemblages, diversity, and abundance from parallel point transects on riparian and adjacent dry and mesic upslope forests. We detected 80 bird species from >12,000 point-transect observations during 1998–1999. Eighteen species accounted for 75% of all detections. Species richness and evenness were similar in all 3 forest types, with approximately 35 species and high evenness (0.85) in each forest type. Bird species assemblages differed among dry, mesic, and riparian forest

types, with the greatest differences between riparian and both dry and mesic upland forests. Riparian forest had the greatest number (9) of strong characteristic, or indictor, species among the 3 forest types. Upland mesic forest was characterized by 7 indicator species. Upland dry forest had 4 indicator species. Our results indicate that current standards and guidelines for riparian buffers zones would allow for avian refuge and corridor functions along these streams. Forest managers could use our indicator species to predict and monitor shifts in upland forest species composition from thinning and prescribed burning practices that are used to reduce fuels in uplands and to reduce continuity of fire effects between riparian and upland zones.
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888. **Breeding birds of even- and uneven-aged pine forests of eastern Texas.**
Thill, R. E. and Koerth, N. E.
Southeastern Naturalist 4(1): 153-176. (2005)
NAL Call #: IPSP11706 ; ISSN: 15287092
Descriptors: pine forests/ forest management/ thinning/ breeding/ birds/ Texas
Abstract: While single-tree selection, uneven-aged management is being used increasingly on southern national forests as an alternative to clearcutting and planting of pine, its effects on wildlife are largely unknown. We compared breeding season bird abundance, species richness, diversity, and composition among uneven-aged stands and six serai stages of even-aged stands in upland pine (predominantly loblolly pine, Pinus taeda Linnaeus) forests of eastern Texas. Even-aged stands 18-80 years old generally had the lowest abundance, richness, and diversity of birds; uneven-aged stands and even-aged stands 1-9 years old generally had comparable values for all three of these measures. Numbers of migrants were highest in seedling, sapling, and pre-commercially thinned even-aged stands. Although many migrants were encountered in uneven-aged stands, their frequencies of occurrence there (even in the most recently harvested stands) were generally less than in early sere even-aged stands. While overall bird abundance, species richness, and diversity under single-tree selection may be comparable or higher than that found throughout most of a typical national forest even-aged rotation, our data suggest that single-tree selection management will not provide suitable habitat for many migrant species that require early succession conditions.
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889. **Breeding songbird abundance related to secondary succession in the subarctic forests of western Labrador.**
Schwab, F. E.; Simon, N. P. P.; and Carroll, C. G.
Ecoscience 8(1): 1-7. (2001)
NAL Call #: QH540.E366; ISSN: 11956860
Descriptors: fire/ Labrador/ secondary succession/ snags/ songbirds/ subarctic forest/ abundance/ breeding population/ disturbance/ forest fire/ secondary succession/ snag/ songbirds/ Canada/ Betula papyrifera
Abstract: To describe the effects of natural disturbance on birds in western Labrador, we mapped songbird territories in fourteen 10-ha plots originating by natural fire. Plots were 2, 18, 40, < 70 (young conifer) and > 135 years old (mature conifer and mature white birch. Betula papyrifera, forests). Three species, dark-eyed junco, white-throated sparrow and ruby-crowned kinglet, accounted for 50% of all bird records. Bird density and species richness peaked in 2-year-old burns and mature forest stages. High bird densities in 2-year-old burns were likely due to high snag densities. Most species were not unique to a particular age since disturbance, but there were different species in early, <40-year-old burns, and later stages. Some birds such as yellow-billied flycatcher and Swainson's thrush were exclusive to white birch forests, a rare forest type in western Labrador.
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890. **Bridging native and scientific observations of snowshoe hare habitat restoration after clearcutting to set wildlife habitat management guidelines on Waswanipi Cree land.**
Jacqmain, H.; Belanger, L.; Hilton, S.; and Bouthillier, L.
Canadian Journal of Forest Research 37(3): 530-539.(Mar. 2007)
NAL Call #: SD13.C35
Descriptors: habitat management/ snowshoe hare/ forest management/ tribal peoples/ Quebec/ Canada
Abstract: Large-scale timber harvesting in the northern black spruce forest, on Quebec Cree territory, causes immediate loss of productive wildlife habitat for Cree hunters. Duration of this impact is key information to improve forest management. The objective here was to examine the postharvesting habitat restoration delay for snowshoe hare, a species valuable to Cree hunters, as well as a wildlife indicator of the sapling stage. A minimum threshold for vegetation development was established, at which the return of hare populations is considered acceptable by Cree hunters. To do so, an adaptive approach was used, combining Cree hunter knowledge and biological assessment. Hare populations were monitored in 36 cut blocks, ranging from 0 to 30 years after harvest. Cree hunters were interviewed to determine when a cut block becomes adequate for snaring. The combined analysis of the two knowledge sources indicated that stands that meet the threshold average 4 m in height, 6300 trees/ha in density, and are aged between 13 and 27 years. Current regulation sets this threshold at 3 m in height, regardless of cut block scale, and at 20 years postcut when considering family hunting ground scale, and thus, does not fully meet sustainable resource development objectives. This citation is from AGRICOLA.

891. **Burning for wild turkey.**
Speake, D.
Forest Landowner 62(1): 28-29. (2003)
NAL Call #: SD144.A15F67; ISSN: 10879110
Descriptors: combustion/ competition/ cost effectiveness/ vegetation/ habitat management/ forestry
Abstract: The use of burning as a tool for control of vegetation for food and cover is discussed. It is a cost-effective, natural force that plants and animals are adapted to and it can be used over large areas in a short period of time. The use of controlled burning along with other habitat controls to manage the wild turkey habitats was also discussed.
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892. **Burrow availability and desiccation risk of mole salamanders (Ambystoma talpoideum) in harvested versus unharvested forest stands.**
Rothermel, B. B. and Luhring, T. M.
Journal of Herpetology 39(4): 619-626. (2005)
NAL Call #: QL640.J6; ISSN: 00221511.
Notes: doi: 10.1670/251-04A.1.
Descriptors: Ambystoma/ Ambystoma talpoideum/ Ambystomatidae/ Amphibia/ Amphiuma means/ Caudata/ Pinus taeda
Abstract: Clearcutting and other forest management practices that remove canopy and disturb ground cover may exacerbate the risk of desiccation, particularly for newly metamorphosed amphibians. We examined dehydration rates of juvenile Mole Salamanders (Ambystoma talpoideum) in relation to burrow availability in four experimental forest management treatments. Juvenile salamanders (N = 41) were confined to small enclosures in four treatments representing a range of habitat disturbance: clearcut with coarse woody debris (CWD) removed; clearcut with CWD retained; thinning; and an unharvested control of second-growth, mature loblolly pine. Half of the salamanders in each habitat treatment were provided with artificial burrows. Water loss over 72 h was significantly higher in the clearcut with CWD retained than in the other three treatments. Most water loss occurred during the first two nights, when salamanders may have been most active. Only 40% of salamanders without burrows survived in the clearcuts, versus 90% in the thinned stand and 100% in the control. Ninety percent of the salamanders with access to a burrow survived in the clearcuts versus 100% in the thinning and control. We found no correlation between soil moisture and water loss and attribute higher desiccation rates in the clearcuts to high temperatures (> 44°C). Although habitat changes resulting from thinning did not lead to increased desiccation, complete canopy removal greatly increased risk of mortality caused by desiccation. Our results also demonstrate that this risk is strongly mediated by the availability of burrows. © 2005 Society for the Study of Amphibians and Reptiles.
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893. **Canada lynx (Lynx canadensis) habitat and forest succession in northern Maine, USA.**
Hoving, C. L.; Harrison, D. J.; Krohn, W. B.; Jakubas, W. J.; and McCollough, M. A.
Wildlife Biology 10(4): 285-294. (2004)
NAL Call #: SK351.W663; ISSN: 09096396
Descriptors: Akaike's information criterion/ AIC/ habitat/ Lepus americanus/ Lynx canadensis/ Maine/ model/ regeneration/ succession/ lynx/ Lynx lynx
Abstract: The contiguous United States population of Canada lynx, Lynx canadensis, was listed as threatened in 2000. The long-term viability of lynx populations at the southern edge of their geographic range has been hypothesized to be dependent on old growth forests; however, lynx are a specialist predator on snowshoe hare Lepus americanus, a species associated with early-successional forests. To quantify the effects of succession and forest management on landscape-scale (100 km^2) patterns of habitat occupancy by lynx, we compared landscape attributes in northern Maine, USA, where lynx had been detected on snow track surveys to landscape attributes where surveys had been conducted, but lynx tracks had not been detected. Models were constructed a priori and compared using logistic regression and Akaike's Information Criterion (AIC), which quantitatively balances data fit and parsimony. In the models with the lowest (i.e. best) AIC, lynx were more likely to occur in landscapes with much regenerating forest, and less likely to occur in landscapes with much recent clearcut, partial harvest and forested wetland. Lynx were not associated positively or negatively with mature coniferous forest. A probabilistic map of the model indicated a patchy distribution of lynx habitat in northern Maine. According to an additional survey of the study area for lynx tracks during the winter of 2003, the model correctly classified 63.5% of the lynx occurrences and absences. Lynx were more closely associated with young forests than mature forests; however, old-growth forests were functionally absent from the landscape. Lynx habitat could be reduced in northern Maine, given recent trends in forest management practices. Harvest strategies have shifted from clearcutting to partial harvesting. If this trend continues, future landscapes will shift away from extensive regenerating forests and toward landscapes dominated by pole-sized and larger stands. Because Maine presently supports the only verified populations of this federally threatened species in the eastern United States, changes in forest management practices could affect recovery efforts throughout that region.
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894. **A case for using plethodontid salamanders for monitoring biodiversity and ecosystem integrity of North American forests.**
Welsh, H. H. and Droege, S.
Conservation Biology 15(3): 558-569. (2001)
NAL Call #: QH75.A1C5; ISSN: 0888-8892.
Notes: Literature review.
Descriptors: biodiversity/ canopy/ ecosystems/ forest health/ forests/ microclimate/ microhabitats/ monitoring/ small mammals/ Amphibia/ birds/ Caudata/ Lepidoptera/ North America/ vertebrates/ Chordata/ animals/ insects/ arthropods/ invertebrates
Abstract: Terrestrial salamanders of the family Plethodontidae have unique attributes that make them excellent indicators of biodiversity and ecosystem integrity in forested habitats. Their longevity, small territory size, site fidelity, sensitivity to natural and anthropogenic perturbations, tendency to occur in high densities, and low sampling costs mean that counts of plethodontid salamanders provide numerous advantages over counts of other North American forest organisms for indicating environmental change. Furthermore, they are tightly linked physiologically to microclimatic and successional processes that influence the distribution and abundance of numerous other hydrophilic but difficult-to-study forest-dwelling plants and animals. Ecosystem processes such as moisture cycling, food-web dynamics, and succession, with their related structural and microclimatic variability, all affect forest biodiversity and have been shown to affect salamander populations as well. We determined the variab ility associated with sampling for plethodontid salamanders by estimating the coefficient of variation from available time-series data. The median coefficient of variation indicated that variation in counts of individuals among studies was much lower in plethodontids (27%) than in lepidoptera (93%), passerine birds (57%), small mammals (69%), or other amphibians (37-46%), which means

plethodontid salamanders provide an important statistical advantage over other species for monitoring long-term forest health.
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895. **Cattle grazing in a national forest greatly reduces nesting success in a ground-nesting sparrow.**
Walsberg, Glenn E.
Condor 107(3): 714-716. (2005)
NAL Call #: QL671.C6; ISSN: 0010-5422
Descriptors: dark-eyed junco/ Pinus ponderosa/ ponderosa pine/ Arizona/ cattle grazing/ Coconino County, Kaibab National Forest/ commercial enterprises/ disturbances/ farming and agriculture/ forest/ grazing/ habitat destruction/ land zones/ nesting success/ North America/ predation/ productivity/ reproduction/ savanna/ terrestrial ecology/ vegetation cover/ wildlife-human relationships/
Junco hyemalis
Abstract: Grazing of domestic livestock on public lands in the western United States is a major source of habitat destruction. I quantified nest success of ground-nesting Dark-eyed Juncos (Junco hyemalis) breeding in ponderosa pine forests and pine savanna in the Kaibab National Forest of northern Arizona. Comparison. of results for areas grazed by cattle to results for immediately adjacent areas protected from grazing revealed that cattle grazing was associated with a dramatic (75%) reduction in nest success. Cattle grazing reduced vegetation cover over nests by an average of 41%, exposing the nest to more extreme climatic conditions as well as possibly making them more conspicuous to predators.
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896. **Cavity-nester habitat development in artificially made Douglas-fir snags.**
Brandeis, T. J.; Newton, M.; Filip, G. M.; and Cole, E. C.
Journal of Wildlife Management 66(3): 625-633. (2002)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: beetle colonization/ Decay development/ Douglas-fir/ Fomitopsis cajanderi/ Fomitopsis pinicola/ Fungal inoculation/ Oregon/ Phellinus pini/ Phlebiopsis gigantea/ Pseudotsuga menziesii/ snags/ wildlife habitat/ beetle/ cavity/ nesting/ wildlife management/ Cryptoporus volvatus/ Dendroctonus/ Dryocopus pileatus/ Fomitopsis cajanderi/ Fomitopsis pinicola/ Phellinus pini/ Phlebiopsis gigantea/ Picoides villosus/ Pseudotsuga menziesii/
Trichaptum abietinum
Abstract: Standing dead trees, or snags, are a source of foraging habitat and nesting cavities for wildlife. We evaluated the efficacy of creating Douglas-fir (Pseudotsuga menziesii) snags (by girdling, silvicide treatment, and topping) and their influence on deterioration rate by describing bark beetle activity, fungal colonization, and use by cavity nesters. To compare the development of artificial with natural fungal infection, we inoculated snags with Fomitopsis pinicola, Fomitopsis cajanderi, Phellinus pini, and Phlebiopsis gigantea. Silvicide-treated and fully topped trees took just over 1 year to die; girdled trees took slightly over 2 years to die. Trees topped at mid-crown that died took almost 3 years. Top breakage began 4 years after treatment. Neither snag-creation methods nor artificial inoculation directly affected bark beetle (Dendroctonus spp., Ips spp.) activity or the presence of externally visible fungal fruiting bodies 4 years after treatment. Native decay fungi, particularly Trichaptum abietinum and Cryptoporus volvatus, extensively colonized snag sapwood. Snag-creation method and artificial inoculation did not appreciably affect woodpecker activity after 4 years. Rather, length of time the snag had been dead had the most influence on bird use. All snags except the living mid-crown topped trees provided foraging habitat and may be a suitable condition for cavity-nest excavation. Pileated woodpeckers (Dryocopus pileatus), hairy woodpeckers (Picoides villosus), and other species excavated and de-barked the created snags during foraging, and possibly during nesting activity.
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897. **Cervid forage utilization in noncommercially thinned ponderosa pine forests.**
Gibbs, M. C.; Jenks, J. A.; Deperno, C. S.; Sowell, B. F.; and Jenkins, K. J.
Journal of Range Management 57(5): 435-441. (2004)
NAL Call #: 60.18 J82; ISSN: 0022409X
Descriptors: Cervus elaphus/ diets/ forage/ standing biomass/ mule deer/ Odocoileus hemionus/ Odocoileus virginianus/ white-tailed deer/ habitat use/ thinning/ ungulate/ Custer State Park/ South Dakota/
Pinus ponderosa
Abstract: To evaluate effects of noncommercial thinning, utilization of forages consumed by elk (Cervus elaphus L.), mule deer (Odocoileus hemionus Raf.), and white-tailed deer (Odocoileus virginianus Raf.) was measured in ponderosa pine (Pinus ponderosa P. & C. Lawson) stands in Custer State Park, S. D. Treatments consisted of unthinned (control; 22 to 32 m^2/ha basal area), moderately thinned (12 to 22 m^2/ha basal area), and heavily thinned (3 to 13 m^2/ha basal area) stands of ponderosa pine. During June, July, and August, 1991 and 1992, about 7,000 individual plants were marked along permanent transects and percent-weight-removed by grazing was ocularly estimated. Sample plots were established along transects and plants within plots were clipped to estimate standing biomass. Pellet groups were counted throughout the study area to determine summer habitat use of elk and deer. Diet composition was evaluated using microhistological analysis of fecal samples. Average percent-weight-removed from all marked plants and percent-plants-grazed were used to evaluate forage utilization. Standing biomass of graminoids, shrubs, and forbs increased ($P < 0.05$) from unthinned to moderately and heavily thinned stands. Utilization of graminoids and shrubs averaged less than 1% when measured as percent-weight-removed and percent-plants-grazed and did not differ ($P > 0.05$) across treatments. Forb use averaged less than 5% within sampling periods when measured as percent-weight-removed and percent-of-plants grazed and did not differ among treatments. Results of pellet group surveys indicated that cervids were primarily using meadow habitats. When averaged over the 2 years, forbs were the major forage class in deer diets, whereas graminoids were the major forage class in diets of elk.
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898. **Change in wildlife habitats in Quebec forests: Analysis of major trends over three decades.**
Crete, M. and Marzell, L.
Forestry Chronicle 82(3): 368-382. (2006)
NAL Call #: 99.8 F7623; ISSN: 0015-7546
Descriptors: boreal forests/ dead wood/ fauna/ forest management/ forest pests/ habitats/ insect pests/ plant

communities/ plant pests/ species diversity/ wildlife conservation/ Abies balsamea/ Acer saccharum/ Betula alleghaniensis/ Carya cordiformis/ Choristoneura fumiferana/ mosses/ Odocoileus virginianus/ Picea
Abstract: As forest management intensified between the 1970s and the 1990s, we tested the prediction that three forest attributes, likely essential for some wildlife species, became rarer during this time interval: old (>100 years) stands, dead wood and woody species diversity. We used a network of about 7000 permanent plots, surveyed at least three times, for determining trends followed by these variables during the last three decades of the 20th century. We stratified our analysis according to the six vegetation domains of the southern half of Quebec where forest management occurs, i.e., from the sugar maple-bitternut to the spruce-moss domain. The proportion of old stands clearly diminished only in the western part of the sugar maple- and balsam fir-yellow birch domains. However, stands composed of old trees were already very scarce during the 1970s everywhere except in the spruce-moss domain where they could have increased in importance during the study period. Snags tended to become rarer only in the western part of sugar maple- and balsam fir-yellow birch domains whereas their abundance increased elsewhere, sometimes substantially, because of the spruce budworm epidemic that affected Quebec between 1975 and 1990. Results suggest that tree diversity was impoverished in the two southernmost forest domains; the same tendency existed also for saplings, particularly because of intense browsing by white-tailed deer. In the boreal forest, the spruce budworm epidemic favoured sapling diversity during the 1980s and 1990s. Our analysis indicates that we must: (1) quickly exclude some typical old stands from forest management in all vegetation domains; (2) determine if some woody species became rarer in forest stands of southern Quebec; (3) identify which elements of the forest fauna depend on old stands, rare tree species and senescent trees, and (4) continue to monitor the trend of dead wood present in Quebec forests.
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899. **Changing fire regimes and the avifauna of California oak woodlands.**
Purcell, Kathryn L. and Stephens, Scorr L.
Studies in Avian Biology (30): 33-45. (2005)
NAL Call #: QL671.S8; ISSN: 0197-9922
Descriptors: violet-green swallow/ western bluebird/ western kingbird/ anthropogenic/ avian diversity/ fire/ fire frequency/ fire intensity/ fire suppression/ livestock grazing/ oak woodlands
Abstract: Natural and anthropogenic fire once played an important role in oak woodlands of California. Although lightning-ignited fires were infrequent, the California Indians used fire to modify oak woodland vegetation for at least 3,000 yr. These high-frequency, low-intensity fires likely resulted in little mortality of mature oaks, low but continuous tree recruitment, an open understory, and a fine-grained mosaic of vegetation patches. Following settlement by Europeans in the mid-1800s, ranchers burned to reduce shrub cover and to increase grassland area and forage production; surface fires were common with average fire-return intervals of 8-15 yr. Fire suppression, begun in the 1940s to 1950s, led to increases in surface and crown fuels, invasion of woody vegetation in the understory, and increased tree density. In the absence of demonstrated fire effects on oak woodland birds, we used changes in vegetation structure expected to result from fire and fire suppression to predict the response of oak woodland birds to fire and fire suppression based on nesting habitat of 17 common oak woodland species breeding at the San Joaquin Experimental Range, Madera County, California. Our results suggest that populations of Western Kingbirds (Tyrannus verticalis), Western Bluebirds (Sialia mexicana), and Violet-green Swallows (Thchycineta thalassina), would increase in abundance following fire, because they consistently nested in habitat similar to that expected to result from frequent, low-intensity fire. The species predicted to respond negatively to changes resulting from fire differed among the variables examined. If fire produces a mosaic of habitat patches rather than a homogeneous landscape, we expect that the differing habitat needs of most species will be provided for. As with fire, the most obvious change resulting from excluding livestock was an increase in shrub cover. The question naturally arises to what extent livestock grazing creates habitat similar to that created by historical fire, but this question remains unstudied. More fire-history research is needed to understand past fire regimes of oak woodlands and the effects of fire, including prescribed fire, on the vegetation and the bird community. The effects of grazing and the extent to which grazing mimics fire clearly require more study. We encourage others to test our hypotheses regarding responses of birds to variables expected to be altered by fire: shrub cover, tree density, and numbers of snags, saplings, and logs. Finally, we need to test our working hypothesis that a mosaic of habitat patches will provide the habitat conditions needed to sustain the high avian diversity characteristic of oak woodlands.
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900. **Changing perceptions of the role of managed forests as wildlife habitat in the Pacific Northwest.**
Aubry, K. B.
In: Managing for wildlife habitat in westside production forests, General Technical Report-PNW 695/ Harrington, T. B. and Nicholas, G. E.; Portland, OR: Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture, 2007. pp. 3-17.
Notes: 08874840 (ISSN).
Descriptors: forest management/ landscape/ old growth/ riparian/ wildlife
Abstract: Forest management objectives and the perceived role of managed forests as wildlife habitat in the Pacific Northwest changed in many significant ways during the 20th century. Before 1900, wildlife was generally considered something to be exploited or exterminated, not managed or protected. This perspective began to change in the early 1900s when Theodore Roosevelt promoted the doctrine of "conservation through wise use," and Aldo Leopold established the science and practice of wildlife management with the publication of his seminal textbook, Game Management. However, the most revolutionary changes in public and professional perceptions regarding forest management for wildlife objectives occurred in the latter part of the 20 th century. Many of these changes began during the 1970s, after the environmental movement of the 1960s resulted in the enactment of federal legislation designed to minimize environmental degradation, perpetuate biological diversity, and protect endangered species. In this paper, I argue that changing perceptions

about the role of managed forests as wildlife habitat were associated primarily with the following four key conceptual turning points that were strongly influenced by these legislative mandates and the ground-breaking research and landmark publications of various scientists and resource professionals in this region: (1) for which species should forests be managed? (2) at what spatial or ecological scales should forests be managed? (3) which riparian zones should be managed? (4) can old-growth attributes be created in managed forests?
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901. **Characteristics of Mount Graham red squirrel nest sites in a mixed conifer forest.**
Merrick, Melissa J.; Bertelsen, Sadie R.; and Koprowski, John L.
Journal of Wildlife Management 71(6): 1958-1963. (2007)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Rodentia/ Sciuridae/ Tamiasciurus hudsonicus grahamensis/ Arizona/ breeding grounds/ forests/ ecosystems/ forest management/ forestry practices/ habitat alterations/ forestry management/ Graham County, Pinaleno Mountains/ habitat management/ habitat use/ mixed conifer forest/ nest site characteristics/ wildlife-human relationships/ commercial enterprises/ conservation/ wildlife management/ disturbances/ land zones/ reproduction/ breeding/ Picea engelmannii/ Populus ssp.
Abstract: The Mount Graham red squirrel (Tamiasciurus hudsonicus grahamensis) is constrained to the Pinaleno Mountains in southeastern Arizona, USA. The population's endangered status and extensive forest damage from insects and fire warrants a better understanding of habitat variables important for nest site selection. We examined characteristics of cavity (n = 91) and drey (n = 38) nests and compared these to random sites (n = 113). Dreys were found primarily in Engelmann spruce (Picea engelmannii) and corkbark fir (Abies lasiocaroa var. arizonica). Cavity nests occurred primarily in aspen (Populus tremuloides) and corkbark fir. Squirrels selected nest sites with higher canopy cover and more corkbark fir, decayed logs, and living trees. Forest management plans emphasizing thinning must consider how altering these habitat characteristics could affect availability and suitability of tree stands for nesting squirrels.
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902. **Characteristics of roost sites of adult wild turkey females.**
Chamberlain, Michael J.; Leopold, Bruce D.; and Burger, L. Wes
Journal of Wildlife Management 64(4): 1025-1032. (2000)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Meleagris gallopavo silvestris/ wild turkey/ Meleagris gallopavo/ birds/ behavior/ roosts/ roosting/ habitat use/ movements/ home range-territory/ ecosystems/ pine/ forests, mixed/ riparian habitat/ diurnal rhythm/ habitat management for wildlife/ modeling/ seasonal activities/ statistics/ wildlife management areas/ wild turkey/ habitat/ sleeping place/ dispersion/ female/ movement/ season/ eastern wild turkey/ Mississippi: central region/ Jasper County, Mississippi/ Newton County, Mississippi/ Scott County, Mississippi/ Smith County, Mississippi
Abstract: Little research has examined roost-site selection processes by eastern wild turkeys (Meleagris gallopavo silvestris). Additionally, few studies have quantified selection of roost sites relative to availability of habitats within the home range and female movements prior to roosting. Hence, the authors examined selection of roost sites relative to availability of habitats within the home range and assessed the relationship between selected landscape metrics and location of roost sites. They obtained 638 triangulated roost locations on 34 adult female wild turkeys during 1996-97 on a study area composed of different landowners in central Mississippi. Roosting habitat use differed (P < 0.01) from availability within home ranges, with females preferring to roost in sawtimber pine (Pinus spp.) and pine-hardwood stands. Distance to nearest creek and stand age frequently differed (P < 0.05) between roost and random sites. Roost sites were closer to creeks and in older aged stands than random sites. Females did not appear to increase movements prior to roosting, suggesting that roosting may influence female movements throughout the day, allowing females to be at preferred roosting sites at dusk. Alternatively, females may simply roost in the nearest suitable habitat at the end of the day. The authors suggest managers and biologists consider the importance of stand age and landscape metrics to roost site selection when managing for eastern wild turkeys.
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903. **Clearcut logging restricts the movements of terrestrial Pacific giant salamanders (Dicamptodon tenebrosus Good).**
Johnston, Barbara and Frid, Leonardo
Canadian Journal of Zoology 80(12): 2170-2177. (2002)
NAL Call #: 470 C16D; ISSN: 0008-4301
Descriptors: Dicamptodon tenebrosus/ Caudata/ Dicamptodontidae/ Lissamphibia/ behavior/ wildlife management/ clearcut logging/ movement patterns/ precipitation/ British Columbia/ Chilliwack and Nooksack Drainage Basins/ distribution/ forests/ ecosystems/ forestry practices/ habitat alterations/ home range/ territory/ Washington/ wildlife-human relationships/ Canada/ commercial enterprises/ disturbances/ habitat use/ land zones/ Pacific giant salamander
Abstract: Pacific giant salamanders (Dicamptodon tenebrosus Good) in the Chilliwack River valley of southwestern British Columbia are at the periphery of their range, and therefore of conservation concern. Although logging is a potential threat to the species, no studies have examined how clear-cutting affects its terrestrial stage. We used radiotelemetry to compare the movements of 35 terrestrial Pacific giant salamanders at sites with three different logging histories: forested, clearcut to the stream margin, and clearcut with riparian buffer strips. The results demonstrate that logging affected movements of the salamanders. Salamanders in clearcuts remained significantly closer to the stream, spent more time in subterranean refuges, and had smaller home ranges than those at forested sites. During a dry year, salamanders in clearcuts were significantly more dependent on precipitation for their movement than salamanders in forested habitats. Salamander movement behavior in riparian buffer strips was not significantly different from that at forested sites but was significantly different from that at clearcut sites. Riparian buffer strips appear to mitigate some of the negative effects of clearcuts on salamander movement.
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904. **Coarse woody debris and pine litter manipulation effects on movement and microhabitat use of Ambystoma talpoideum in a Pinus taeda stand.**
Moseley, K. R.; Castleberry, S. B.; and Ford, W. M.
Forest Ecology and Management 191(1-3): 387-396. (2004)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2004.01.015.
Descriptors: Ambystoma talpoideum/ Ambystomidae/ coarse woody debris/ pine litter/ plantation silviculture/ debris/ forestry/ radar/ mole salamanders/ pine litters (PL)/ ecology/ amphibians/ habitat use/ litter/ silviculture/ woody debris/ Ambystoma talpoideum/ Pinus taeda
Abstract: We examined effects of coarse woody debris (CWD) and pine litter (PL) manipulations on movement and microhabitat use by mole salamanders (Ambystoma talpoideum) in the upper Coastal Plain of South Carolina. Individuals were tracked within field enclosures using harmonic radar detection from 3 December 2002 to 1 August 2003. Enclosure study one (ES1) consisted of three treatments: (1) high CWD/high PL; (2) low CWD/low PL; (3) high CWD/low PL. Enclosure study two (ES2) consisted of two treatment types: complete PL removal and unmanipulated control. Activity of A. talpoideum within ES1 high CWD/low PL, low CWD/high PL and high CWD/high PL treatments did not differ. Individuals subject to ES2 PL removal treatments moved during more nights than individuals in control treatments. During night surveys ES2 PL removal treatments moved on a greater percentage of nights, and were active for longer periods of time, than individuals in control treatments. A. talpoideum exposed to low PL treatments may have utilized CWD as a means of compensating for inadequate microclimate conditions provided by reduced pine litter depth. Our results suggest that reduction of CWD and pine litter has little effect on A. talpoideum activity levels. Conversely, complete pine litter removal prompts individual salamanders to move more frequently and for longer periods, thereby potentially being subjected to increased desiccation and predation risk. Within managed pine forests in the southeastern United States, forest management practices that minimize pine litter and CWD removal can help to maintain suitable habitat for amphibian groups such as ambystomatid salamanders.
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905. **Combining pine timber and wildlife management objectives.**
Goerlich, D. and Parkhurst, J.
Forest Landowner 62(4): 42-44. (2003)
NAL Call #: SD144.A15F67; ISSN: 10879110
Descriptors: conservation/ logging (forestry)/ softwoods/ vegetation/ pine timber management/ regeneration harvest/ wildlife habitat/ wildlife management/ forestry/ conservation/ forest management/ forests/ harvesting/ plantations/ prescribed burning/ reforestation/ thinning/
Abstract: In some cases pine plantations, once established, are not managed effectively to produce maximum wildlife benefit. Pine plantations can provide great wildlife habitat over time where landowners are willing to adopt well-established management strategies. No single vegetation group-pine plantation or otherwise-can satisfy the habitat needs for all wildlife species. With proper design and periodic and timely management efforts, pine timber and wildlife management objectives can be compatible.
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906. **A comparison of density and reproductive indices of songbirds in young and old boreal forest.**
Rangen, S. A.; Hobson, K. A.; and Clark, R. G.
Wildlife Society Bulletin 28(1): 110-118. (2000)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: boreal forest/ density/ forest management/ habitat quality/ nest success/ power analysis/ reproductive behaviors/ songbirds/ critical analysis/ estimation method/ index method/ passerines/ reproductive success/ Zonotrichia albicollis
Abstract: Reproductive behaviors have been used to estimate relative reproductive success for songbirds in grasslands, but little is known about the ease of detecting these behaviors in more complex habitats such as forests. We evaluated the feasibility of detecting differences in reproductive effort and success, using songbird behavior and number of fledglings observed, and investigated the relationship of indices of reproductive behaviors and fledgling frequencies versus species densities in 2 age-classes of forest. We used spot-mapping to determine breeding bird densities, whereas behavioral censuses and spot-mapping documented reproductive activity. Eighty-three percent of species did not differ in density between young and old stands. Census coverage totalled 4.3 hour/ha (SE = 0.12, n = 6) for young (25 years) and 4.1 hour/ha (SE = 0.13, n = 6) for old stands (76-100 years), when we combined behavioral observations obtained from late morning surveys and early morning spot-mapping on the same grids. Two of 7 ground and 1 of 5 aboveground nesting species showed greater productivity in young than old stands and 1 of 7 ground-nesting species had greater reproductive success in old than young stands, using indices of reproductive behavior. However, differences between forest age-classes in detections of fledglings were found only for white-throated sparrows (Zonotrichia albicollis). Lack of differences in indices of reproductive behavior between stand ages was related to low statistical power and poor visibility of birds in forests, particularly in stands with high canopies. Power analysis indicated that 126 spot-mapping grids/treatment are required to attain 80% power with a hypothesized difference in the index reproductive behavior of 50% (i.e., effect size = 0.5) and α = 0.05. Thus, using indices of reproductive behavior and observations of fledglings to estimate nesting success in forested habitats is not feasible unless number of replicate spot-mapping grids is extremely large, species are very abundant, and birds concentrate their activities in lower parts of the canopy. Relationships between indices of reproductive behaviors or frequencies of fledglings and density were positive for 40-45% of species, yet were weak for species overall. Further work is needed in different habitat types, including varied forest types, to test the feasibility of collecting reproductive behaviors and estimating fledgling numbers and to verify the assumption that breeding bird density is a good predictor of habitat quality.
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907. **Comparison of rodent communities in sites with different degrees of disturbance in deciduous forest of southeastern Morelos, Mexico.**
Garcia Estrada, Carlos; Romero Almaraz, Ma De Lourdes; and Sanchez Hernandez, Cornelio
Acta Zoologica Mexicana Nueva Serie (85): 153-168. (2002); ISSN: 0065-1737

Descriptors: age structure/ cattle grazing/ community composition/ conservation biology/ deciduous forests: habitat/ demographic parameters/ environmental disturbance/ firewood extraction/ intersite differences/ lumber harvesting/ microhabitat preference/ population density/ soils/ species diversity/ topography
Abstract: This study is the first work that compares rodent communities in a deciduous forest in Mexico. It documents differences between sites experiencing different degrees of disturbance caused by firewood and lumber extraction, and cattle grazing; a relatively undisturbed site (Site 1) and another more disturbed site (Site 2) in southeastern Morelos State. In each site we captured six species of rodents. Though habitat disturbance did not modify diversity or evenness of rodent species, the total number of individuals captured in Site 1 (n=319) was greater than in Site 2 (n=90). Effects of habitat fragmentation were expressed in significant differences in population density, age structure and microhabitat preference between two sites for Baiomys musculus, Peromyscus levipes and P. melanophrys. The disturbance of deciduous forest appears to be the principal factor explaining differences in demographic parameters of rodent species between the two study sites, as these two sites have the same climate, similar soils, and topography which differ only slightly.
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908. **Compatibility of delayed cutting regime with bird breeding and hay nutritional quality.**
Nocera, J. J.; Parsons, G. J.; Milton, G. R.; and Fredeen, A. H.
Agriculture, Ecosystems and Environment 107(2-3): 245-253. (2005)
NAL Call #: S601.A34; ISSN: 01678809.
Notes: doi: 10.1016/j.agee.2004.11.001.
Descriptors: bobolink/ breeding phenology/ crude protein/ fledging rate/ grassland birds/ hay cutting/ livestock nutrition/ grassland/ hay/ phenology/ Canada/ North America/ Nova Scotia/ Ammodramus nelsoni/ Dolichonyx oryzivorus/ Passerculus sandwichensis
Abstract: The breeding phenology of three grassland bird species was studied in managed hayfields of Nova Scotia, Canada: bobolink (Dolichonyx oryzivorus), savannah sparrow (Passerculus sandwichensis), and Nelson's sharp-tailed sparrow (Ammodramus nelsoni subvirgatus), under delayed hay cutting regimes (post-1 July). Weekly changes were monitored in several measures of hay nutritional quality (percent crude protein (CP %), acid detergent fibre (ADF), calcium (Ca) and phosphorus (P)). Timing of peak fledging was variable across years, but generally occurred in the first week of July. Delay of cutting by 1 week in late June or early July resulted in a small reduction in hay nutritional quality. However, that hay would still meet energy and CP % requirements for non-lactating beef cows. Regression models showed that a delay of 1.5 weeks (from 20 June to 1 July) in cutting translated to a mean decrease in CP % of 2.1. Conversely, this delay secured an increase in the rate of fledgling, from 0 to 20% for bobolink, 56% for savannah sparrow, and 44% for Nelson's sharp-tailed sparrow. Postponing cut by 1 more week (to a minimum of 7 July) gave the benefit of allowing maximum fledging rates for all species, while CP % lost 3.5. While this level of CP % is unlikely to support high maintenance periparturient cows and feeder/finisher cattle, it could be made profitable through mineral supplementation. ADF levels were considerably elevated, while Ca and P improved in the same time period. These trends show delayed hay cutting can be a viable option for farmers opting to conserve breeding birds on hayfields. The feasibility of delaying cut varies with a farm's specialization, and to a degree, breed kept. Such practices can be incorporated into a holistic approach to agroecosystem management.
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909. **Competitive effects on plantation white spruce saplings from shrubs that are important browse for moose.**
Posner, Scott D. and Jordan, Peter A.
Forest Science 48(2): 283-289. (2002)
NAL Call #: 99.8 F7632; ISSN: 0015-749X
Descriptors: Alces alces/ Cervidae/ Artiodactyla/ forestry practices/ habitat alterations/ terrestrial ecology/ herbicide control/ competitive suppression/ frost damage/ USDA Forest Service/ browse shrub species/ conifer plantations/ controlling competing shrubs/ foods-feeding/ forests/ ecosystems/ habitat management/ Minnesota/ Superior National Forest/ wildlife-human relationships/ commercial enterprises/ conservation/ wildlife management/ diets/ disturbances/ land zones/ nutrition/ moose
Abstract: Conifer planting is often accompanied by herbicide control of surrounding broadleaf, woody plants that may interfere with conifer growth, a process that releases conifers from competitive suppression. Because potential competitors often provide browse for wildlife, their removal may conflict with objectives in multiple-resource management. While some agencies, such as the USDA Forest Service (USFS), have greatly reduced herbicide use, many other timber producers still rely on chemicals to release conifers from competing vegetation. In northeastern Minnesota, where moose (Alces alces) are a highly valued resource, we studied impacts of broadleaf shrubs on 4- to 16-yr-old white spruce (Picea glauca) along with the extent of browsing by moose on these shrubs. Height, diameter, and current vertical growth increment of spruce were compared among four levels of presence (density strata) of shrubs immediately surrounding each sapling. Spruce grew as well or better in the low and medium density strata as in the non-shrub stratum. In the high density stratum, height and growth increment, particularly in 10- to 16-yr-old spruce, appeared reduced. Presence of shrubs seemed to reduce frost damage in young spruce. Moose browsing reduced height of most shrub species, suggesting that these animals provide a release effect on adjacent spruce. We recommend a release strategy that avoids reduction of shrubs beyond the level that assures normal growth in young spruce, so as both to minimize loss of browse for wildlife and avoid unnecessary silvicultural costs.
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910. **Conservation incentives programs for endangered species: An analysis of landowner participation.**
Langpap, C.
Land Economics 80(3): 375-388. (2004); ISSN: 00237639
Descriptors: economic incentives/ forestry/ habitat conservation/ wildlife habitat
Abstract: It has been argued that the land-use restrictions prescribed by the Endangered Species Act have failed to protect endangered species on private land. Hence, there has been a call for using incentives to complement this regulatory approach. This paper uses data from a survey of

private forest owners to examine the demographic and land characteristics that determine landowner participation in incentives programs. The results suggest that targeting incentives to younger landowners who have acquired property more recently, who own more woodland, and who are interested in conservation and providing wildlife habitat may be effective in increasing participation rates. © 2004 by the Board of Regents of the University of Wisconsin System.
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911. **Conservation of endangered species: Can incentives work for private landowners?**
Langpap, C.
Ecological Economics 57(4): 558-572. (2006)
NAL Call #: QH540.E26; ISSN: 09218009.
Notes: doi: 10.1016/j.ecolecon.2005.05.007.
Descriptors: Endangered Species Act/ incentives/ NIPFs/ non-industrial private forests/ voluntary conservation agreements
Abstract: It has been argued that the traditional regulatory approach of the Endangered Species Act, based on land-use restrictions, has failed to protect endangered species on private land. In response, there has been a call for the use of incentives to complement this regulatory approach. This paper examines the potential of incentives programs to elicit conservation-oriented management choices from landowners. Data obtained from a survey of non-industrial private forest owners in Oregon and Washington is used to examine the effectiveness of various incentives. The results indicate that incentives, in particular compensation and assurances, can be effective in increasing the conservation effort provided by landowners. The results also suggest that conservation policy for private lands could be improved by relying on a combination of incentives, including financial incentives and assurances, rather than exclusively on the threat of regulation.
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912. **Conservation of the marbled murrelet under the northwest forest plan.**
Raphael, Martin G.
Conservation Biology 20(2): 297-305. (2006)
NAL Call #: QH75.A1C5 ; ISSN: 0888-8892
Descriptors: conservation measures/ ecology/ terrestrial habitat/ abiotic factors/ land zones/ Brachyramphus marmoratus: disturbance by man/ habitat management/ forest management plan application/ endangered species/ national parks and reserves/ forest and woodland/ abiotic factors/ United States/ Aves, Charadriiformes, Alcidae/ birds/ chordates/ vertebrates
Abstract: The Marbled Murrelet (Brachyramphus marmoratus) was listed as threatened in 1992, primarily because of loss of its old-forest nesting habitat. Monitoring conducted over the first 10 years following implementation of the Northwest Forest Plan shows at-sea murrelet populations appear to be stationary, but recruitment is very low and demographic models project a 4-6% annual rate of decline. Monitoring of nesting habitat indicated there were about 1.6 million ha of higher-suitability nesting habitat on all lands at the start of the plan, about half of which occurred on federal lands. Most (88%) of higher-suitability habitat on federal lands was protected within reserves. Over the past 10 years, losses of habitat due primarily to fire have totalled about 2% on federal lands. Losses have been much greater (12%) on nonfederal lands, due primarily to timber harvest. Habitat is expected to accrue within reserves as younger forest matures and attains sufficient diameter to support nesting sites. At-sea estimates of population size are strongly and positively correlated with amounts of adjacent nesting habitat at a broad scale, supporting the idea that amounts of nesting habitat are a primary driver in wide-scale murrelet population distribution. Conditions at sea, however, such as temperature regimes, prey availability, and pollutants, continue to affect murrelet populations. The system of large reserves seems to have achieved the short-term objective of conserving much of the remaining nesting habitat on federal lands. These reserves are also likely to contribute to the long-term objective of creating large, contiguous blocks of nesting habitat. The plan has a primary role in conserving and restoring nesting habitat on federal land but will succeed in this role only if land allocations calling for such protection are in place for many decades.
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913. **Conservation of the northern spotted owl under the northwest forest plan.**
Noon, Barry R. and Blakesley, Jennifer A.
Conservation Biology 20(2): 288-96. (2006)
NAL Call #: QH75.A1C5; ISSN: 0888-8892
Descriptors: Strix occidentalis/ ecosystem/ strigiformes/ trees/ conservation of natural resources [history]/ conservation of natural resources [methods]/ forestry [organization and administration]/ conservation of natural resources [legislation and jurisprudence]/ forestry [history]/ history, 20th century/ northwestern United States/ weather/ spotted owl/ habitat management/ forest/ silviculture/ population/ loss of habitat/ competition/ prey/ food
Abstract: Development of the Northwest Forest Plan (NWFP) was motivated by concerns about the over-harvest of late-seral forests and the effects of intensive forest management on the long-term viability of the Northern Spotted Owl (Strix occidentalis caurina). Following several years of intense political and legal debates, the final NWFP was approved in 1994. Even though the plan evolved with a broad ecosystem perspective, it remained anchored in the Spotted Owl reserve design proposed in 1990. Based on a criterion of stable or increasing populations, a decade later it remains unclear whether the enactment of the NWFP has improved the conservation status of Spotted Owls. The results of intensive monitoring of several Spotted Owl populations for over a decade suggest a continuing range-wide decline even though rates of timber harvest have declined dramatically on federal lands. The cause of the decline is difficult to determine because the research needed to establish cause and effect relations has not been done. One plausible hypothesis is that the owl's life history greatly constrains its rate of population growth even when habitat is no longer limiting. Since enactment of the NWFP, new threats have arisen, including the movement of Barred Owls (S. varia) into the range of the Spotted Owl, political pressure to increase levels of timber harvest, and recent changes to forest laws that eliminate the requirement to assess the viability of wildlife populations on U.S. Department of Agriculture Forest Service lands. At this time is appears that Spotted Owl conservation rests critically on continued implementation of the protections afforded by the NWFP and the U.S. Endangered Species Act.
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914. **Convergence in arthropod assemblages with various restoration approaches for Canadian deciduous forests.**
Bellocq, M. Isabel and Smith, Sandy M.
Journal of Insect Conservation 7(2): 99-109. (2003)
NAL Call #: QL362.J68 ; ISSN: 1366-638X
Descriptors: conservation measures/ ecology/ population dynamics/ terrestrial habitat/ land zones/ Canada/ North America/ Arthropoda: habitat management/ deciduous forest restoration/ treatments effect on abundance and community structure/ trophic structure/ deciduous forest restoration treatments effect/ community structure/ population density/ forest and woodland/ deciduous forest/ restoration treatments effect on abundance and community structure/ Ontario/ Durham Regional Forest/ deciduous forest restoration treatments effect on abundance and community structure/ Insecta, Coleoptera, Adephaga, Caraboidea/ arthropods/ beetles/ insects/ invertebrates
Abstract: Silvicultural practices are traditionally aimed at increasing forest profits; however, recent approaches to forest conservation have broadened to include nature-based silviculture for regenerating forests. In southern Ontario (Canada), originally dominated by deciduous forests, conifer plantations were established on abandoned agricultural sites. Currently, there is an increasing interest to convert these conifer stands to a state that mimics the original deciduous forest. We investigated arthropod abundance, species richness of carabid beetles, and abundance of arthropod assemblages (trophic and prey groups) under five silvicultural treatments conducted to regenerate deciduous forests (the natural forest type) from the old conifer plantations. The treatments included: (1) uniform canopy removal; (2) uniform canopy removal and understory removal; (3) group canopy removal; (4) group canopy removal and understory removal; and (5) untreated control plots (relatively pure red pine). Insects were sampled annually using sweepnets and pitfall traps. Results revealed treatment effects on the abundance of Coleoptera, Heteroptera, herbivores, and small arthropods (<3 mm) caught in sweepnet samples, where plots subjected to group shelterwood removal and understory removal supported higher abundances than the control plots. There was no treatment effect on the abundance of other arthropod groups or on the species richness and abundance of carabid beetles. The silvicultural treatments used to encourage natural regeneration did not seem to affect arthropod food availability for insectivorous vertebrates. Thus, the type of silvicultural strategy used to convert pine plantations to a stage that mimics the natural deciduous forests had little overall impact on arthropods.
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915. **Coordinating short-term projects into an effective research program: Effects of site preparation methods on bird communities in pine plantations.**
Kilgo, John C.; Miller, Karl V.; and Moore, William F.
Studies in Avian Biology (21): 144-147. (2000)
NAL Call #: QL671.S8; ISSN: 0197-9922
Descriptors: habits-behavior/ birds/ communities/ conservation/ ecosystem management/ ecosystems/ forestry practices/ habitat management/ habitat use/ management/ pine plantations/ techniques/ wildlife/ wildlife-habitat relationships/ Pinus spp./ South Carolina, Western/ Savannah River Site
Abstract: Several short-term projects conducted at the Savannah River Site have focused on the effects on avian populations of different techniques of preparing a site for tree planting in young pine plantations. The purpose of this paper is to provide an overview of these studies, to summarize the information they provide regarding the effects of pine management on avian communities, and to demonstrate how multiple short-term projects can be used to address pressing management issues. O'Connell (1993), Sparling (1996), and Branch (1998) examined breeding and wintering bird use of areas treated with several mechanical and chemical site preparation methods. Overall, there were few treatment-related effects on bird populations. Both O'Connell and Sparling believed that the few differences in bird use of treatment plots were associated with minor differences in the structural diversity of the vegetation. Each of these short-term studies provided timely information on an issue of management importance and, taken together, they provide a more comprehensive picture of the effects of site preparation methods on bird communities in pine plantations than a single long-term study.
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916. **Corridor use by diverse taxa.**
Haddad, Nick M.; Bowne, David R.; Cunningham, Alan; Danielson, Brent J.; Levey, Douglas J.; Sargent, Sarah; and Spira, Tim
Ecology 84(3): 609-615. (2003)
NAL Call #: 410 Ec7; ISSN: 0012-9658
Descriptors: conservation measures/ ecology/ population dynamics/ terrestrial habitat/ land zones/ comprehensive zoology: habitat management/ retention of corridors between habitat patches/ evaluation of corridor use by diverse taxa/ landscape level experiments/ emigration/ effects of habitat corridors between patches/ diverse taxa/ landscape experiment study/ distribution within habitat/ dispersal along habitat corridors of diverse taxa/ habitat utilization/ habitat corridors/ use by diverse taxa/ conservation implications/ terrestrial habitat/ fragmented landscapes/ use of habitat corridors by diverse taxa/ forest and woodland/ fragmented pine forest/ landscape level experiment/ South Carolina/ Savannah River National Environment Research Park/ corridor use by diverse taxa in experimentally fragmented forest
Abstract: One of the most popular approaches for maintaining populations and conserving biodiversity in fragmented landscapes is to retain or create corridors that connect otherwise isolated habitat patches. Working in large-scale, experimental landscapes in which open-habitat patches and corridors were created by harvesting pine forest, we showed that corridors direct movements of different types of species, including butterflies, small mammals, and bird-dispersed plants, causing higher movement between connected than between unconnected patches. Corridors directed the movement of all 10 species studied, with all corridor effect sizes >68%. However, this corridor effect was significant for five species, not significant for one species, and inconclusive for four species because of small sample sizes. Although we found no evidence that corridors increase emigration from a patch, our results show that movements of disparate taxa with broadly different life histories and functional roles are directed by corridors.
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917. **Corridors may not improve the conservation value of small reserves for most boreal birds.**
Hannon, S. J. and Schmiegelow, F. K. A.
Ecological Applications 12(5): 1457-1468. (2002)
NAL Call #: QH540.E23; ISSN: 10510761
Descriptors: boreal birds/ boreal mixedwood forest/ clearcuts/ conservation value/ corridors/ fragmentation/ gap sensitivity/ habitat generalists/ landscape connectivity/ logging/ old-forest specialists/ reserve size/ avifauna/ boreal forest/ conservation management/ habitat corridor/ habitat fragmentation/ reserve design
Abstract: Building or maintaining corridors in fragmented landscapes may be an important method to conserve gap-sensitive species that avoid crossing gaps in forest cover. We tested the effectiveness of corridors by examining the changes in abundance of boreal birds pre- and post-logging in experimental 10-ha and 40-ha reserves that were isolated or connected by corridors, relative to their abundance responses in continuous forest (reference sites). Prior to the analysis, we categorized birds as to their predicted gap sensitivity based on two measures: their use of corridors and gap-crossing behavior in small-scale trials, and their habitat affinities (forest species vs. habitat generalists). The abundance of forest species as a group was consistently higher in reference reserves than in isolated or connected reserves after harvest, except for the first year after harvest, when crowding occurred in isolates. Habitat generalist species showed no differences in abundances across reserve types. As a group, resident species were more abundant in reference and connected reserves than in isolates in three of five years post-harvest, suggesting that corridors might benefit these species. None of the single species analyzed showed consistent evidence of benefiting from corridors. Although four species were most abundant in connected reserves after harvest, their abundances were not significantly lower in isolates than in reference sites. Behavioral classification (gap-crossing propensity) was not useful in classifying single species as to how gap sensitive they would be in response to our experiment: habitat affinity was a better predictor. We suggest that corridors may be useful to retain resident birds on harvested landscapes, but that corridors connecting small reserves of forest are unlikely to offset the impacts of fragmentation for most boreal birds. Assessments of the utility of corridors must, however, be done in the context of the full plant and animal communities that live in the boreal forest.
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918. **Created snag monitoring on the Willamette National Forest.**
Boleyn, Pat; Wold, Eric; and Byford, Ken
In: Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests, General Technical Report-PSW 181/ Laudenslayer, W. F.; Shea, P. J.; Valentine, B. E.; Weatherspoon, C. P.; and Lisle, T. E.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 765-775.
Notes: 0196-2094 (ISSN); Symposium held November 2-4, 1999 in Reno, NV.
http://www.fs.fed.us/psw/publications/documents/gtr-181/
Descriptors: conservation measures/ nutrition/ feeding behavior/ reproduction/ reproductive behavior/ ecology/ terrestrial habitat/ land zones/ Picidae: habitat management/ Creation of standing dead trees/ foraging/ breeding site/ nest site/ roosting/ habitat utilization/ Created standing dead tree use/ forest and woodland/ Oregon/ Cascade mountains/ Willamette National Forest/ Aves, Piciformes/ birds/ chordates/ vertebrates
Abstract: Management agencies currently create snags from live trees and leave them in stands after cutting. Little information exists on the use of these snags by wildlife. This study had two objectives: to document whether created snags were used by wildlife, and if used, to elucidate stand and snag features associated with the use of these created snags by wildlife. We documented sign of woodpecker foraging and/or nesting or roosting use, along with snag and stand features in 55 systematically selected stands across the Willamette National Forest in Oregon. We found that woodpecker use was associated with created snag characteristics. Mainly, the status (live or dead) of the created snag was associated with the presence or absence of woodpecker foraging excavations. Management considerations are discussed, including the need to monitor wildlife use before and after created snags are killed and in subsequent years.
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919. **A cross-sectional analysis of Michigan nonindustrial private forest landowners.**
Potter-Witter, K.
Northern Journal of Applied Forestry 22(2): 132-138. (2005)
NAL Call #: SD143.N6; ISSN: 07426348
Descriptors: landowner assistance program effectiveness/ private nonindustrial forestland/ budget control/ harvesting/ soils/ taxation/ timber/ landowner assistance program effectiveness/ private nonindustrial forest management/ private nonindustrial forestland/ wildlife habitats/ forestry/ forest management/
Abstract: Incentive and assistance programs for nonindustrial private landowners in Michigan were evaluated for their effectiveness in encouraging forest management activities. This article reports on selected results of a comparative analysis of program enrollment, landowner characteristics, and management accomplishments. The analysis was based on data from a survey of 2,230 nonindustrial private forestland (NIPF) owners who were members of the Michigan Forest Association (MFA) or were enrolled in the Commercial Forest Program (CF), the Forest Stewardship Program (FSP), or the Two-Hearted River Watershed (TRW) landowner program in 2000. With a 55% overall response rate, landowners reported on present and past management activities and program enrollment. To address the question of the effectiveness of incentive programs, this comparative analysis tested the hypotheses that forest management activity reported by Michigan NIPF landowners who were enrolled in several types of incentive programs did not differ significantly by program and that management activity was not significantly explained by landowner demographics and parcel characteristics. Landowner program enrollment was compared with respect to tree-planting, timber harvesting, timber stand improvement, wildlife habitat improvement, and soil and water protection. To examine the differences, if any, between landowners who practice forest management and those who do not, explanatory demographic and parcel characteristic variables also were tested for their effect on management activity levels. © 2005 by the Society of American Foresters.
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920. **Current and future red-cockaded woodpecker habitat availability on non-industrial private forestland in North Carolina.**
Drake, D. and Jones, E. J.
Wildlife Society Bulletin 31(3): 661-669. (2003)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: endangered species/ forest management/ habitat/ non-industrial private forests/ North Carolina/ Picoides borealis/ red-cockaded woodpecker/ conservation management/ forest management/ habitat availability/ private land/ United States/ Picoides borealis
Abstract: We conducted a mail survey of 2,000 non-industrial private forest landowners (NIPFLs) in the Sandhills and lower Coastal Plain regions of North Carolina to determine the current condition and predict future availability of habitat for the endangered red-cockaded woodpecker (Picoides borealis, RCW) on non-industrial private forestland. Concern has been raised that the legal penalties under Section 9 of the Endangered Species Act (ESA) create a disincentive among private landowners to provide habitat and manage RCW on their property. Section 9 prohibits the physical harming or killing of an endangered or threatened species as well as any modification or destruction of habitat that supports a federally listed species. We found that current habitat availability in terms of combined tract size and stand age was low, and shrinks considerably when the nominal level of habitat management occurring on these lands is factored in. The amount of RCW habitat that may be provided on private lands in the future has the potential to improve moderately due to an increasing level of habitat management that is currently occurring and a relatively stable outlook regarding respondents' forest management objectives for the next 25 years. However, stand age and habitat management should be increased in order to increase the amount of RCW habitat provided on private lands. Private lands, through the Safe Harbor Program and other incentives, could play an integral role in RCW recovery efforts by providing additional landmass as well as movement corridors among public lands.
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921. **Dead wood all around us: Think regionally to manage locally.**
Duncan, Sally
PNW Science Findings (42): 1-5. (2002).
http://www.fs.fed.us/pnw/sciencef/scifi42.pdf
Descriptors: ecosystem management/ ecosystems/ forestry practices/ forests/ habitat management/ habitat surveys/ land use/ modeling/ snags/ study methods/ succession/ wildlife/ wildlife-habitat relationships/ Washington/ Oregon
Abstract: The author discusses the relevance of dead wood, which acts as a crucial component of healthy, biologically diverse forests. The basic information about the distribution and characteristics of snags and down trees in the forests of the Pacific Northwest is lacking. Dead wood is home to invertebrates and microorganisms and is important habitat for wildlife. Initially, dead wood data were collected to address wildlife habitat issues. However, recently, the study of dead wood is used to study the issues of forest health, site productivity, fuels, and carbon stores as well. A recent study by the Pacific Northwest Research Station delved into existing resource inventories to create new information estimating density, volume, and percentage cover for dead wood across 49 million acres of upland forests in Oregon and Washington. The aim was to provide basic information about ecological patterns as well as analyzing forest policies at regional and national levels. At the forest policy level, the data will act as indicators of biodiversity and global carbon cycles for the conservation and sustainable management of temperate and boreal forests. Over the last 100 years, timber management and wildlife suppression have significantly altered forest succession and the distribution of dead wood. Researchers analyzed plots that estimated the natural range of variability in snags and down wood in upland forest habitats. The findings are being used in dead wood management models and to provide information about wildlife habitat and ecosystem health.
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922. **Decay dynamics and avian use of artificially created snags.**
Hallett, J. G.; Lopez, T.; O'Connell, M. A.; and Borysewicz, M. A.
Northwest Science 75(4): 378-386. (2001)
NAL Call #: 470 N81; ISSN: 0029344X
Descriptors: avifauna/ cavity/ decomposition/ foraging behavior/ habitat use/ nest site/ snag/ United States
Abstract: The loss of standing dead trees (snags) from logging has led to artificial creation of snags to help maintain cavity-nesting species. We compared two methods of snag creation: cutting tops and girdling. A total of 1,189 trees of 10 coniferous species was treated between 1991 and 1997 on timber sales in northeastern Washington. We monitored 1,108 trees at approximately 2-yr intervals to determine degree of decay (on a nine-point scale), signs of foraging, and presence of cavities. Nearly 7% of the girdled trees were still alive after 4-7 yr, whereas all but one topped tree died. Initial decline (i.e., reaching decay class 2) was faster for ponderosa pine and western larch than for Douglas-fir. Western larch lost bark (decay class 4) earlier than other species. Topped trees declined more quickly than girdled trees, but girdled trees reached decay class 4 faster. The proportion of trees with evidence of foraging and cavities increased with decay class. Western larch was used more for foraging than other species, and there was no effect of treatment on foraging use. In contrast, topped Douglas-fir and grand fir were used more for foraging than girdled trees at later decay classes. Cavities were observed only in trees that were topped. Interspecific differences in presence of cavities were not observed before decay class 4; western larch had the lowest frequency of cavities, whereas grand fir had the highest. The use of specific treatments for creating snags and selection of species may make these habitat elements available over long time periods.
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923. **Decaying wood in Pacific Northwest forests: Concepts and tools for habitat management.**
Rose, C. L.; Marcot, B. G.; Mellen, T. K.; Ohmann, J. L.; Waddell, K. L.; Lindley, D. L.; and Schreiber, B.
Wildlife habitat relationships in Oregon and Washington/ Johnson, D. H. and O'Neill, T. A.
Corvallis, OR: Oregon State University Press, 2001; pp. 580-623.
http://www.fs.fed.us/wildecology/decaid/decaid_background/chapter24cwb.pdf

Descriptors: vertebrates/ silviculture/ habitat management/ dead wood/ Washington/ Oregon
Abstract: This chapter provides a synthesis of knowledge on processes and functions of wood decay in forest productivity and wildlife habitat, and summarizes available information on the current regional status of decaying wood. It then ofers managers a stepwise assessment process to set goals and objectives, and select silvicultural tools to manage wood decay for desired results.
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924. **Defining quality of red-cockaded woodpecker foraging habitat based on habitat use and fitness.**
Walters, Jeffrey R.; Daniels, Susan J.; Carter, Jay H.; Doerr, Phillip D.; and Carter J. H.
Journal of Wildlife Management 66(4): 1064-1082. (2002)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Picoides borealis/ Piciformes/ Picidae/ red-cockaded woodpecker/ Picidae/ forestry practices/ habitat alterations/ wildlife management/ bird group size/ fitness/ foraging habitat quality/ forest stands/ habitat features/ habitat management/ habitat patches/ habitat use/ midstory/ pine density/ resource selection/ sandhills/ conservation/ wildlife management/ foods-feeding/ forests/ ecosystems/ group size/ home range-territory/ North Carolina/ status/ resource selection and habitat use/ Sandhills/ behavior/ land zones/ nutrition/ population ecology/ woodpeckers/ extermination-endanger/ food/ habitat/ habitat evaluation/ ecological requirements/ reproduction/ fertility-recruitment/ forest/ silviculture/ red-cockaded woodpecker/ Pinus spp.
Abstract: Accurate understanding of habitat quality is a critical component of wildlife management. We developed a definition of high-quality foraging habitat for the red-cockaded woodpecker (Picoides borealis), a federally endangered, cooperatively breeding bird species, from analyses of resource selection and habitat use, relationships between fitness measures and habitat features, and an extensive literature review. In the North Carolina Sandhills, use of foraging habitat at the level of individual trees, habitat patches, and forest stands was strongly and positively related to age and size of pines (Pinus spp.). Use of habitat patches and forest stands was greatest at intermediate densities of medium-sized and large pines and was negatively associated with hardwood and pine midstory. Size of red-cockaded woodpecker groups, an important fitness measure for this species, was positively related to density of old-growth pines within the home range and negatively related to density of medium-sized pines and height of hardwood midstory. Similar results were reported by 2 other studies. High-quality foraging habitat for red-cockaded woodpeckers, therefore, contains sparse or no midstory, intermediate densities of medium-sized and large pines, and oldgrowth pines in at least low densities. Although we documented a relationship between group size and the amount of habitat meeting our definition of "high quality," we were unable to identify the optimum amount of high-quality habitat to provide per group because most study groups had relatively little high-quality foraging habitat. Both fitness and habitat selection in our study population may be constrained by quality and quantity of foraging habitat. James et al. (2001) recommended. and we strongly agree, that foraging habitat be managed for abundant herbaceous ground cover, low densities of small and medium-sized pines, and moderate densities of large pines. We also stress the importance of old-growth pines in foraging habitat. Because the structure of high-quality foraging habitat is similar to that of high-quality nesting habitat, we recommend that management of these 2 be increasingly integrated.
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925. **Demographic effects of habitat selection by hermit thrushes wintering in a pine plantation landscape.**
Brown, David R.; Strong, Cheryl M.; and Stouffer, Philip C.
Journal of Wildlife Management 66(2): 407-416. (2002)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Catharus guttatus/ Passeriformes/ Turdidae/ hermit thrush/ population studies/ terrestrial ecology/ arrival patterns/ between-winter site fidelity/ body condition/ body size/ demographic effects/ habitat quality/ habitat selection/ hardwood forest/ overwinter survivorship/ territory size/ wintering/ forests/ ecosystems/ forestry practices/ habitat alterations/ habitat management/ habitat use/ Louisiana/ pine plantation and hardwood forests/ Tangipahoa Parish/ wildlife-human relationships/ commercial enterprises/ conservation/ wildlife management/ disturbances/ land zones/ hermit thrush/ Pinus taeda/ Louisiana
Abstract: Many species of migratory songbirds use silvicultural landscapes during the nonbreeding season. However, variation in habitat quality (i.e., the differential relative fitness value of habitats) resulting from different silvicultural management strategies and different age classes of these habitats is poorly understood. We studied the patterns of winter habitat selection by hermit thrushes (Catharus guttatus) among pine and hardwood habitats within a pine plantation landscape in southeastern Louisiana. We compared arrival patterns, relative abundance, territory size, body condition (mass, fat, and feather regrowth), between-winter site fidelity, and overwinter survivorship among birds in 3 age classes of even-aged loblolly pine (Pinus taeda) plantation and hardwood forest. We considered these demographic and condition measures as proximate estimates of relative fitness, and thus as indicators of habitat quality. Hermit thrushes in pole-stage (13-16 yr old) pine habitat had smaller territories, higher relative abundance, stayed leaner, and regrew feathers faster than birds in the other habitats, which suggests that this is the best habitat for wintering hermit thrushes among those we studied. Among other habitats, hardwood forest appears to be the lowest quality, but some measures (fat, territory size, and overwinter survivorship) indicate that the sapling-stage pine habitat is the lowest quality. Early arriving birds, disproportionately adults, avoid hardwoods, but beyond this we could find no evidence of segregation by age, sex, or body size among habitats. Our findings suggest that relatively small differences in habitat type and within-season changes in habitat quality can have important effects on the overwinter success of hermit thrushes. Pine plantations that differ in age by less than 10 years differentially affect the condition and demographics of wintering hermit thrushes. For conservation strategies to be successful, the dynamic spatial and temporal variation in habitat quality must be incorporated into models of population processes. Although pine plantation managers should consider multiple wildlife species, they also must be aware that individual species may have differential success among suitable habitats.
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926. **Demographic responses by birds to forest fragmentation.**
Lampila, P.; Monkkonen, M.; and Desrochers, A.
Conservation Biology 19(5): 1537-1546. (2005)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1111/j.1523-1739.2005.00201.x.
Descriptors: bird demography/ edge effects patch size/ habitat loss/ meta-analysis/ patch isolation/ avifauna/ demography/ forest ecosystem/ habitat fragmentation/ habitat loss/ Aves
Abstract: Despite intensive recent research on the effects of habitat loss and fragmentation on bird populations, our understanding of underlying demographic causes of population declines is limited. We reviewed avian demography in relation to habitat fragmentation. Then, through a meta-analysis, we compared specific demographic responses by forest birds to habitat fragmentation, providing a general perspective of factors that make some species and populations more vulnerable to fragmentation than others. We obtained data from the scientific literature on dispersal, survival, fecundity, and nesting success of birds. Birds were divided into sub-groups on the basis of region, nest site, biogeographical history, and migration strategy. Species most sensitive to fragmentation were ground- or open-nesters nesting in shrubs or trees. Residents were equally sensitive to fragmentation in the Nearctic and Palearctic regions, but Nearctic migrants were more sensitive than Palearctic migrants. Old World species were less sensitive than New World species, which was predicted based on the history of forest fragmentation on these two continents. Pairing success was the variable most associated with fragmentation, suggesting an important role of dispersal. Fledgling number or condition, timing of nesting, and clutch size were not associated with sensitivity to fragmentation, suggesting that negative fragmentation effects on birds do not generally result from diminished food resources with increasing level of fragmentation. Future studies on demographic responses of birds to habitat fragmentation would be more effective if based on a combination of measures that can distinguish among the demographic mechanisms underlying population changes related to habitat fragmentation. ©2005 Society for Conservation Biology.
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927. **Demography of northern flying squirrels informs ecosystem management of western interior forests.**
Lehmkuhl, J. F.; Kistler, K. D.; Begley, J. S.; and Boulanger, J.
Ecological Applications 16(2): 584-600. (2006)
NAL Call #: QH540.E23; ISSN: 10510761.
http://www.treesearch.fs.fed.us/pubs/27220
Descriptors: Cascade Range/ demography/ density/ Douglas-fir/ fuel management/ Glaucomys sabrinus/ home range/ Mycophagy/ northern flying squirrel/ ponderosa pine
Abstract: We studied northern flying squirrel (Glaucomys sabrinus) demography in the eastern Washington Cascade Range to test hypotheses about regional and local abundance patterns and to inform managers of the possible effects of fire and fuels management on flying squirrels. We quantified habitat characteristics and squirrel density, population trends, and demography in three typical forest cover types over a four-year period. We had 2034 captures of flying squirrels over 41 000 trap nights from 1997 through 2000 and marked 879 squirrels for mark-recapture population analysis. Ponderosa pine (Pinus ponderosa) forest appeared to be poorer habitat for flying squirrels than young or mature mixed-conifer forest. About 35% fewer individuals were captured in open pine forest than in dry mixed-conifer Douglas-fir (Pseudotsuga menziesii) and grand fir (Abies grandis) forests. Home ranges were 85% larger in pine forest (4.6 ha) than in mixed-conifer forests (2.5 ha). Similarly, population density (Huggins estimator) in ponderosa pine forest was half (1.1 squirrels/ha) that of mixed-conifer forest (2.2 squirrels/ha). Tree canopy cover was the single best correlate of squirrel density (r=0.77), with an apparent threshold of 55% canopy cover separating stands with low- from high-density populations. Pradel estimates of annual recruitment were lower in open pine (0.28) than in young (0.35) and mature (0.37) forest. High recruitment was most strongly associated with high understory plant species richness and truffle biomass. Annual survival rates ranged from 45% to 59% and did not vary among cover types. Survival was most strongly associated with understory species richness and forage lichen biomass. Maximum snow depth had a strong negative effect on survival. Rate of per capita increase showed a density-dependent response. Thinning and prescribed burning in ponderosa pine and dry mixed conifer forests to restore stable fire regimes and forest structure might reduce flying squirrel densities at stand levels by reducing forest canopy, woody debris, and the diversity or biomass of understory plants, truffles, and lichens. Those impacts might be ameliorated by patchy harvesting and the retention of large trees, woody debris, and mistletoe brooms. Negative stand-level impacts would be traded for increased resistance and resilience of dry-forest landscapes to now-common, large-scale stand replacement fires. © 2006 by the Ecological Society of America.
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928. **A density-dependent matrix model for bottomland hardwood stands in the Lower Mississippi Alluvial Valley.**
Zhao, Dehai; Borders, Bruce; and Wilson, Machelle
Ecological Modelling 184(2-4): 381-395. (2005)
NAL Call #: QH541.15.M3E25; ISSN: 0304-3800
Descriptors: density dependent matrix model: mathematical and computer techniques/ wildlife habitat/ biodiversity/ timber production/ Lower Mississippi Alluvial Valley/ water quality protection
Abstract: Bottomland hardwoods in the Lower Mississippi Alluvial Valley (LMAV) have become one of the most endangered ecosystems in the United States. This ecosystem is an important ecological resource providing many functions and values such as wildlife habitat, water quality protection, biodiversity, and timber production. Active management and restoration of bottomland hardwoods stress the need for tools to support decision-making, but no reliable quantitative information, such as developed growth and yield models, is available for such forests with high species diversity. A density-dependent matrix model, which recognizes differences in tree species and size, was developed for these bottomland mixed-species hardwoods in LMAV. The model was calibrated using data from continuous forest inventory plots. Trees were placed in one of 13 diameter classes of soft hardwoods or hard hardwoods, or four diameter classes of non-commercial species. Five-year predictions show good

agreement between the actual and predicted diameter distributions. In terms of value of stand basal area, the model predicted well for stands with densities ranging from 13.8 to 41.3 m^2/ha (60-180 ft^2/acre). The model will be useful for short-term inventory projections and simulation studies of the development of these stands using different management regimes. © 2004 Elsevier B.V. All rights reserved.
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929. **A density management diagram for longleaf pine stands with application to red-cockaded woodpecker habitat.**
Shaw, J. D. and Long, J. N.
Southern Journal of Applied Forestry 31(1): 28-38. (2007)
NAL Call #: SD1.S63; ISSN: 01484419
Descriptors: Picoides borealis/ Pinus palustris/ silviculture/ stand density index/ stocking diagram
Abstract: We developed a density management diagram (DMD) for longleaf pine (Pinus palustris P. Mill.) using data from Forest Inventory and Analysis plots. Selection criteria were for purity, defined as longleaf pine basal area (BA) that is 90% or more of plot BA, and even-agedness, as defined by a ratio between two calculations of stand density index. The diagram predicts stand top height (mean of tallest 40 trees/ac) and volume (ft^3/ac) as a function of quadratic mean diameter and stem density (trees/ac). In this DMD we introduce a "mature stand boundary" that, as a model of stand dynamics, restricts the size-density relationship in large-diameter stands more than the expected self-thinning trajectory. The DMD is unbiased by geographic area and therefore should be applicable throughout the range of longleaf pine. The DMD is intended for use in even-aged stands, but may be used for uneven-aged management where a large-group selection system is used. Use of the diagram is illustrated by development of density management regimes intended to create and maintain stand structure desirable for the endangered red-cockaded woodpecker (Picoides borealis).
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930. **Diameters and heights of trees with cavities: Their implications to management.**
Bunnell, Fred L.; Wind, Elke; Boyland, Mark; and Houde, Isabelle
In: Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests, General Technical Report-PSW 181/ Laudenslayer, W. F.; Shea, P. J.; Valentine, B. E.; Weatherspoon, C. P.; and Lisle, T. E.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 717-737.
Notes: 0196-2094 (ISSN); Symposium held November 2-4, 1999 in Reno, NV.
http://www.fs.fed.us/psw/publications/documents/gtr-181/
Descriptors: commercial activities/ conservation measures/ ecology/ habitat utilization/ terrestrial habitat/ land zones/ Aves/ Mammalia: forestry/ tree cavity use in relation to tree diameter and height significance/ habitat management/ habitat utilization/ tree cavity use/ influence of tree diameter and height/ management implications/ forest/ habitat preference/ forest and woodland/ North America/ Pacific Northwest/ tree cavity use in relation to tree diameter and height/ forest management significance/ Aves/ birds/ chordates/ mammals/ vertebrates
Abstract: Primary cavity nesters select larger trees when nesting in conifers than when nesting in hardwoods. Larger birds use larger nest trees, but the trend is more weakly expressed in hardwoods, as is expected if rot governs nest tree selection. Birds select larger nest trees in more productive coastal forests than in inland forests. Actual nest heights are much shorter than nest tree heights, but species-specific averages are rarely below 5 meters. Larger mammals require older, larger trees where rot is advanced. Bats also use larger trees, particularly when roosting in conifers. Sustaining all cavity users requires sustained provision of a range of diameters of decaying and dead trees, including some trees at least 50 cm dbh (smaller in less productive forests).
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931. **The disruption of an ant-aphid mutualism increases the effects of birds on pine herbivores.**
Mooney, K. A.
Ecology 87(7): 1805-1815. (2006)
NAL Call #: 410 Ec7; ISSN: 00129658
Descriptors: ant-aphid mutualism/ canopy arthropod community/ Cinara/ emergent multiple-predator effect/ Essigella/ insect community ecology/ intraguild predation/ mutualism/ Pinus ponderosa/ Schizolachnus/ trait-mediated indirect interaction
Abstract: Predators affect herbivores directly and indirectly, by consumptive and nonconsumptive effects, and the combined influence of multiple predators is shaped by interactions among predators. I documented the individual and combined effects of birds (chickadees, nuthatches, warblers) and ants (Formica podzolica) on arthropods residing in pine (Pinus ponderosa) canopies in a factorial field experiment. Birds and ants removed herbivores but simultaneously benefited them by removing predatory arthropods. Birds and ants had net negative and positive effects, respectively, on the abundance of herbivore prey, supporting the notion that vertebrate predators have stronger negative effects on herbivores than do arthropod predators. Aphids (ant-tended and untended species) constituted three-quarters of herbivore biomass. The effect of birds on ant-tended aphids was twice that on untended aphid species or tended aphid species without ants. This was not due to there being more ant-tended aphids for birds to prey on; tended and untended aphid species were in similar abundances in the absence of birds. Instead, the effects of birds were strengthened by attributes of the mutualism that rendered tended aphids susceptible to predation. These dynamics led to nonadditive effects of birds and ants: birds only reduced tended aphid species and total herbivore abundances on trees with ants, while ants only increased tended aphid species and total herbivore abundances in the absence of birds. Consequently, top predators in this system only influenced total herbivore abundance when they disrupted an ant-aphid mutualism. © 2006 by the Ecological Society of America.
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932. **Distribution patterns of birds associated with snags in natural and managed eastern boreal forests.**
Drapeau, Pierre; Nappi, Antoine; Giroux, Jean Francois; Leduc, Alain; and Savard, Jean Pierre
In: Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests, General Technical Report-PSW 181/ Laudenslayer, W. F.; Shea, P. J.; Valentine, B. E.; Weatherspoon, C. P.; and Lisle, T. E.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 193-205.
Notes: 0196-2094 (ISSN); Symposium held November 2-4, 1999 in Reno, NV.
http://www.fs.fed.us/psw/publications/documents/gtr-181/
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land zones/ North America/ Canada/ Aves: forestry/ forest/ Ontario and Quebec/ habitat management/ species distribution/ dead trees/ natural vs managed forest significance/ distribution within habitat/ natural vs managed forest/ habitat utilization/ forest and woodland/ Ontario/ Abitibi Lake model Forest/ Quebec/ Abitibi region/ Aves/ birds/ chordates/ vertebrates
Abstract: In boreal forests, several bird species use standing dead trees for feeding or nesting and depend on them for their survival. Studies on wildlife use of snags have shown that their availability is greatly influenced by the age of the forest and the type of perturbation (natural versus anthropogenic). Accordingly, cavity-nesting birds seem largely affected by these changes in availability of snags. In North American boreal forests, relationships between birds and dead wood availability have predominantly been documented in western forests. The dynamics of dead wood and the distribution patterns of birds associated with this habitat feature remain largely unknown in eastern black spruce forests. Distribution patterns of birds associated with dead wood were documented in the eastern black spruce forest of northwestern Quebec, Canada. Study areas were composed of four forest landscapes (50-100 kmz) that were naturally disturbed by different fire events (1 year, 20 years, 100 years and > 200 years) and two logged landscapes (20 years, 80 years). Birds were surveyed by point counts. Overall, 348 point counts were distributed over the six forest landscapes. Vegetation plots centered at each point count were used to sample live trees and dead wood. In naturally disturbed forest landscapes, species richness and abundance cavity-nesting birds reached a peak in early post-fire and in mature forest landscapes. Standing dead wood availability and abundance patterns of cavity-nesting birds were significantly less in 20-year-old managed forests landscapes than in those of naturally disturbed forests landscapes. This pattern was persistent in mature forests comparisons between 80-year-old horse-logged second-growth forests and mature forests of post-fire origin. Our results suggest that old-growth forests in this portion of the eastern black-spruce forest ecosystem do not play a key role for cavity- nesting birds. Mature and over-mature stands are, however, key habitats for many species of secondary cavity nesters, whereas early post-fire stands are key habitats for primary cavity-nesting birds and represent the main source of recruitment for standing dead wood in this ecosystem. Changes in silvicultural practices designed to maintain specific structure of over-mature stands (increased partial cutting) may provide a means for maintaining cavity-nesting birds at the landscape scale. Intensification of salvage cutting in early post-fire landscapes is another serious concern in black spruce forests. Reduction in the overall availability of dead wood through such forest practice may affect populations of some primary cavity nesters that are restricted to this specific forest type.
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933. **Disturbance effects on small mammal species in a managed Appalachian forest.**
Kaminski, J. A.; Davis, M. L.; Kelly, M.; and Keyser, P. D.
American Midland Naturalist 157(2): 385-397. (2007)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: ecological disturbance/ forestry practices/ forests/ habitat selection/ habitats/ harvesting/ logging/ microhabitats/ mountain areas/ mountain forests/ small mammals/ wild animals/ wildlife conservation/ Acer rubrum/ Acer saccharum/ Betula alleghaniensis/ Blarina brevicauda/ Clethrionomys gapperi/ Dipodidae/ Fagus grandifolia/ Liriodendron tulipifera/ Magnolia/ Peromyscus leucopus/ Peromyscus maniculatus/ Prunus serotina/ Tamias striatus
Abstract: Forestry practices result in a range of levels of disturbance to forest ecosystems, from clearcutting and deferment (high disturbance) to single-tree selection cutting and unharvested forests (low disturbance). We investigated the effects of timber harvest and disturbance on small mammal species in the Allegheny Mountains of West Virginia. In 2003 and 2004, mammals were captured using Sherman box traps, individually marked, and released. We collected habitat data in 2004 to characterize macrohabitat at the stand level and microhabitat surrounding each trap. Trap success was significantly higher in disturbed habitats than undisturbed habitats for red-backed vole Myodes (Clethrionomys) gapperi (P=0.0012) and woodland jumping mouse Napaeozapus insignis (P=0.0221). Abundance estimated using the Jolly-Seber method was significantly higher in disturbed habitats for red-backed voles (P=0.0001). Adult northern short-tailed shrews Blarina brevicauda (P=0.0001) and white-footed and deer mice Peromyscus spp. (P=0.0254) weighed more in disturbed habitats. Small mammal distribution was strongly influenced by microhabitat factors, which differed substantially within stands. Leaf litter depth was a significant microhabitat factor for four of the five species analyzed, with red-backed voles (P=0.0001), woodland jumping mice (P=0.0001), Peromyscus spp. (P=0.0055), and eastern chipmunks Tamias striatus (P=0.0007) all preferring shallow leaf litter. These small mammal species responded neutrally or favorably to disturbance, and identified favorable microhabitat features regardless of stand type.
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934. **Diversity and abundance of breeding birds in a managed loblolly pine forest in Louisiana.**
Legrand, H. G.; Chamberlain, M. J.; and Moser, E. B.
American Midland Naturalist 157(2): 329-344. (2007)
NAL Call #: 410 M58; ISSN: 00030031.
Notes: doi: 10.1674/0003-0031(2007)157 [329:DAAOBB]2.0.CO;2.
Descriptors: Pinus taeda/ loblolly pine/ birds/ breeding/ wildlife habitat/ Louisiana
Abstract: Declines of numerous Neotropical migrant birds have been attributed to habitat destruction and alteration. Forest management activities may promote changes to habitat components and, with the increase in commercial forestry in the South, information on Neotropical migrants in

managed forests is needed. We examined the avian communities and habitat characteristics of four forest age classes at Ben's Creek Wildlife Management Area, a managed loblolly pine (Pinus taeda) forest in eastern Louisiana during the 2003 and 2004 summer breeding seasons. Mean species richness and relative diversity in 4-5 and 13-23 y stands were similar and greater than 7-9 y stands, and similar in 1 y stands to other age classes. Of 17 guilds (habitat, foraging and nesting) examined, relative abundance was similar across stand age only for second growth inhabitants and ground gleaning foragers. Frequency of occurrence varied across stand age for 17 of 19 species analyzed. Late-successional bird species occurred with greater frequency in 13-23 y stands, whereas occurrence of early-successional bird species was greater in 1 y and 4-5 y stands. Birds of conservation concern detected included both early- and late-successional species. Mean bird community conservation value was similar across stand age. Effects of stand age appear to benefit certain species, but are potentially costly for others. Efforts to combine management of timber and conservation of songbirds must consider both species habitat requirements and the distribution of these requirements in the landscape.
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935. **Diversity in ponderosa pine forest structure following ecological restoration treatments.**
Waltz, A. E. M.; Fule, P. Z.; Covington, W. W.; and Moore, M. M.
Forest Science 49: 885-900. (Dec. 2003)
NAL Call #: 99.8 F7632
Descriptors: Pinus ponderosa/ forest trees/ coniferous forests/ Populus tremuloides/ Pinus edulis/ Juniperus osteosperma/ Artemisia tridentata/ Bromus tectorum/ ecological restoration/ natural regeneration/ stand structure/ stand density/ history/ canopy/ basal area/ stems/ prescribed burning/ wildlife habitats/ fire behavior/ forest litter/ forest thinning/ dendrochronology/ Quercus gambelii/ Robinia/ Arizona/ Robinia neomexicana/ forest mensuration and description/ forestry production natural regeneration/ forest fire management/ natural resources, environment, general ecology, and wildlife conservation/ forestry related
Abstract: We tested the effectiveness of ponderosa pine forest restoration by comparing forest restoration treatments to untreated forest and to reconstructed forest structure in 1870 (date of Euro-American settlement) using an experimental block design at the Grand Canyon-Parashant National Monument in northwestern Arizona. Forest tree density averaged more than 20 times the historical tree density, and basal area was 4 to 6 times higher in contemporary forests than in historical forests. Restoration treatments consisted of thinning young trees to emulate the forest density, tree composition, and spatial distribution in 1870, followed by prescribed burning. Following restoration treatment, tree density was significantly reduced but remained 6 times higher than historical forests. Basal area in restored forests was still 2.5 times greater than reconstructed basal area values. Ponderosa pine dominance changed little from pretreatment data across the four blocks, averaging 60% of stems and 87% of the basal area prior to treatment and 56% of stems and 85% of the basal area following treatment. Ninety-eight percent of contemporary forest trees were less than 100 yr old prior to restoration treatment; this proportion was reduced to 82% following treatment. Restoration treatment also significantly reduced canopy cover and increased total tree regeneration. However, treatment effects on forest fuels were highly variable. Litter and duff fuel layers were significantly reduced by prescribed fire but woody debris increased. Overall forest structural diversity following treatment implies that fire behavior, wildlife habitats, and other ecological attributes will vary relatively widely in the future landscape. This citation is from AGRICOLA.

936. **Diversity of the beetle (Coleoptera) community captured at artificially-created snags of Douglas-fir and Grand fir.**
Sandoval, S. J.; Cook, S. P.; Merickel, F. W.; and Osborne, H. L.
Pan-Pacific Entomologist 83(1): 41-49. (2007); ISSN: 00310603
Descriptors: Buprestidae/ Cerambycidae/ Curculionidae/ Scolytinae/ snags/ species diversity/ species richness
Abstract: Snags are dead standing trees that have been killed by such forces as fire, wind, lightning, insects/disease, drought and/or flooding. Snag management includes such practices as protecting/maintaining existing snags and artificially creating additional snags. Snags can be used by the insect community that occurs on a site. The objective of the current study was to describe and compare the abundance, species composition and diversity of the beetle community captured adjacent to artificially created snags of Douglas-fir, Pseudotsuga menziesii var. glauca Franco, and Grand fir, Abies grandis (Douglas) Lindley. Beetle populations directly adjacent to the artificially created snags were monitored throughout the season using Lindgren-funnel traps placed directly adjacent to snags. A total of 27,428 beetles from 28 families were captured from May through September, 2002. Significantly more beetles were captured adjacent to the Douglas-fir snags than the Grand fir snags. Beetle capture was highest in late May and lowest in early August. Family richness of the captured beetle community was similar at traps adjacent to the Douglas-fir and Grand fir snags but family diversity was lower at traps adjacent to the Douglas-fir snags. A single species, Hylastes nigrinus (Mannerheim) (Curculionidae: Scolytinae), dominated the early capture peak. Ten genera of scolytids and at least 14 species were captured. An additional 10 genera (16 species) of other curculionids were captured. The population of these other curculionids was similar in abundance, richness and diversity at both the Douglas-fir and Grand fir snags. There were 12 species (7 genera) of Buprestidae captured and the total population was also similar adjacent to both snag species. The Cerambycidae captured during the study represented 26 species, with species richness and diversity being higher adjacent to the Grand fir snags.
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937. **Dying and dead hardwoods: Their implications to management.**
Bunnell, Fred L.; Wind, Elke; and Wells, Ralph
In: Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests, General Technical Report-PSW 181/ Laudenslayer, W. F.; Shea, P. J.; Valentine, B. E.; Weatherspoon, C. P.; and Lisle, T. E.; Albany, CA: Pacific Southwest Research

Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 695-716.
Notes: 0196-2094 (ISSN); Symposium held November 2-4, 1999 in Reno, NV.
http://www.fs.fed.us/psw/publications/documents/gtr-181/
Descriptors: conservation measures/ nutrition/ feeding behavior/ reproduction/ reproductive behavior/ ecology/ community structure/ terrestrial habitat/ land zones/ comprehensive zoology: habitat management/ ecological importance of presence of hardwoods significance/ forest/ foraging/ site preferences/ presence of hardwood trees relationship/ parental care/ rearing location/ species diversity/ forest and woodland/ ecological importance of presence of hardwoods and habitat management implications/ North America/ Pacific Northwest
Abstract: Although they usually comprise less than 10 percent of forest cover in western forests, hardwoods contribute greatly to sustaining biological richness. Hardwoods are highly preferred as cavity sites, are preferred foraging sites for several bird species, encourage insectivorous mammals and amphibians, and provide preferred substrate for many cryptogams and invertebrates. In the Pacific Northwest, two cavity-nesting species choose hardwoods for 70 percent or more of their nest sites, while many prefer hardwoods, even in coastal forests where hardwoods are scarce. Because many forest-dwelling species in the Pacific Northwest show strong preferences for hardwoods, hardwoods should be retained and managed as desired trees.
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938. **Ecological impacts of deer overabundance.**
Cote, S. D.; Rooney, T. P.; Tremblay, J. P.; Dussault, C.; and Waller, D. M.
Annual Review of Ecology, Evolution, and Systematics 35: 113-147. (2004); ISSN: 00664162.
Notes: doi: 10.1146/annurev.ecolsys.35.021103.105725.
Descriptors: browsing/ Cervidae/ forest regeneration/ herbivory/ plant-herbivore interactions/ browsing/ ecological impact/ plant-herbivore interaction/ ungulate/ Animalia/ Aves/ Cervidae/ Hexapoda/ Insecta/ Mammalia
Abstract: Deer have expanded their range and increased dramatically in abundance worldwide in recent decades. They inflict major economic losses in forestry, agriculture, and transportation and contribute to the transmission of several animal and human diseases. Their impact on natural ecosystems is also dramatic but less quantified. By foraging selectively, deer affect the growth and survival of many herb, shrub, and tree species, modifying patterns of relative abundance and vegetation dynamics. Cascading effects on other species extend to insects, birds, and other mammals. In forests, sustained overbrowsing reduces plant cover and diversity, alters nutrient and carbon cycling, and redirects succession to shift future overstory composition. Many of these simplified alternative states appear to be stable and difficult to reverse. Given the influence of deer on other organisms and natural processes, ecologists should actively participate in efforts to understand, monitor, and reduce the impact of deer on ecosystems.
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939. **Ecological management and restoration of bat trees.**
Brown, Timothy K.
Bat Research News 41(4): 111. (2000)
NAL Call #: QL737.C5 B328; ISSN: 0005-6227
Descriptors: bats/ habits-behavior/ ecosystems/ foods-feeding/ forestry practices/ forests/ habitat management/ habitat use/ mammals/ management/ restoration/ roosts/ roosting/ techniques/ wildlife/ Washington
Abstract: The author presented information on techniques for modifying tree structure and function in younger forests and maintenance of existing trees in more mature forests. A variety of techniques utilizing chain saws, fire, and logging are used to create special bat roosting and foraging features in Washington forests.
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940. **Ecological relationships of terrestrial small mammals in western coniferous forests.**
Hallett, James G.; O'Connell, Margaret A.; and Maguire, Chris C.
In: Mammal community dynamics: Management and conservation in the coniferous forests of western North America/ Zabel, C. J. and Anthony, R. G., 2003; pp. 120-156.
Notes: Literature review; 0511057903 (ISBN).
Descriptors: commercial activities/ conservation measures/ ecology/ land zones/ Mammalia: forestry/ coniferous forest management/ ecological relationships/ small terrestrial fauna/ habitat management/ North America/ Mammalia/ chordates/ mammals/ vertebrates
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941. **Ecological research at the Goosenest Adaptive Management Area in northeastern California.**
Ritchie, Martin W.
Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; General Technical Report-PSW 192, 2005. 121 p.
Notes: 0196-2094 (ISSN).
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Aves/ Mammalia: forestry/ establishment and activities/ forest/ habitat management/ ecology/ large scale ecological research project/ Establishment and activities/ fire/ California/ Klamath National Park/ Goosenset Ranger District/ birds/ chordates/ mammals/ vertebrates
Abstract: This paper describes the establishment of an interdisciplinary, large-scale ecological research project on the Goosenest Adaptive Management Area of the Klamath National Forest in northeastern California. This project is a companion to the Blacks Mountain Ecological Research Project described by Oliver (2000). The genesis for this project was the Northwest Forest Plan (USDA and USDI 1994a). As a part of the Northwest Forest Plan, a network of Adaptive Management Areas was created in Oregon, Washington, and northern California. One of the primary goals of the Goosenest Adaptive Management Area was to investigate means of accelerating the development of late-successional forest properties. Led by researchers from the

Pacific Southwest Research Station in Redding, California, an interdisciplinary team of scientists designed an experiment to evaluate the use of mechanical treatments and prescribed fire to accelerate late-successional conditions in the Goosenest Adaptive Management Area. The experimental design features four treatments, each replicated five times. The treatment units are 100 acres (40.5 hectares), plus a buffer area of varying size, but generally close to 328 feet (100 meters) in width. The first of the four treatments features a thinning favoring the reestablishment of pine dominance in the forest (Pine-Emphasis Treatment). In this treatment the prescription favors the retention of dominant and codominant pine trees. The second treatment employs the same mechanical treatment as the Pine Emphasis, with the additional application of prescribed fire (Pine-Emphasis With Fire). A third treatment is a mechanical treatment intended to redistribute growth to the largest diameter trees without regard for species distribution (Large Tree Treatment). The fourth, and final, treatment is a control of no active management (Control Treatment), permitting the vegetation to continue along its current trajectory. The last of the mechanical treatments were completed in 2000. The initial prescribed burn treatment was completed on the five Pine-Emphasis-with-Fire Treatments in fall 2001; these same five units will be reburned 5-10 years after the initial burn. The first post-treatment measurements of vegetation and wildlife were taken in summer 2002. Remeasurements are planned for a 5-year cycle for most forest attributes. Currently, however, birds and small mammals are observed yearly due to year-to-year variation in abundance common to these species.
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942. **Ecological restoration of southwestern ponderosa pine ecosystems: A broad perspective.**
Allen, C. D.; Savage, M.; Falk, D. A.; Suckling, K. F.; Swetnam, T. W.; Schulke, T.; Stacey, P. B.; Morgan, P.; Hoffman, M.; and Klingel, J. T.
Ecological Applications 12(5): 1418-1433. (2002)
NAL Call #: QH540.E23; ISSN: 10510761
Descriptors: anthropogenic change/ ecological restoration/ ecosystem management/ fire suppression effects/ forest restoration programs/ natural range of variation/ ponderosa pine forests/ reference conditions/ United States, southwestern region/ ecosystem management/ forest ecosystem/ prescribed burning/ restoration ecology/ thinning/ Pinus ponderosa
Abstract: The purpose of this paper is to promote a broad and flexible perspective on ecological restoration of Southwestern (U.S.) ponderosa pine forests. Ponderosa pine forests in the region have been radically altered by Euro-American land uses, including livestock grazing, fire suppression, and logging. Dense thickets of young trees now abound, old-growth and biodiversity have declined, and human and ecological communities are increasingly vulnerable to destructive crown fires. A consensus has emerged that it is urgent to restore more natural conditions to these forests. Efforts to restore Southwestern forests will require extensive projects employing varying combinations of young-tree thinning and reintroduction of low-intensity fires. Treatments must be flexible enough to recognize and accommodate: high levels of natural heterogeneity; dynamic ecosystems; wildlife and other biodiversity considerations; scientific uncertainty; and the challenges of on-the-ground implementation. Ecological restoration should reset ecosystem trends toward an envelope of "natural variability," including the reestablishment of natural processes. Reconstructed historic reference conditions are best used as general guides rather than rigid restoration prescriptions. In the long term, the best way to align forest conditions to track ongoing climate changes is to restore fire, which naturally correlates with current climate. Some stands need substantial structural manipulation (thinning) before fire can safely be reintroduced. In other areas, such as large wilderness and roadless areas, fire alone may suffice as the main tool of ecological restoration, recreating the natural interaction of structure and process. Impatience, overreaction to crown fire risks, extractive economics, or hubris could lead to widespread application of highly intrusive treatments that may further damage forest ecosystems. Investments in research and monitoring of restoration treatments are essential to refine restoration methods. We support the development and implementation of a diverse range of scientifically viable restoration approaches in these forests, suggest principles for ecologically sound restoration that immediately reduce crown fire risk and incrementally return natural variability and resilience to Southwestern forests, and present ecological perspectives on several forest restoration approaches.
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943. **An ecological simulation framework integrating forest dynamics and red-cockaded woodpecker habitat management.**
Rewerts, Chris C.; Doresky, John K.; Swiderek, Peter K.; Barron, Michael G.; and Sydelko, Pamela J.
In: 89th Annual Meeting of the Ecological Society of America: Lessons of Lewis and Clark: Ecological Exploration of Inhabited Landscapes. Portland, OR.; p. 424; 2004.
Descriptors: biogeography: population studies/ forestry/ wildlife management: conservation/ forest dynamics/ forest management/ habitat management/ population recovery
Abstract: The red-cockaded woodpecker (Picoides borealis) (RCW) is a federally listed endangered species endemic to open, mature and old growth pine ecosystems in the southeastern United States. At Fort Benning, Georgia, the RCW population recovery is inarguably the most central and critical land management issue. Over the course of the last several years, a number of management actions have resulted in an increase in the installation's RCW population. Longer term goals for the installation RCW recovery have focused on developing restoration strategies designed to reestablish a dominant upland canopy structure of longleaf pine (Pinus palustris), which were likely present as the primary upland forest type in pre-settlement conditions. Currently, older stands of loblolly pines (Pinus taeda) dominate these areas, and thus are the critical source of habitat for the RCW. The loblolly species are considered "off-site" for these areas; being not well adapted to the local conditions, they are showing signs of a combination of stress and disease known as "pine decline syndrome" and ultimately premature mortality. The combination of having a large proportion of the RCW population dependant upon senescing stands of loblolly pines presents the possibility that the installation will be facing a potential of significant population declines. Responding to this, the installation organized a workshop in

February 2004 to explore strategies for RCW management, longleaf restoration, and components of pine decline syndrome. The goal is to represent these strategies in a simulation framework that combines the dynamics of forest management, growth, and mortality with a spatially-explicit, individual based model of the population dynamics of the RCW. This simulation framework needs to be able to help prioritize short-term management actions as well as to project longer-term outcomes of management plans. This paper gives the status of the understanding of the situation, the management actions proposed, and the strategies developed to use simulation tools to focus the management actions and project their outcomes.
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944. **Economic and biological compatibility of timber and wildlife production: An illustrative use of production possibilities frontier.**
Rohweder, Mark R.; McKetta, Charles W.; and Riggs, Robert A.
Wildlife Society Bulletin 28(2): 435-447. (2000)
NAL Call #: SK357.A1W5; ISSN: 0091-7648.
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ comprehensive zoology: forestry/ habitat management/ forest and woodland/ timber and wildlife resource compatibility analysis
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945. **Edge effect on nesting success of ground nesting birds near regenerating clearcuts in a forest-dominated landscape.**
Manolis, J. C.; Andersen, D. E.; and Cuthbert, F. J.
Auk 119(4): 955-970. (2002)
NAL Call #: 413.8 AU4 ; ISSN: 00048038
Descriptors: avifauna/ clearcutting/ ecological impact/ edge effect/ forest edge/ nesting success/ population ecology/ silviculture/ United States/ Catharus guttatus/ Molothrus ater/ Seiurus aurocapillus
Abstract: Forest fragmentation has been implicated as a cause of population declines of several Neotropical migrant bird species. Fragmentation increases the amount of habitat edge, and reduced nesting success rates near forest edges are well documented in agricultural landscapes ("edge effects"). However, edge effects in predominantly forested landscapes, particularly those related to timber harvest, are poorly understood. This study examines nesting success of ground nesting birds in relation to clearcut edges in a forest-dominated landscape in north-central Minnesota. A total of 383 nests of seven species of ground nesting birds were found and monitored during 1992-1998. Ovenbird (Seiurus aurocapilus; n = 318) and Hermit Thrush (Catharus guttatus; n = 44) nests composed the majority of the sample. Predation accounted for 94% of all nest failures. Brown-headed Cowbird (Molothrus ater) parasitism was low (1.8% for all ground nests). Using proportional hazards regression, distance to nearest clearcut edge was the best predictor of nest failure. For all ground nests, nesting success was 0.18 at 0-100 m, 0.39 at 101-500 m, and 0.52 at 501-954 m from nearest clearcut edge. Source-sink modeling indicated that distances ≤100 m from clearcut edges were sink habitats for Ovenbirds (i.e. recruitment was lower than survival). These results provide strong evidence of a negative edge effect on ground nests, extending 100 m or more from clearcut edges in a forest-dominated area of north-central Minnesota.
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946. **Edge effects on nesting dickcissels (Spiza americana) in relation to edge type of remnant tallgrass prairie in Kansas.**
Jensen, W. E. and Finck, E. J.
American Midland Naturalist 151(1): 192-199. (2004)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: bird/ brood parasitism/ edge effect/ grassland/ nest predation/ Kansas/ Spiza americana
Abstract: Edge effects on grassland-nesting birds should be less pronounced or absent near cropland edges of grasslands that lack wooded-edge habitat often used by nest predators and brood parasites. We compared nest predation, brood parasitism and densities of dickcissel (Spiza americana) nests in relation to distance from woodland and cropland edges of Kansas tallgrass prairie. Daily nest predation rates did not differ (P > 0.25) among distance intervals (≤50 m, 51-100 m, ≤100 m and >100 m) from either edge type or among 50-m intervals adjacent to each edge type. Brood parasitism rates by the brown-headed cowbird (Molothrus ater) were higher ≤100 m vs. >100 m from woodland edges (P = 0.04), being highest ≤50 m from woodland edges (P = 0.09). Parasitism rates were not related to distance from cropland edges, although parasitism rates ≤50 m from woodland and cropland edges were statistically similar (P = 0.16). Dickcissel nest densities were lower ≤50 m from woodland edges relative to farther distance intervals (P = 0.004), indicating dickcissel avoidance of this edge type. There was no similar pattern of nest density on cropland-edged sites, but nest densities ≤50 in from woodland and cropland edges were statistically similar (P = 0.17). Thus, some woodland edge effects on this grassland bird species were apparent but might vary geographically.
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947. **Effect of cattle stocking rate on the nutritional ecology of white-tailed deer in managed forests of southeastern Oklahoma and southwestern Arkansas.**
Jenks, Jonathan. Oklahoma State University, 1992.
Descriptors: Odocoileus virginianus/ livestock/ food supply/ feeding behavior/ nutrition/ grazing/ habitat alterations/ wildlife-livestock relationships/ Arkansas: Pike County/ Arkansas: Howard County/ Oklahoma: McCurtain County
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948. **Effect of domestic cattle on the condition of female white-tailed deer in southern pine-bluestem forests, USA.**
Jenks, Jonathan A.; Leslie, David M.; and Leslie, D. M.
Acta Theriologica 48(1): 131-144. (2003)
NAL Call #: 410 AC88; ISSN: 0001-7051
Descriptors: Arkansas/ carcass weight/ cattle stocking/ commercial enterprises/ disturbances/ ecosystems/ farming and agriculture/ fat/ femur/ food competition/ food supply/ forest management/ forests/ globulin/ glucose/ habitat use/ Howard and Pike Counties/ interspecies relationships/ interspecies relationships or intraspecies relationships/ kidneys/ land zones/ McCurtain County/ nutrition/ nutritional condition/ Oklahoma/ physical condition/ physiological

indices/ physiology/ productivity/ reproduction/ soils/ southern pine bluestem forests/ stocking intensity/ vegetation/ wildlife management/ wildlife-human relationships/ white-tailed deer/ cattle/ agriculture/ condition/ weight/ competition/ food/ pregnancy/ blood
Abstract: Effect of domestic cattle stocking on the nutritional condition of white-tailed deer Odocoileus virginianus (Zimmermann, 1780) was assessed using physiological indices of collected specimens. Three study areas were delineated in McCurtain County, Oklahoma (heavy cattle stocking), and Howard (moderate to light cattle stocking) and Pike (no cattle stocking) counties, Arkansas that were similar with respect to soils and vegetation but differed with respect to cattle stocking rate. Female white-tailed deer were collected from study areas in February and August 1987-1988 to assess nutritional condition. Deer collected from study areas exposed to cattle grazing in February had lower carcass weights, fat attributes (femur marrow and kidney fat), and reproductive rates (fetuses/doe) than deer that were not exposed to cattle grazing. In August, deer collected from the moderate cattle area had heavier eviscerated carcass weights, serum glucose, albumin, and albumin/globulin ratios than deer collected from the heavy cattle area. Results suggest that if cattle are removed from managed forests in winter, nutritional condition of deer would be improved because of reduced competition for food.
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949. **The effect of forest roads on the reproductive success of forest-dwelling passerine birds.**
King, D. I. and DeGraaf, R. M.
Forest Science 48(2): 391-396. (2002)
NAL Call #: 99.8 F7632; ISSN: 0015749X
Descriptors: edges/ habitat/ microclimate/ nest success/ Seiurus aurocapillus/ biodiversity/ microclimate/ forestry/ Seiurus aurocapillus
Abstract: Recent studies indicate that forest roads may affect the distribution of forest-dwelling birds. However, previous studies have not demonstrated any significant effects of forest roads on avian productivity. We studied the effect of maintained and unmaintained forest roads on (1) forest bird nest survival, (2) reproductive parameters of ovenbirds (Seiurus aurocapillus) potentially associated with food abundance, and (3) habitat and microclimate at six sites on the White Mountain National Forest, New Hampshire, during two breeding seasons. Nest survival did not differ between areas near (0-150 m) and far (>150 m) from maintained forest roads, and was marginally (P=0.08) higher in areas near (0-150 m) unmaintained roads. When the 0-150 m distance class was subdivided, however, nest survival was significantly higher within 0-75 m of maintained roads than >75-150 m away. Ovenbird nest initiation dates, clutch size, and fledging success did not differ between areas near (0-150 m) and far (>150 m) from maintained and unmaintained forest roads, and this result did not change when the distance class 0-150 m from roads was subdivided. There were no relationships between habitat or microclimate and distance from maintained roads. We conclude that small, unsurfaced forest roads at low road density do not result in decreases in forest passerine bird productivity in extensively forested areas in New England.
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950. **The effect of shelterwood harvesting and site preparation on eastern red-backed salamanders in white pine stands.**
Morneault, Andree E.; Naylor, Brian J.; Schaeffer, Lee S.; and Othmer, Dianne C.
Forest Ecology and Management 199(1): 1-10. (2004)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ conservation measures/ ecology/ population dynamics/ terrestrial habitat/ land zones/ North America/ Canada/ Plethodon cinereus: forestry/ habitat management/ population size/ forest shelterwood harvesting and site preparation effects/ forest and woodland/ White pine forest/ Ontario/ Central/ Amphibia, Lissamphibia, Caudata, Plethodontidae/ amphibians/ chordates/ vertebrates
Abstract: We studied the effects of the regeneration cut of the shelterwood system and four site preparation options on populations of eastern red-backed salamanders in 90-100-year-old white pine forests in central Ontario, Canada. We established the study in 1994 using a randomized complete block design with three replicates and five treatments: (1) no harvest, no site preparation; (2) harvest. no site preparation; (3) harvest, mechanical site preparation; (4) harvest, chemical site preparation; (5) harvest, mechanical and chemical site preparation. We applied harvest and site preparation treatments from fall 1995 to fall 1997. We collected pre-treatment data in spring and summer of 1995 and post-treatment data from 1998 to 2002. We monitored salamander abundance using a grid of 20 cover boards surveyed 10 times per year within each of the 15 treatment plots. We also quantified changes in overstory and understory cover, supply of downed woody debris, and disturbance to the forest floor. Our data suggest that shelterwood cutting and site preparation can have immediate negative effects on the abundance of red-backed salamander populations in pine forest. However, effects are relatively short lived (5 years). Changes in abundance appeared to be related to overstory and understory cover, and forest floor disturbance. © 2004 Elsevier B.V. All rights reserved.
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951. **Effect of vegetation maintenance of an electric transmission right-of-way on reptile and amphibian populations.**
Yahner, R. H.; Bramble, W. C.; and Byrnes, W. R.
Journal of Arboriculture 27(1): 24-29. (2001)
NAL Call #: SB436.J6; ISSN: 02785226
Descriptors: amphibians/ herbicides/ reptiles/ right-of-way/ salamanders/ snakes/ tree control/ relative abundance/ species diversity/ United States/ Diadophis punctatus/ Plethodon cinereus/ Storeria occipitomaculata
Abstract: A 2-year study of reptile and amphibian populations was conducted on a 230-kV transmission line right-of-way (ROW) of GPU Energy in the Allegheny Mountain Physiographic Province, Centre County, Pennsylvania, U.S., from June through October 1998 and March through October 1999. The objective was to compare the diversity and relative abundance of reptiles and amphibians between the ROW versus the adjacent forest, among five treatment units on the ROW, and between wire and borders zones on treatments on the ROW. Nine species were recorded during the study, with the three most common species being redback salamanders (Plethodon cinereus), northern redbelly

snakes (Storeria occipitomaculata occipitomaculata), and northern ringneck snakes (Diadophis punctatus edwardsii). All nine species occurred on the ROW, but only redback salamanders and Jefferson salamanders (Ambystoma jeffersonianum) were found in the adjacent forest. The diversity and relative abundance ranged from six species in the stem-foliage unit to three species in the handcutting unit. Eight and six species, respectively, were noted in the wire and border zones of the ROW. However, 81% of the observations in wire zones were those of snakes, whereas 85% of the observations in border zones were salamanders. The ROW contained a much more diverse community of reptiles and amphibians than the adjacent forest. Forest-management practices can have negative impacts on populations of amphibians and reptiles. Thus, this study provides important information on forest-management practices required for the conservation of reptiles and amphibians.
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952. **Effects of burning and thinning on lodgepole chipmunks (Neotamias speciosus) in the Sierra Nevada, California.**
Meyer, Marc D.; Kelt, Douglas A.; and North, Malcolm P.
Northeastern Naturalist 88(2): 61-72. (2007)
NAL Call #: QH105.M2M36; ISSN: 1051-1733
Descriptors: commercial activities/ biometrics/ ecology/ population dynamics/ terrestrial habitat/ land zones/ Neotamias speciosus: forestry/ forest burning and thinning/ Effect on population structure and body mass/ weight/ body mass/ forest burning and thinning effects/ population structure/ forest and woodland/ mixed conifer forest/ burning and thinning/ California/ Sierra Nevada/ Teakettle Experimental Forest/ Mammalia, Rodentia, Sciuridae/ chordates/ mammals/ rodents/ vertebrates
Abstract: Prescribed burning and mechanical thinning are widely used to manage fuels in North American forests, but few studies have examined the relative impacts of these treatments on wildlife. Using a fully factorial and completely randomized design, we examined the short-term effects of prescribed burning (no burn vs. burn), mechanical thinning (no thin, light thin, and heavy thin), and combinations of these treatments on the capture rate and demographic parameters of Lodgepole Chipmunks (Neotamias speciosus) in mixed-conifer forests in the southern Sierra Nevada of California. Chipmunks were sampled in eighteen 4-ha treatment plots during the summer of 1999 and 2000 (pre-treatment) and 2002 and 2003 (post-treatment). Although burning and thinning caused significant changes in forest structure, neither treatment had a significant effect on the capture rate or most demographic parameters of N. speciosus. Body mass of males (2002 and 2003) and the ratio of males to females (2003) decreased following burning. Body mass and percentage reproductive females were positively correlated with the total number of White Fir (Abies concolor) cones produced across treatments and years, possibly reflecting a positive association between chipmunk reproduction and food availability. These results suggest that prescribed burning and mechanical thinning may have minor or no short-term effects on the capture rate and demography of N. speciosus in mixed-conifer forests of the Sierra Nevada, but effects over longer periods have not been investigated.
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953. **Effects of clearcutting with corridor retention on abundance, richness, and diversity of small mammals in the Coastal Plain of South Carolina, USA.**
Constantine, N. L.; Campbell, T. A.; Baughman, W. M.; Harrington, T. B.; Chapman, B. R.; and Miller, K. V.
Forest Ecology and Management 202(1-3): 293-300. (2004)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2004.07.036.
Descriptors: clearcutting/ pine plantations/ Pinus/ small mammals/ agricultural products/ coastal zones/ ecosystems/ forestry/ harvesting/ corridor retention/ habitat diversity/ pine plantation management/ biodiversity/ abundance/ forest management/ habitat corridors/ plantation/ species diversity/ species richness/ biodiversity/ rice/ South Carolina/ Gossypium hirsutum/ Mammalia/ Oryzomys palustris/ Rodentia/ Sigmodon hispidus
Abstract: We studied six pine plantations in coastal South Carolina to determine the influence of clearcutting with corridor retention on small mammal abundance, richness, and diversity. Small mammals were live-trapped in recently clearcut stands that retained pine corridors 100 m in width and in adjacent pine plantations, 20-23-years-old. We compared small mammal communities between harvested stands with corridors and non-harvested pine stands. We captured 1158 small mammals, representing 844 unique individuals and seven different species in 94,080 trap nights. Rodent abundance, richness, and diversity indices were greater in harvested stands with corridors than in non-harvested pine stands. The early successional habitat created by clearcutting was used by many small mammal species, including cotton rats (Sigmodon hispidus) and marsh rice rats (Oryzomys palustris). Species composition of small mammals within the corridor habitats was similar to that in the non-harvested pine stands. The inclusion of corridors in pine plantation management enhances habitat diversity and ecosystem maintenance and contributes to local diversity of the small mammal community.
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954. **Effects of commercial thinning on home-range and habitat use patterns of a male northern spotted owl: A case study.**
Meiman, Susan; Anthony, Robert; Glenn, Elizabeth; Bayless, Todd; Ellingson, Amy; Hansen, Michael C.; and Smith, Clint
Wildlife Society Bulletin 31(4): 1254-1262. (2003)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Strix occidentalis caurina/ Strigiformes/ Strigidae/ northern spotted owl/ Strix occidentalis/ habitat use patterns/ strix occidentalis caurina/ core use area/ home range patterns/ second-growth forests/ northern spotted owl/ old-growth forests/ wildlife-human relationships/ home range-territory/ habitat management/ habitat alterations/ habitat change/ habitat use/ commercial enterprises/ forestry practices/ commercial thinning/ terrestrial ecology/ land zones/ home-range/ disturbances/ behavior/ conservation/ male/ distribution/ ecosystems/ silviculture/ wildlife/ dispersion/ forests/ Oregon
Abstract: Presents a case study that examined the effects of commercial thinning on home-range and habitat-use patterns of spotted owls in second-growth forests in the Oregon Coast Ranges. Information on site history and radiotelemetry monitoring; Data analysis; Implications of the study on wildlife management.
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955. **The effects of corridors on herpetofauna assemblages in intensively managed forests.**
Baughman, William Mckelvey. Clemson University, 2000.
Notes: Degree: PhD; Advisor: Guynn, David C.
Descriptors: corridors/ habitat fragmentation/ species diversity/ forest management/ monitoring/ pine plantations/ survival/ coarse woody debris/ coastal plain/ South Carolina/ Pinus taeda
Abstract: Long-term studies have indicated major declines in herpetofauna communities in the United States. One activity that has drawn particular attention is forest management. While some studies have suggested that timber harvesting is a major factor contributing to this decline, others indicate that negative impacts are temporary, as buffer zones or corridors may maintain species richness within herpetofaunal communities. The objective of our study was to determine the value of corridors to herpetofauna in managed forest landscapes in the Coastal Plain of South Carolina. A 100-m wide unharvested corridor was left across each of three 20-ha harvest sites. A 1-ha enclosure was placed in each of the three corridors and within an unharvested 20-ha control area. Two standard drift fence arrays were located in the harvested areas on each site as well as in the unharvest control. Pre-harvest (January 1997 through December 1997) monitoring from the four intensively managed Pinus taeda plantations found 49 species and 4,147 individuals. Chi-square analysis revealed no significant difference in the number of species captured between sites. Analysis of variance detected no difference for the number of Anura, Testudines, Lacertilia, and Serpentes captured between treatments. The number of Caudata bordered on significance between sites (F = 15.79, P = 0.057), with the control site harboring more individuals. No significant differences were detected in habitat variables between sites. Pearson's correlation analysis revealed that the number of Caudata was positively correlated with coarse woody debris (r = 0.98, P = 0.01). Post-harvest monitoring (May 1998 through December 1999) identified 59 species and 15,747 individuals using these sites. Analysis of variance detected no difference for the number of Anura, Cau data, Lacertilia, Testudines, and Serpentes moving into or along corridors. No significant differences were detected in pre- and post-treatment species diversity and evenness indices for corridor habitats. No significant differences were detected in recruitment for Anura and Testudines. There was an increase in recruitment of Caudata on the treatment sites (F = 13.49, P = 0.05). Estimates of survival indicate no significant differences between the control and treatment sites.
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956. **Effects of disturbance on birds of conservation concern in eastern Oregon and Washington.**
Bull, E. L. and Wales, B. C.
Northwest Science 75([supplement]): 166-173. (2001)
NAL Call #: 470 N81; ISSN: 0029-344X.
Notes: Literature review.
Descriptors: rare species/ fires/ roads/ human impact/ forest management/ Aves/ Haliaeetus leucocephalus/ Falco peregrinus/ Histrionicus histrionicus/ Bartramia longicauda/ Accipiter gentilis/ Buteo regalis/ Leucosticte atrata/ Pinus ponderosa/ birds/ bald eagle/ peregrine falcon/ harlequin duck/ upland sandpiper/ northern goshawk/ ferruginous hawk/ black rosy finch/ ponderosa pine
Abstract: The effects on birds of forest insects, tree diseases, wildfire, and management strategies designed to improve forest health (e.g., thinning, prescribed burns, road removal, and spraying with pesticides or biological microbial agents) are discussed. Those bird species of concern that occur in forested habitats in eastern Oregon and Washington include the bald eagle (Haliaeetus leucocephalus), peregrine falcon (Falco peregrinus), harlequin duck (Histrionicus histrionicus), upland sandpiper (Bartramia longicauda), northern goshawk (Accipiter gentilis), ferruginous hawk (Buteo regalis), and black rosy finch (Leucosticte arctoa). In addition, seven species of woodpeckers and nuthatches were considered because of their rare status. Forest disturbances that create dead trees and logs are critical to cavity-nesting birds because the dead trees with their subsequent decay provide nesting and roosting habitat. The insects associated with outbreaks or dead trees provide prey for the woodpeckers and nuthatches. The loss of nest or roost trees as a result of disturbance could be detrimental to bald eagles, goshawks, or ferruginous hawks, while the loss of canopy cover could be detrimental to harlequin ducks and goshawks or to prey of some of the raptors. The more open canopies created by thinning may be beneficial to a species like the black rosy finch, yet detrimental to some woodpeckers due to a decrease in cover. Prescribed burning may be beneficial to those woodpeckers primarily associated with ponderosa pine (Pinus ponderosa) stands and detrimental to other woodpeckers because of the loss of coarse woody debris. Removal of roads is likely to benefit most of these species because of the subsequent decrease in human activity. Recovery plans for bald eagles and peregrine falcons are available for managers to use in managing habitat for these species.
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957. **Effects of edge contrast on redback salamander distribution in even-aged northern hardwoods.**
Degraaf, Richard M. and Yamasaki, Mariko
Forest Science 48(2): 351-363. (2002)
NAL Call #: 99.8 F7632; ISSN: 0015-749X
Descriptors: Plethodon cinereus/ Caudata/ Lissamphibia/ Plethodontidae/ climatology/ clearcut harvesting/ coverboard clusters/ edge contrast types/ clear cutting/ conservation/ distribution/ forests/ ecosystems/ forestry practices/ habitat alterations/ New Hampshire/ status/ White Mountain National Forest/ wildlife-human relationships/ commercial enterprises/ disturbances/ habitat use/ land zones/ population ecology/ redback salamanders
Abstract: Terrestrial salamanders are sensitive to forest disturbance associated with even-aged management. We studied the distribution of redback salamanders (Plethodon cinereus) for 4 yr at edges between even-aged northern hardwood stands along three replicate transects in each of three edge contrast types: regeneration/mature, sapling/mature, and poletimber/mature in northern New Hampshire. We used 2 m^2 coverboard clusters at the edge, and at 5, 10, 20, and 40 m into the younger and mature stands. Salamanders were surveyed 12 times per year from May to October, approximately once every 2 wk, usually within 24 hr of a rain event. Habitat variables included board station soil temperature, litter depth, organic layer depth, depth to soil mottling, herbaceous cover, down log cover, three classes of understory hardwood stem density

(0.5-1m tall, 1-2 m tall and <10 cm dbh, and > 2 m tall), softwood stem density, Rubus/other stem density, and overstory basal area (ba) and mean dbh. A total of 4,038 redback salamanders were detected during 432 transect counts. The mean salamander density was 0.41/ m^2 across regenerating stand transects, 0.47 m^2 across sapling transects, and 0.69 m^2 across poletimber transects. We analyzed salamander distribution by edge type, replicate, year, station (distance from edge), and their interactions. There were significant differences in salamander detections among edge types, replicates, station, and years for both counts across entire younger forest/mature forest transects and across the younger forest transect sections. There were significant interactions between edge type and distance from edge. Salamander detections were greater (P < 0.001) in pole/mature edges than in sapling/mature and regeneration/mature edges in all years. Counts in sapling and regeneration stands were not different. The pattern of salamander abundance was similar across all edge types: low abundance 40 m out in the younger stand, increased abundance near or at the edge, a decrease just inside the edge, peak abundance in the mature stand (20 m inside the edge), and decline at 40 m in the mature stand. alamander counts differed among years across all transects, tracking yearly precipitation differences. Counts also varied seasonally; early spring and late summer counts were higher (P < 0.001) than counts in early to mid-summer and fall. Salamander counts were negatively related to total understory stem density, density of hardwood stems > 2 cm tall and < 10 cm dbh, and percent herb cover, and positively related to soil organic layer depth (P values 0.10). A stepwise regression model included percent herbaceous ground cover, number of hardwood stems > 2 m tall and < 10 cm dbh, and organic soil layer depth, and explained 29% of the variation in redback salamander counts. Our findings are consistent with reported recovery times for redback salamanders after clearcut harvesting; recovery rates even along edges may take about 30 yr. Seasonal and yearly variation must be taken into account if terrestrial salamanders are used in monitoring programs.
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958. **Effects of experimental forestry treatments on a Maine amphibian community.**
Patrick, David A.; Hunter, Malcolm L.; and Calhoun, Aram J. K.
Forest Ecology and Management 234(1-3): 323-332. (2006)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: Anura/ Lissamphibia/ Ranidae/ Rana sylvatica/ wildlife-human relationships/ clearcutting/ commercial enterprises/ distribution/ disturbances/ habitat use/ experimental forestry treatment/ forests/ ecosystems/ forestry practices/ habitat alterations/ forestry treatments/ habitat quality/ habitat selection/ land zones/ Maine/ movements during dispersal/ Orono, Dwight B. Demeritt and Penobscot Forests/ terrestrial ecology
Abstract: Predicting how timber harvesting will influence sensitive taxa such as Amphibians is of critical importance for sustainable management of forests. In 2004 and 2005, we studied the effects of four forestry treatments (clearcut with coarse woody debris (CWD) removed, clearcut with CWD retained, partial-cut of 50% of canopy cover, and an uncut control) on movement, habitat selection, and abundance of Amphibians in Maine. Four landscape-scale replicates of these four forestry treatments were created with each replicate centered on a breeding pool. A total of 8632 emerging juvenile wood frogs were captured and marked at drift fences encircling breeding pools, with 1166 marked wood frogs (Rana sylvatica), and 13,727 unmarked Amphibians captured in drift fence/pitfall arrays at 16, 50, 100, and 150 m from the pools. Our capture results in the different treatments were consistent with previous studies in showing that adult abundance and habitat use differed among species, with wood frogs, spotted salamanders (Ambystoma maculatum), and eastern red-backed salamanders (Plethodon cinereus) preferring uncut and partial-cut habitat, and adult green frogs (Rana clamitans) and American bullfrogs (Rana catesbeiana) being more tolerant of clearcutting. Spotted salamanders also showed reduced captures with partial canopy removal and increased captures with the retention of CWD. Our results for juvenile Amphibians differed from previous research, with lower captures of all study species (statistically significant for seven of nine species) in clearcuts compared to uncut and partial-cut treatments. Clearcuts did not reduce habitat permeability for the low number of marked wood frogs that entered these treatments. Data from marked wood frogs also suggest that both density of conspecifics and habitat quality can influence habitat selection, and potentially dispersal of juvenile Amphibians. The avoidance of clearcuts by juveniles of all study species suggests that this silvicultural technique may reduce both abundance and dispersal of many species, rather than just species where adults are known to be forest-dependent. Species may also be affected by partial as well as full canopy removal, and the retention of CWD may play a role in mitigating some of the effects of clearcutting. © 2006 Elsevier B.V. All rights reserved.
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959. **Effects of experimentally reduced prey abundance on the breeding ecology of the red-eyed vireo.**
Marshall, M. R.; Cooper, R. J.; DeCecco, J. A.; Strazanac, J.; and Butler, L.
Ecological Applications 12(1): 261-280. (2002)
NAL Call #: QH540.E23; ISSN: 10510761
Descriptors: Appalachia/ avian breeding productivity/ Bacillus thuringiensis/ deciduous forest anhropods/ food limitation/ gypsy moth/ indirect pesticide effects/ Lepidoptera/ neotropical migrant birds/ red-eyed vireo/ timing of breeding/ Vireo olivaceus/ clutch size/ hatching/ mortality/ prey availability/ reproduction/ United States/ Aves/ bacteria (microorganisms)/ Galliformes/ Lepidoptera/ Lymantria/ Lymantria dispar/ Lymantriidae/ Passeri/ Phacelia congesta/ Vertebrata/ Vireonidae
Abstract: Given the demonstrated importance of caterpillars in the breeding-season diet of many neotropical-nearctic migratory forest songbirds, a large-scale manipulative experiment was conducted to examine how variation in caterpillar abundance influenced the breeding ecology of the Red-eyed Vireo (Vireo olivaceus). The Red-eyed Vireo is a canopy-forager that consumes and feeds its young a large proportion of caterpillars during the breeding season. Caterpillar abundance was experimentally reduced in May of 1997 and 1998 on nine replicate 30-ha study plots (three treated, six untreated) in the Monongahela National Forest, West Virginia, through the application of Bacillus thuringiensis according to gypsy moth (Lymantria dispar) management protocols. Each annual application significantly reduced the abundance of

Lepidoptera larvae on the Bacillus-treated plots relative to the nontreated plots for five and six weeks after spraying, respectively. This time period coincided with the nest initiation, incubation, and nestling stages of the Red-eyed Vireo. However, there was minimal evidence that this reduction in Lepidoptera larvae had a concurrent negative effect on the Red-eyed Vireos' ability to successfully rear nestlings. There were no differences in clutch size, hatching success, nestling mortality, overall nest success, or annual adult survival between the treated and untreated plots in any year of the study. It did appear, however, that Red-eyed Vireos waited 3-5 d longer to initiate nests in years when caterpillar' abundance was low, due to either natural or experimental causes. Because of a relatively short breeding season, this delay could reduce the seasonal productivity of this species by 0.15-0.25 young per female per year. Even though the effects of Bacillus-induced caterpillar reduction on Red-eyed Vireo reproduction were minimal, we urge caution when considering the application of Bacillus over larger spatial scales, repeatedly in the same area, or in locations of endangered species where even a modest. reduction in seasonal productivity could be detrimental.
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960. **Effects of fire management practices on butterfly diversity in the forested western United States.**
Huntzinger, M.
Biological Conservation 113(1): 1-12. (2003)
NAL Call #: S900.B5; ISSN: 00063207.
Notes: doi: 10.1016/S0006-3207(02)00356-7.
Descriptors: fire/ forest management/ fuel break/ Lepidoptera/ prescribed burn/ riparian/ species diversity/ butterfly/ community composition/ community structure/ fire management/ forest management/ species diversity/ United States/ Lepidoptera
Abstract: In response to a policy of fire suppression since early in the 20th century, forest managers have recently initiated emergency programs of prescribed burning to reduce readily combustible fuel loads in many forests of the western United States. The effects of burning on woody plant composition and structure are relatively well understood; however, little is known about the impact of burning on other taxa. I tested the response of butterflies to fire reintroduction in the Rogue River National Forest and Yosemite National Park. I established replicated transects on three different types of prescribed burn treatment (forest burns, fuel breaks, and riparian burns), as well as control sites, to monitor adult butterfly richness and diversity. Two to three times as many butterfly species occur in forest burns as controls, 13 times as many in fuel breaks as controls, and twice as many in riparian burns as controls. The results of this study suggest that the reintroduction of diverse fire management methods, especially riparian burning, will benefit butterfly diversity in coniferous forests. Further study is required to examine potential proscriptions against riparian burning, including erosion and invasive species encroachment. Both area and density of gaps in the forest canopy were found to explain large amounts of the variation in butterfly richness (R2 = 0.64 and R2 = 0.80, respectively). This study demonstrates that using non-traditional taxa (e.g., butterflies instead of trees) to study ecosystem processes may help to provide valuable insights into alternative management strategies.
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961. **The effects of forest clearcut harvesting and thinning on terrestrial salamanders.**
Grialou, Julie A.; West, Stephen D.; and Wilkins, R. Neal
Journal of Wildlife Management 64(1): 105-113. (2000)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: commercial activities/ conservation measures/ community structure/ population dynamics/ population structure/ terrestrial habitat/ land and freshwater zones/ Caudata: forestry/ habitat management/ forest clearcuts/ harvesting/ thinning/ species diversity/ species presence/ population size/ age-class distribution/ forest and woodland/ Washington/ Willapa Hills/ abundance/ Lissamphibia, Amphibia/ amphibians/ chordates/ vertebrates
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962. **Effects of forest edges on ovenbird demography in a managed forest landscape.**
Flaspohler, D. J.; Temple, S. A.; and Rosenfield, R. N.
Conservation Biology 15(1): 173-183. (2001)
NAL Call #: QH75.A1C5 ; ISSN: 08888892.
Notes: doi: 10.1046/j.1523-1739.2001.99397.x.
Descriptors: edge effect/ forest ecosystem/ forest management/ population ecology/ reproduction/ United States/ Seiurus aurocapillus
Abstract: We studied the reproductive ecology of Ovenbirds (Seiurus aurocapillus) for 3 years in a primarily forested landscape in northern Wisconsin. We searched for and monitored nests in large, closed-canopy northern hardwood forests adjacent to recent clearcuts (<6 years old) and measured the effect of proximity to edge on nest success, clutch size, and breeding pair density. Mayfield nest success was lower near the forest edge (0.44, N_{nests} = 42; <300 m) than in the forest interior (0.69. N_{nests} = 47.. >300 m; x^2 = 4.43, df = 1, p ≤ 0.04), and mean clutch size was higher (4.93) near the forest edge than in the forest interior (4.27; t = -3.83, df = 59, p ≤ 0.0003). Edge effects on nest success and clutch size extended farther (300 m) into intact forest than has been documented previously. Using habitat-specific demographic parameters, we found that annual productivity per pair was similar in edge (3.37 fledglings) and interior (3.85 fledglings) habitat. We used our estimates of per capita annual productivity and published estimates of adult and juvenile survival to approximate the finite rate of growth (λ) for birds breeding in edge and interior locations. Based on published estimates of age-specific survival, both edge and interior habitats appear to be source habitats (where λ > 1) for Ovenbirds in the landscape we studied. Our assessment of population status, however, was extremely sensitive to variation in survival estimates. We used geographic information system data from the Nicolet National Forest to estimate population size in northern and mixed-hardwood forests in this region and to quantify annual productivity in this landscape. Ovenbirds near forest edges faced higher predation pressure but laid more eggs on average than birds in the forest interior. Our data suggest that Ovenbirds may make tradeoffs between the probability of nest success and the per-nest productivity as measured by clutch size. Our findings are consistent with the equilibrium state of the ideal free distribution model in that although individual demographic characteristics (nest success and clutch size) varied with distance from edge, an important correlate of fitness, finite rate of increase (λ) remained relatively similar.
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963. **Effects of forest management on density, survival, and population growth of wood thrushes.**
Powell, L. A.; Lang, J. D.; Conroy, M. J.; and Krementz, D. G.
Journal of Wildlife Management 64(1): 11-23. (2000)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: forest management/ Hylocichla mustelina/ neotropical migrant songbird/ radiotelemetry/ survival/ transect surveys/ wood thrush/ forest management/ passerines/ population density/ population growth/ survival/ United States/ Hylochichla mustelina/ Picoides borealis
Abstract: Loss and alteration of breeding habitat have been proposed as causes of declines in several Neotropical migrant bird populations. We conducted a 4-year study to determine the effects of winter prescribed burning and forest thinning on breeding wood thrush (Hylocichla mustelina) populations at the Piedmont National Wildlife Refuge (PNWR) in Georgia. We estimated density, adult and juvenile survival rates, and apparent annual survival using transect surveys, radiotelemetry, and mist netting. Burning and thinning did not cause lower densities (P = 0.25); wood thrush density, ranged from 0.15 to 1.30 pairs/10 ha. No radiomarked male wood thrushes (n = 68) died during the 4 years, but female weekly survival was 0.981 ± 0.014 (SE) for females (n = 63) and 0.976 = 0.010 for juveniles (n = 38). Apparent annual adult survival was 0.579 (SE = 0.173). Thinning and prescribed burning did not reduce adult or juvenile survival during the breeding season or apparent annual adult survival. Annual population growth (y) at PNWR was 1.00 (95% confidence interval [CI] = 0.32-1.63), and the considerable uncertainty in this prediction underscores the need for long-term monitoring to effectively manage Neotropical migrants. Population growth increased on experimental compartments after the burn and thin (95% CI before = 0.91-0.97, after = 0.98-1.05), while control compartment y declined (before = 0.98-1.05, after = 0.87-0.92). We found no evidence that the current management regime at PNWR, designed to improve red-cockaded woodpecker (Picoides borealis) habitat, negatively affected wood thrushes.
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964. **Effects of forest management practices on red-shouldered hawks in Ontario.**
Naylor, B. J.; Baker, J. A.; and Szuba, K. J.
Forestry Chronicle 80(1): 54-60. (2004)
NAL Call #: 99.8 F7623; ISSN: 00157546
Descriptors: Buteo lineatus/ effectiveness monitoring/ forest management/ habitat guidelines/ nest success/ Ontario/ red-shouldered hawk/ selection/ shelterwood/ tolerant hardwoods/ Buteo lineatus
Abstract: The red-shouldered hawk (Buteo lineatus) is a species of special concern throughout its northern range. It is considered to be sensitive to forest management practices because it requires dense mature hardwood forest for nesting. In Ontario, guidelines that prescribe spatial and temporal buffers were developed in about 1990 to mitigate the potential impacts of harvesting. We monitored 84 nesting areas of red-shouldered hawks in central and southeastern Ontario from 1988 to 1995 to describe the effects of forest management practices on the occupancy and productivity of nesting areas, to evaluate the effectiveness of the guidelines, and recommend modifications as appropriate. The number of years nesting areas had been used previously had a significant negative effect on activity status, but not on nest success. Nesting areas harvested with application of the guidelines had a similar probability of being active to those in uncut forest but nesting areas harvested without application of the guidelines did not. Neither the area nor proximity of selection cuts with a moderate to high residual basal area (≥ 18 m^2/ha) affected the activity status of nesting areas. In contrast, the area and proximity of heavy cuts (shelterwood cuts or selection cuts with a residual basal area of 14-16 m^2/ha) appeared to have a negative effect on activity status. When nesting areas were active, the proximity and amount of harvesting did not influence nest success. We concluded that the impact of harvesting on the activity status of nesting areas could be mitigated by prohibiting heavy cuts within 300 m of active nests and retaining ≥20 ha of forest dominated by tolerant and mid-tolerant hardwood trees, ≥18 m tall, with ≥70% canopy closure around nests.
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965. **Effects of forest management practices on the diversity of ground-occurring beetles in mixed northern hardwood forests of the Great Lakes region.**
Werner, Shahla M. and Raffa, Kenneth F.
Forest Ecology and Management 139(1-3): 135-155. (2000)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ conservation measures/ ecology/ habitat utilization/ terrestrial habitat/ land and freshwater zones/ Coleoptera: forestry/ forest management practices/ ground dwelling community/ community structure/ habitat preference/ ground dwelling taxa/ forest and woodland/ hardwood forests/ Michigan/ Wisconsin/ Great Lakes region/ Coleoptera/ Insecta/ arthropods/ coleopterans/ beetles/ insects/ invertebrates
Abstract: Ground-occurring Coleoptera were sampled over 2 years using pitfall traps in 23 northern hardwood or eastern hemlock-dominated sites representing even-aged, uneven-aged, or old growth forests. Overall, 65,586 individuals were obtained, representing 33 families and 192 species. Carabids comprised 54% of the total catch in 1996, when all the families were tallied. There was little variation in the number and relative abundance of carabid species caught between seasons. No differences in overall species richness or abundance were observed among forest management regimes or habitat types. However, there were substantial differences in species composition. Thirteen species showed significant habitat associations among the five forest management regimes, and 21 species were associated with specific habitat features of the sites, such as dominant tree species or canopy structure. More species (16) were affected by the presence of forest management than by tree species dominance (6) or canopy structure (5). Harpalus fulvilabris, Pterostichus coracinus, Carabus nemoralis, Glischrochilus siepmanni, Nicrophorus orbicollis, and Nicrophorus sayi were more commonly caught in managed than in old growth forest sites, while Carabus sylvosus, Platynus decentis and Oiceoptoma novaboracensis were more commonly associated with old growth sites. Calosoma frigidum and Necrophila americana were associated with northern hardwood sites, while Platynus decentis was significantly associated with sites dominated by eastern hemlock. Calosoma frigidum, Necrophila americana, and Nicrophorus vespilloides were more common in even-aged

sites, while a lampyrid and a leiodid morphospecies were more common in sites with an uneven-aged canopy structure. The importance of microsite features was reflected in the high variability observed among sites and among traps within sites. Results indicate that conservation of a range of forest types is required in order to maintain the diversity of ground-occurring beetles on a regional scale. This will be quite challenging, since forest types such as old growth hemlock-hardwood are rare across the landscape due to habitat fragmentation and logging.
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966. **Effects of forest roads on macroinvertebrate soil fauna of the southern Appalachian Mountains.**
Haskell, D. G.
Conservation Biology 14(1): 57-63. (2000)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1046/j.1523-1739.2000.99232.x.
Descriptors: fauna/ invertebrate/ forest ecosystem/ macroinvertebrate/ road/ soil fauna/ United States
Abstract: Many forested landscapes are fragmented by roads, but our understanding of the effects of these roads on the function and diversity of the surrounding forest is in its infancy. 1 investigated the effect of roads in otherwise continuous forests on the macroinvertebrate fauna of the soil. I took soil samples along transects leading away from the edges of unpaved roads in the Cherokee National Forest in the Southern Appalachian mountains of the United States. Roads significantly depressed both the abundance and the richness of the macroinvertebrate soil fauna. Roads also significantly reduced the depth of the leaf-litter layer. These effects persisted up to 100 m into the forest. Wider roads and roads with more open canopies tended to produce steeper declines in abundance, richness, and leaf-litter depth, but these effects were significant only for canopy cover and litter depth. The macroinvertebrate fauna of the leaf litter plays a pivotal role in the ability of the soil to process energy and nutrients. These macroinvertebrates also provide prey for vertebrate species such as salamanders and ground-foraging birds. The effect of roads on the surrounding forest is compounded by the sprawling nature of the road system in this and many other forests. My data suggest that even relatively narrow roads through forests can produce marked edge effects that may have negative consequences for the function and diversity of the forest ecosystem.
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967. **Effects of forest thinning and prescribed burning on bat activity in the Piedmont of South Carolina.**
Loeb, Susan C.; Waldrop, Thomas A.; and Leput, David W.
Bat Research News 43(4): 164. (2002)
NAL Call #: QL737.C5 B328; ISSN: 0005-6227.
Notes: Conference paper: 32nd Annual North American Symposium on Bat Research, Burlington, VT, November 06-09, 2002.
Descriptors: Eptesicus fuscus/ Lasionycteris noctivagans/ Lasionycteris seminolus/ Lasiurus borealis/ Nycticeius humeralis/ Pipistrellus subflavus/ Vespertilionidae/ Chiroptera/ forestry practices/ habitat alterations/ wildlife management/ bat detector/ Piedmont regions/ bat activity/ habitat suitability/ snags/ stand density/ tree growth/ big brown bat/ silver-haired bat/ Seminole bat/ red bat/ evening bat/ eastern pipistrelle/ Pinus spp.
Abstract: Based on morphological and acoustical considerations, several investigators have predicted that structurally complex environments, such as dense forests, will not be used by many species of bats. Thus, forest management practices that decrease clutter may increase the suitability of many forested stands for bats. We tested this hypothesis using two common forest management practices that decrease stand density: thinning and prescribed burning. The study was conducted on 12 14-ha plots on the Clemson Experimental Forest in the Upper Piedmont of South Carolina. The plots were located in 17-50 year-old pine-hardwood stands. The study design consisted of three replicates of four treatments: Control, Thin, Burn, Thin+Burn. From May-August 2002 we mist-netted in the vicinity of the plots to determine the composition of the bat community. We used Anabat II bat detectors to sample bat activity on each plot during two night each month from May through August 2001 and 2002. Bat detectors were placed at two random grid points for the first night and moved to new points on the second night. One detector was placed at the top of a 10 m extendable pole and the other was placed at approximately 1 m above ground. Red bats (Lasiurus borealis), big brown bats (Eptesicus fuscus), eastern pipistrelles (Pipistrellus subflavus), and evening bats (Nycticeius humeralis) were the most common bats captured; we also captured one silver-haired bat (Lasionycteris noctivagans) and one seminole bat (L. seminolus). Bat activity was significantly lower in 2002 than in 2001, and in both years, we recorded significantly higher activity from detectors mounted on 10-m poles than from detectors close to the ground. Bat activity also varied significantly among treatments. In 2001, bat activity was significantly higher in Thin and Thin-Burn plots than in Control or Burn plots. In 2002, bat activity was significantly higher in Thin, Burn, and Thin-Burn plots than in Control plots. Thus, in the short-term, forest management practices that decrease tree density increase habitat suitability for bats. Other benefits of these practices, such as increased tree growth resulting in larger trees and snags, should favor bats in the long-term.
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968. **Effects of group-selection opening size on breeding bird habitat use in a bottomland forest.**
Moorman, C. E. and Guynn, D. C.
Ecological Applications 11(6): 1680-1691. (2001)
NAL Call #: QH540.E23 ; ISSN: 10510761
Descriptors: bottomland forest/ breeding birds/ gap size/ gap vegetation/ group selection/ habitat use/ neotropical migrant/ silviculture/ South Carolina/ succession/ avifauna/ breeding population/ group selection/ habitat use/ United States/ Aves/ Empidonax virescens/ Geothlypis trichas/ Impleta/ Indigofera/ Molothrus ater/ Parula americana/ Passerina cyanea/ Vireo griseus
Abstract: An increase in timber removals from southern bottomland forests of the United States has been predicted, warranting investigations of the effects of silvicultural alternatives on avian breeding habitat. We studied the effects of creating group-selection openings (man-made canopy gaps) of various sizes on breeding bird habitat use in a bottomland hardwood forest in the Upper Coastal Plain of South Carolina, USA. We used spot mapping and mist netting to estimate bird abundance at 0.06-, 0.13-, 0.26-, and 0.5-ha gaps and at uncut control areas during the 1996, 1997, and 1998 breeding seasons (1 May-1 August). There were significant increases in the number of species

mapped (P = 0.0001) and netted (P = 0.0001) with successive increases in gap size. The greatest number of total spot-map detections (P = 0.0002) and mist net captures (P = 0.0004) also occurred in and around the large gaps. These patterns were the result of increased use of larger gaps by field-edge species, primarily Brown-headed Cowbird (Molothrus ater), Common Yellow-throat (Geothlypis trichas), and Indigo Bunting (Passerina cyanea), and some forest-edge species, such as White-eyed Vireo (Vireo griseus) and Northern Parula (Parula americana). Conversely, Acadian Flycatcher (Empidonax virescens) was less abundant in and adjacent to gaps. Because there were few differences in vegetation among gaps of different sizes, it is likely that birds that were detected more frequently in and adjacent to larger gaps selected those gaps based on other factors correlated with size. Creation of 0.5-ha group-selection openings in southern bottomland forests should provide breeding habitat for some field-edge species in gaps and habitat for forest-interior species and canopy-dwelling forest-edge species between gaps, provided that sufficient mature forest is maintained.
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969. **Effects of group-selection opening size on the distribution and reproductive success of an early-successional shrubland bird.**
King, David I. and Degraaf, Richard M.
Forest Ecology and Management 190(2-3): 179-185. (2004)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: forestry/ terrestrial ecology: ecology, environmental sciences/ wildlife management: conservation/ group selection forestry method/ applied and field techniques/ clearcut/ group selection opening size effects/ habitat quality/ opening shape/ opening size/ patch area/ reproductive success/ silviculture
Abstract: Group-selection is a widely used silvicultural technique, and although recent studies have compared the ecology of birds inhabiting patches of regenerating forest created by group-selection with that of birds in clearcuts, little is known about the effect of opening size and shape on the ecology of early-successional shrubland birds within stands treated with group-selection. We studied chestnut-sided warblers (Dendroica pensylvanica), which are an early-successional shrubland bird, nesting in 29 patches of regenerating (4-5 years old) northern hardwoods forest 0.15-0.69 ha in area to determine whether the ecology of this species is affected by patch size or shape. Chestnut-sided warbler density decreased with patch size, however nests were initiated earlier in larger patches. There were no relationships between patch area and number of young fledged per territory or nest predation rates. Similarly, there were no relationships between patch shape (defined as the ratio of the patch perimeter to the perimeter of a circle of the same area) and territory density, date of initiation of first nests, number of young fledged per territory, or nest predation rates. These results contrast with the results of studies of area sensitivity of mature forest and grassland birds, in which bird density is negatively related to patch area. However, later nest initiation in smaller patches suggests that smaller patches are lower quality habitat, which is consistent with the negative relationships between patch area and habitat quality reported in studies of birds nesting in patches of mature forest.
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970. **Effects of group selection silviculture in bottomland hardwoods on the spatial activity patterns of bats.**
Menzel, M. A.; Carter, T. C.; Menzel, J. M.; Mark Ford, W.; and Chapman, B. R.
Forest Ecology and Management 162(2-3): 209-218. (2002)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/S0378-1127(01)00516-3.
Descriptors: anabat/ bottomland hardwoods/ foraging/ group selection silviculture/ habitat use/ hardwoods/ harvesting/ timber/ bat activity/ forestry/ activity patterns/ bats/ ecological impact/ foraging behavior/ habitat use/ harvesting/ silviculture/ United States
Abstract: The effects of forest management practices on the spatial activity patterns of bats are poorly understood. We determined the effect of group selection timber harvests on the spatial activity patterns of bats below the forest canopy at the Savannah River Site, Aiken, SC, using the Anabat system. We monitored the effect of group selection timber harvests on feeding and foraging activity of bats at three spatial scales: among habitats within a landscape, among harvested and unharvested areas in the stand where patches were harvested, and within an individual gap. Habitats examined included Carolina bays, unharvested bottomland hardwoods, bottomland hardwoods in which a group selection harvest occurred, and upland stands containing a hardwood/pine mix. Within the harvested stand, we compared the level of foraging and feeding activity among large patch cuts (gaps), small gaps, skidder trails, and forested areas. Within the large gaps, we compared activity among the center of the gap, the edge of the gap, and the forest surrounding the gap. Levels of bat activity differed among stands. More activity occurred in the bottomland stand in which patches had been harvested and around Carolina bays than in unharvested stands of bottomland hardwoods and upland hardwoods and pines. Levels of bat activity also differed among harvested and unharvested areas within the stand and among different positions within gaps and the surrounding forest. Activity was concentrated in forest gaps and along skidder trails. Within gaps, activity was concentrated along the edge between the gap and forest. Spatial activity patterns also depended on the species of bat. These results suggest that the inclusion of gaps in bottomland hardwoods increases the total level of foraging and feeding activity of bats below the canopy. They also suggest differences in the size and shape of the harvest affect the total amount of bat activity recorded in the gap and that these effects may be species specific.
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971. **Effects of group-selection timber harvest in bottomland hardwoods on fall migrant birds.**
Kilgo, John C.; Miller, Karl V.; and Smith, Winston P.
Journal of Field Ornithology 70(3): 404-413. (1999)
NAL Call #: 413.8 B534; ISSN: 0273-8570
Descriptors: commercial activities/ behavior/ ecology/ terrestrial habitat/ land and freshwater zones/ Aves: forestry/ bottomland hardwood group selected timber harvest/ migration/ community structure/ migrant communities/ forestry practices/ distribution within habitat/ habitat utilization/ forest and woodland/ South Carolina/ Aiken/ Barnwell and Allendale Counties/ birds/ chordates/ vertebrates
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972. **Effects of gypsy moth defoliation on forest birds: An assessment using breeding bird census data.**
Gale, G. A.; DeCecco, J. A.; Marshall, M. R.; Russ McClain, W.; and Cooper, R. J.
Journal of Field Ornithology 72(2): 291-304. (2001)
NAL Call #: 413.8 B534; ISSN: 02738570
Descriptors: Lymantria dispar/ gypsy moth/ birds/ species richness/ species density/ forest management
Abstract: Although the gypsy moth (Lymantria dispar) is a significant insect pest of eastern deciduous forests in the United States, relatively little is known about its effects on forest bird communities. We used six Breeding Bird Census sites from Connecticut, Pennsylvania, and Virginia to assess changes in bird species richness and individual species density in the years surrounding a gypsy moth outbreak. Individual species' responses were variable among states, and only a few species showed consistent responses to outbreaks across sites. Yellow-billed Cuckoos (Coccyzus americanus) and Black-billed Cuckoos (C. erythmpthalmus) appeared two years prior to an outbreak and then disappeared immediately after an outbreak on four of the sites and increased in numbers on another site. Indigo Buntings (Passerina cyanea), which are usually associated with open habitat, increased temporarily after outbreaks and then returned to pre-outbreak densities within 5 yrs after the outbreak. At the community or guild level, there was a significant reduction in species associated with closed-canopy forests during the outbreak year(s) compared with the average of all other years (before and after the outbreak). There were no other general responses by the avian communities to the outbreaks, including associations with habitat preference, foraging guild, or nesting substrate. This study suggests that the effects of gypsy moth defoliation on the avian community are likely to be short-term (assuming that tree mortality is not severe) and spatially variable. The minimal nature of these effects also suggests that compared with pesticide options for gypsy moth control, allowing the gypsy moth to defoliate, when feasible, is preferable when managing for forest birds.
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973. **Effects of hardwood reduction on winter birds in northwest Florida longleaf pine sandhill forests.**
Provencher, L.; Gobris, N. M.; and Brennan, L. A.
Auk 119(1): 71-87. (2002)
NAL Call #: 413.8 AU4 ; ISSN: 00048038
Descriptors: avifauna/ conservation management/ habitat management/ herbicide/ prescribed burning/ thinning/ United States/ Baeolophus bicolor/ Dendroica pinus/ Picoides borealis/ Pinus palustris/ Poecile carolinensis/ Sitta pusilla/ Spizella passerina
Abstract: Reversing decades of fire exclusion by hardwood midstory reduction is now used to recover populations of the federally endangered Red-cockaded Woodpecker (Picoides borealis) in longleaf pine (Pinus palustris) forest ecosystems. The effects of Red-cockaded Woodpecker management on winter birds in longleaf pine sandhill forests are largely unknown. Examining habitat use of winter migrants, some of which are declining, may influence the selection of habitat management techniques used for Red-cockaded Woodpeckers to benefit overwintering migrants. During the winters (December-February) of 1997-1998 and 1998-1999, we tested experimentally the effects of hardwood reduction treatments applied in 1995 on winter birds at Eglin Air Force Base in fire-excluded northwest Florida longleaf pine sandhills. Treatments were (1) prescribed spring burning, (2) herbicide application, (3) mechanical felling and girdling, and (4) a control where decades of fire exclusion was maintained. We also sampled winter bird flocks in frequently burned, nonexperimental reference plots to measure management success. Hardwood reduction techniques had no effect on flock species richness, which averaged 7.9 and 7.2, respectively, during 1997-1998 and 1998-1999. Larger flocks in felling and girdling and in herbicide plots were primarily due to significantly higher numbers of overwintering Chipping Sparrows (Spizella passerina), as well as resident Red-cockaded Woodpeckers and an influx of temperate migrant Pine Warblers (Dendroica pinus). In contrast, flocks in control plots were smaller (flock size and species composition in spring burn plots were intermediate) and composed of hardwood-associated species, such as Tufted Titmouse (Baeolophus bicolor) and Carolina Chickadee (Poecile carolinensis). The relative uses of longleaf pines and hardwoods by Red-cockaded Woodpeckers, Pine Warblers, and Brown-headed Nuthatches (Sitta pusilla) during both winters best explained that winter birds present in herbicide, felling and girdling, and reference plots were more likely to forage on the same tree species and substrates than birds in spring-burned plots, and least likely to forage on the same species and substrates as birds in the control plots. Those differences corresponded to the following increasing order of hardwood stem mortality among treatments: control, spring burn (41%), felling and girdling (62%), and herbicide (92%). Repeated burning is recommended to restore the reference foraging condition because it was eight times less expensive than other techniques, which favored mostly Chipping Sparrows.
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974. **Effects of jack pine plantation management on barrens flora and potential Kirtland's warbler nest habitat.**
Houseman, G. R. and Anderson, R. C.
Restoration Ecology 10(1): 27-36. (2002)
NAL Call #: QH541.15.R45R515; ISSN: 10612971.
Notes: doi: 10.1046/j.1526-100X.2002.10103.x.
Descriptors: barrens restoration/ Carex pensylvanica/ endangered species/ jack pine/ Kirtland's warbler/ plantations/ Vaccinium angustifolium/ endangered species/ forest management/ passerines/ plantation/ United States/ Carex/ Passeriformes/ Pinus banksiana
Abstract: Jack pine barrens, once common in northern lower Michigan, mostly have been converted to managed jack pine plantations. Management of the disturbances associated with logging provides the opportunity to maintain the unique plant assemblages of jack pine barrens and nest habitat of the federally endagered Kirtland's warbler. Studies indicate that Carex pensylvanica can develop into dense mats and strongly compete with other barrens species such as Vaccinium angustifolium, which seem to be important species for Kirtland's warbler nest locations. According to forest managers, the most important factors facilitating high cover of V. angustifolium and reducing cover of C. pensylvanica are the amount of shade produced by tree crowns before harvest (pre-harvest shade), the length of time between harvest and planting (planting delay), and fire. We found that high or low levels of pre-harvest shade had no effect on cover of either V.

angustifolium or C. pensylvanica. Planting delays of at least three years following prescribed burns generally increased cover of V. angustifolium in forest plots, which are important for warbler nesting. Analysis of community composition in openings indicated that burning enhanced the growth of barrens species. We found only weak evidence for a negative correlation between the cover of V. angustifolium and C. pensylvanica on our study sites. The openings created in the jack pine plantation are important refugia for barrens flora that would likely be lost under forests managed strictly for jack pine. Maintenance of jack pine barrens flora and Kirtland's warbler nest habitat is possible within the context of a heavily managed forest plantation system.
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975. **Effects of livestock grazing on forest habitats.**
Dennis, Ann
In: Conservation in highly fragmented landscapes/ Schwartz, Mark W.
New York: Chapman and Hall, 1997; pp. 313-341.
Notes: ISBN 0412070316.
NAL Call #: QH76.5.M53C66 1997
Descriptors: forest habitats/ livestock grazing effects/ long term conservation/ book chapter
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976. **Effects of long-term forest management on a regional avifauna.**
Kilgo, John C.; Franzreb, Kathleen E.; Miller, Karl V.; Chapman, Brian R.; and Gauthreaux, Sidney A.
Studies in Avian Biology (21): 81-86. (2000)
NAL Call #: QL671.S8; ISSN: 0197-9922
Descriptors: birds/ communities/ density/ distribution/ ecosystem management/ ecosystems/ forestry practices/ forests/ habitat management/ land use/ species diversity/ wildlife/ South Carolina, Western/ Savannah River Site
Abstract: We compared breeding bird populations on and off of the Savannah River Site (SRS), South Carolina, to determine whether management practices on SRS have affected abundance and composition of the resident avifauna. We assessed relative abundance by comparing Breeding Bird Survey (BBS) data from six routes off SRS with three surrogate routes generated using point-count data from four research projects on SRS. Total number of species per route did not differ on-and off-site. Total number of birds per route was greater off SRS than on. Twenty-three species were more abundant on than off SRS, and 33 species were more abundant off than on SRS. Species more abundant off SRS primarily were those that prefer agricultural or urban habitats, whereas those more abundant on SRS primarily prefer mature forest habitat. We conclude that management practices on SRS have resulted in a landscape that supports many species not otherwise common in the region.
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977. **Effects of long-term grazing by big game and livestock in the Blue Mountains forest ecosystems.**
Irwin, L. L. and Cook, J. G.
Portland, Ore.: U.S. Department of Agriculture, Pacific Northwest Research Station; PNW-GTR-325, 1994. 49 p.
NAL Call #: aSD11.A46 no. 325
http://www.fs.fed.us/pnw/pubs/pnw%5Fgtr325.pdf
Descriptors: Ungulata/ Bos taurus/ Equus caballus/ Ovis aries/ ungulates/ cattle/ horse/ domestic sheep/ vegetation/ food/ agriculture/ forest grazing land/ damage [forest]/ silviculture/ regeneration/ change in vegetation/ fertility-recruitment/ population dynamics
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978. **Effects of new forest management strategies on squirrel populations.**
Carey, A. B.
Ecological Applications 10(1): 248-257. (2000)
NAL Call #: QH540.E23 ; ISSN: 10510761.
http://www.treesearch.fs.fed.us/pubs/5531
Descriptors: biodiversity/ Douglas-fir/ ecosystem management/ forest ecology/ forest management/ Glaucomys sabrinus/ managed forest/ old growth restoration/ Pacific Northwest/ silviculture/ Squirrels/ Tamias townsendii/ Tamiasciurus douglasii/ thinning/ forest management/ management practices/ population size/ rodent/ rotation/ thinning/ United States/ Glaucomys sabrinus/ Pseudotsuga menziesii/ Tamias townsendii/ Tamiasciurus douglasii/ Tsuga heterophylla
Abstract: Two strategies for managing forests for multiple values have achieved prominence in debates in the Pacific Northwest: (1) legacy retention with passive management and long rotations, and (2) intensive management for timber with commercial thinnings and long rotations. Northern flying squirrels (Glaucomys sabrinus), Townsend's chipmunks (Tamias townsendii), and Douglas' squirrels (Tamiasciurus douglasii) were studied retrospectively in Douglas-fir (Pseudotsuga menziesii) forests managed under the alternative strategies in the Puget Trough of Washington. Flying squirrels were twice as abundant under legacy retention as under intensive management for timber, almost as abundant as in old-growth western hemlock (Tsuga heterophylla) forests on the Olympic Peninsula of Washington, but <50% as abundant as in old-growth Douglas-fir forests in western Oregon. Chipmunks were four times as abundant under intensive timber management, as under legacy retention, but less abundant than in old-growth forests. Abundance of Douglas' squirrels did not differ between strategies. Neither strategy produced the increased abundance of all three species that is an emergent property of late-seral forests. A third strategy holds promise: active, intentional ecosystem management that incorporates legacy retention, variable-density thinning, and management for decadence.
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979. **The effects of partial cutting on the rose-breasted grosbeak: Abundance, food availability, and nest survival.**
Smith, Lyndsay A.; Burke, Dawn M; Nol, Erica; and Elliott, Ken A.
Canadian Journal of Forest Research 36(5): 1087-1096. (2006)
NAL Call #: SD13.C35; ISSN: 0045-5067
Descriptors: terrestrial ecology: ecology, environmental sciences/ forestry/ biogeography: population studies/ wildlife management: conservation/ partial cutting/ applied and field techniques/ population density/ food availability/ nest survival
Abstract: Periodic partial harvesting of trees is an important economic activity within the highly fragmented woodlands of southern Ontario. We studied the population density, age structure, food abundance, productivity, and nest survival of

Rose-breasted Grosbeaks (Pheucticus ludovicianus) nesting in 35 deciduous woodlots with varying intensities of harvest. Heavily cut woodlots contained higher densities of territorial males and greater abundances of fruit-bearing shrubs compared with standard cut and reference sites (uncut for > 13 years). Results based on insect sampling were mixed, depending on the sampling technique and sample date. All treatments were demographic sinks, with populations in this landscape showing annual declines of 19%-24%. Though the proportion of parasitized nests tended to be higher in heavily cut sites, harvesting had little effect on nest survival, nest initiation dates, clutch size, age structure, or the number of young fledged from a successful nest. Our results indicate that within the fragmented woodlots of southern Ontario, partial harvesting does not further degrade breeding habitat for Rose-breasted Grosbeaks. However, further research is needed to determine the underlying causes of population declines.
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980. **Effects of postfire snag removal on breeding birds of western Labrador.**
Schwab, Francis E.; Simon, Neal P. P.; Stryde, Steven W.; and Forbes, Graham J.
Journal of Wildlife Management 70(5): 1464-1469. (2006)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Passeriformes/ Piciformes/ Aves/ wildlife-human relationships/ bird-vegetation relationship/ Canada/ commercial enterprises/ conservation/ disturbances/ habitat use/ ecosystems/ forestry practices/ habitat alterations/ generalized linear mixed model/ habitat management/ Labrador, Churchill Falls/ land zones/ methods and techniques/ Newfoundland/ North America/ snag-forest/ wildlife management/ birds/ fire/ Labrador/ salvage logging/ snags/ subarctic forest/ diversity/ biocenosis/ brood-egg/ silviculture/ dead wood/ Newfoundland
Abstract: The article presents a study on the effects of postfire snag removal on breeding birds of Western Labrador, Canada. A before and after experiment with three intensities of postfire snag removal was conducted in the area. There were 231 and 221 breeding territories of 17 and 12 species in 2000 and 2002, respectively, have been recorded. Total bird abundance has been reduced by 50 percent due to 100 percent snag removal treatment, but total bird abundance was similar between years on other treatments.
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981. **Effects of precommercial thinning on snowshoe hare habitat use during winter in low-elevation montane forests.**
Ausband, David E. and Baty, G. Ross
Canadian Journal of Forest Research 35(1): 206-210. (2005)
NAL Call #: SD13.C35; ISSN: 0045-5067
Descriptors: Lagomorpha/ Leporidae/ Lepus americanus/ forests/ ecosystems/ forestry practices/ habitat alterations/ habitat management/ habitat use/ Montana/ montane forest/ montane forest management/ precommercial tree thinning/ Stillwater State Forest/ winter habitat use/ wildlife-human relationships/ commercial enterprises/ conservation/ wildlife management/ disturbances/ land zones/ snowshoe hare/ habitat/ winter/ silviculture/ field technique/ signs/ snow/ feces/ dispersion/ Montana
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982. **Effects of precommercial thinning on snowshoe hares, small mammals, and forest structure in northern Maine.**
Homyack, J. A.
Orono, ME: University of Maine, 2003.
Notes: Degree: MSc
http://www.library.umaine.edu/theses/theses.asp?Cmd=abstract&ID=WLE2003-001
Descriptors: Lepus americanus/ abundance/ capturing methods/ cutting/ forest practices/ habitat changes/ habitat management/ hare, varying/ mammals/ mice, deer/ population density/ sampling/ shrews/ statistics/ transect survey/ Trapping/ voles/ Maine, northern region/ Piscataquis County
© NISC

983. **The effects of prescribed burning and thinning on herpetofauna and small mammals in the upper piedmont of South Carolina: Preliminary results of the national fire and fire surrogate study.**
Kilpatrick, Eran S.; Kubacz, Dean B.; Guynn, David C.; Lanham, J. Drew; and Waldrop, Thomas A.
In: Proceedings of the 12th Biennial Southern Silvicultural Research Conference, General Technical Report-SRS 71/ Connor, Kristina F.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2004. pp. 18-22.
http://www.treesearch.fs.fed.us/pubs/6304
Descriptors: commercial activities/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Amphibia/ Reptilia: forestry/ prescribed burning and thinning/ community structure effects/ forest habitats/ preliminary results/ community structure/ prescribed burning and thinning effects/ forest and woodland/ mixed and pine forest habitats/ fire/ prescribed burning/ South Carolina/ upper piedmont/ Amphibia/ amphibians/ chordates/ mammals/ reptiles/ vertebrates
Abstract: Due to heavy fuel loads resulting from years of fire suppression, upland pine and mixed pine hardwood forests in the Upper Piedmont of South Carolina are at risk of severe wildfire. The National Fire and Fire Surrogate Study (NFFS) was conducted on the Clemson Experimental Forest to study the effects of prescribed burning and thinning on a multitude of factors, including herpetofauna and small mammals. Drift fence/pitfall arrays, modified pitfalls, unmodified pitfalls, and hand captures were used to sample herpetofauna. We captured 1,317 reptiles and amphibians representing 40 species from September 9, 2000 to January 9, 2002. There were no significant treatment effects on abundance within five major taxa (frogs/toads, salamanders, turtles, lizards, and snakes). However, there were treatment effects on two lizard species. When comparing richness, the thin treatment had a significantly higher number of snake species than the burn treatment. Live traps, snap traps, and herpetofauna traps were used to sample small mammals. No small mammals were caught in live traps for 9,600 trap nights. Snap trap success was 0.10 percent for 27,000 trap nights. Small mammals were captured at low levels in herpetofuana traps (0.06 percent trap success) for 163,968 trap nights. Treatment effects could not be determined for small mammals due to the low number of captures.

Although treatment effects were limited, prescribed burning and thinning have been found to alter herpetofauna and small mammal communities.
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984. **Effects of prescribed burning on distribution and abundance of birds in a closed-canopy oak-dominated forest, Missouri, USA.**
Blake, J. G.
Biological Conservation 121(4): 519-531. (2005)
NAL Call #: S900.B5; ISSN: 00063207.
Notes: doi: 10.1016/j.biocon.2004.06.021.
Descriptors: birds/ fire/ oak/ prescribed burning/ restoration/ abundance/ avifauna/ prescribed burning/ restoration ecology/ spatial distribution/ Cuivre River State Park/ Missouri/ Aves/ Empidonax/ Empidonax virescens/ Helmitheros/ Helmitheros vermivorus/ Hylocichla mustelina/ Impleta/ Indigofera/ Oporornis/ Oporornis formosus/ Passerina cyanea/ Picidae/ Quercus/ Seiurus/ Seiurus aurocapillus
Abstract: Prescribed, biennial burning in forest understory started in Cuivre River State Park, Missouri, USA, in the late 1980s to help restore the forest to conditions that existed prior to European settlement. Bird surveys were started in 1996 on two burned and two unburned sections of the park to determine what effects the burning and subsequent changes in vegetation were having on bird populations. Birds were sampled at 17 60-m radius point counts on each study area; each point was sampled twice per year during the main breeding period from 1996 through 2002. Total abundance and species richness differed among the four areas but no differences could be attributed to burning. Some individual species, however, differed in abundance and frequency of occurrence between burned and unburned areas. For example, Indigo Bunting (Passerina cyanea), Kentucky Warbler (Oporornis formosus), and several species of woodpeckers were more abundant on burned areas; Ovenbird (Seiurus aurocapillus), Worm-eating Warbler (Helmitheros vermivorous), Wood Thrush (Hylocicla mustelina) and Acadian Flycatcher (Empidonax virescens) were among the species more abundant on unburned areas. As a consequence, overall community composition differed significantly between burned and unburned areas of the park, but did not differ between burned areas or between unburned areas. Prescribed burning was instituted to restore vegetation to presettlement conditions and has started to achieve that objective. Restoration also has affected and likely will continue to affect bird populations. Future maintenance of a full complement of bird species, including a number of neotropical migrants, will be dependent on presence of both burned and unburned forest habitat.
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985. **Effects of prescribed burns on wintering cavity-nesting birds.**
Bateman, Heather L. and O'Connell, Margaret A.
Northwest Science 80(4): 283-291. (2006)
NAL Call #: 470 N81; ISSN: 0029-344X
Descriptors: Passeriformes/ Piciformes/ environmental factors/ cavity nesting/ Columbia Basin, Turnbull National Wildlife Refuge/ conservation/ wildlife management/ habitat use/ fires-burns/ forests/ ecosystems/ habitat management/ land zones/ pine woodland/ population ecology/ prescribed burning/ species abundance/ terrestrial ecology/ Washington/ Pinus spp./ ponderosa pine
Abstract: Primary cavity-nesting birds play a critical role in forest ecosystems by excavating cavities later used by other birds and mammals as nesting or roosting sites. Several species of cavity-nesting birds are non-migratory residents and consequently subject to winter conditions. We conducted winter bird counts from 1998 to 2000 to examine the abundance and habitat association of cavity-nesting birds in prescribed burned and unburned ponderosa pine (Pinus ponderosa) stands. Even though bird diversity indices did not differ between burned and unburned stands, species-specific bird abundance was associated with habitat variables in three burned and four unburned stands. Total cavity-nesting bird abundance was greater in burned stands. Most cavity-nesting birds were observed in mixed-species flocks. Individual species of these flocks were associated with different habitat variables within stands. Numbers of woodpeckers were significantly greater in burned stands and numbers of chickadees were significantly greater in unburned stands. Bark foragers such as woodpeckers (Picoides spp.) and pygmy nuthatches (Sitta pygmaea) were associated with fewer small trees and recently decayed snags and logs. Foliage gleaners such as the chickadees (Poecile spp.) were associated with small diameter snags. The juxtaposition of burned and unburned stands is important for individual birds reliant upon other members of a mixed-species flock and habitat heterogeneity within stands is important for maintaining a diverse cavity-nesting bird assemblage.
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986. **Effects of prescribed fire and fire surrogates on floral visiting insects of the Blue Ridge province in North Carolina.**
Campbell, J. W.; Hanula, J. L.; and Waldrop, T. A.
Biological Conservation 134(3): 393-404. (2007)
NAL Call #: S900.B5; ISSN: 0006-3207
Descriptors: associations/ mutualism/ ecology/ population dynamics/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Insecta: pollination/ effects of prescribed fire and fire surrogates on floral visiting taxa/ community structure/ population size/ forest and woodland/ fire/ prescribed fire and fire surrogates/ effects on floral visiting taxa/ North Carolina/ Hendersonville/ Green River Game Management Area/ Insecta/ arthropods/ insects/ invertebrates
Abstract: Pollination by insects in forests is an extremely important process that should be conserved. Not only do pollinating insects help to maintain a diversity of plants within forests, but they also aid in pollinating crops found near forested land. Currently, the effects of various forest management practices on floral visiting insect abundance or diversity is unknown, so we investigated how prescribed burning, mechanical shrub control, and combination of the two affected abundance of floral visiting insects. We caught 7921 floral visitors from four orders and 21 families. Hymenoptera was the most abundant and diverse order, with Halictidae being the most abundant family. A total of 45 species of Hymenoptera representing six families were captured. We caught seven families and 35 species of Lepidoptera, six families and 33 species of Coleoptera, and two families and 13 species of Diptera. Most floral visitors were captured in the mechanical shrub control plus prescribed burn treatments, while lower numbers were

caught on the mechanical shrub control only, prescribed burn only and control treatments. Overall species richness was also higher on mechanical plus burn treatments. Total pollinator abundance and the abundance of most orders and families was correlated with decreased tree basal area and increased percent herbaceous plant cover. Our study shows that floral visitors increased in abundance and species richness most from forest disturbance that reduced the density of overstory trees and increased the amount of herbaceous plant growth.
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987. **Effects of prescribed fire on habitat of beaver (Castor canadensis) in Elk Island National Park, Canada.**
Hood, G. A.; Bayley, S. E.; and Olson, W.
Forest Ecology and Management 239(1-3): 200-209. (Feb. 2007)
NAL Call #: SD1.F73
Descriptors: Castor canadensis/ habitats/ habitat preferences/ wildlife habitats/ prescribed burning/ forest ecology/ animal ecology/ fire ecology/ mixed forests/ boreal forests/ wetlands/ drought/ fires/ frequency/ ungulates/ herbivores/ statistical models/ Saskatchewan/ beaver lodges/ plant ecology/ aquaculture/ mathematics and statistics
This citation is from AGRICOLA.

988. **The effects of prescribed fires in different seasons on small mammals in a Sierra Nevada mixed conifer forest.**
Monroe, Michelle Erin
Davis, CA: University of California, Davis, 2006.
Notes: Degree: PhD; Advisor: Eliott-Fisk, Debbie
Descriptors: prescribed fire/ small mammals/ conifer forest/ Sierra Nevada Mountains/ lodgepole chipmunk/ Neotamias speciosus/ deer mouse/ Peromyscus maniculatus/ population density/ habitat management
Abstract: Prescribed fire is an important management practice used to restore natural fire regimes in Sierra Nevada mixed conifer forests where fire has been suppressed over the last century. It is not well known, however, how the timing of prescribed fire affects wildlife species. I compared the effects of prescribed fires during the early season (spring and early summer) with those during the late season (late summer and fall) on small mammal populations using model selection and inference methods. in Chapter 1, I examined the effects of prescribed fire treatments on small mammal movements. in Chapter 2, I evaluated the effects of prescribed fire treatments on small mammal population demographics. in Chapter 3, I explored small mammal habitat relationships following prescribed fire treatments. Lodgepole chipmunk (Neotamias speciosus) movements differed between years, but there was no effect of prescribed fires on their movements (Chapter 1). Deer mouse (Peromyscus maniculatus) movements differed between age groups within years. Prescribed fire treatments did not affect deer mouse movements, except when only adult female deer mouse movements were analyzed. Year effects were more important than fire effects on lodgepole chipmunk densities, total small mammal biomass, deer mouse densities, and deer mouse age ratios (Chapter 2). Prescribed burning had a positive effect on deer mouse pregnancy ratios, and there was only limited support for an effect of year on these ratios. there was essentially no support for different effects of fire depending on the season of fire on total small mammal biomass and deer mouse densities, and only limited support for these effects on lodgepole chipmunk densities, deer mouse age ratios, and deer mouse pregnancy ratios. the prescribed fire treatments differentially impacted small mammal habitat components depending on the season of the fire (Chapter 3). However, there were few significant relationships between these habitat components and deer mouse densities, lodgepole chipmunk densities or small mammal species richness. Overall, year effects often had the greatest influence on the small mammal populations examined, and there were few strong differences between the effects of early season fires and late season fires on these populations.
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989. **Effects of prescribed surface fires on ground- and shrub-nesting Neotropical migratory birds in a mature Indiana oak forest, USA.**
Aquilani, S. M.; LeBlanc, D. C.; and Morrell, T. E.
Natural Areas Journal 20(4): 317-324. (2000)
NAL Call #: QH76.N37; ISSN: 08858608
Descriptors: abundance/ neotropical migrants/ nesting success/ oak-hickory forest/ prescribed burning/ avifauna/ ecological impact/ forest management/ nesting/ prescribed burning/ reproductive success/ United States/ Molothrus ater/ Quercus/ Seiurus aurocapillus
Abstract: Prescribed fires have been used as a forest vegetation management tool in the eastern United States during the past decade, but concerns have been raised about direct or indirect adverse effects on Neotropical migrant bird species that nest in forest interior habitats. Prescribed fires were set in 1993 and 1995 in a mature hardwood forest in southern Indiana, USA, to reduce shade-tolerant understory woody vegetation and thereby increase the abundance and diversity of ground layer vegetation and seedlings of tree species that require moderate light levels (e.g., Quercus L. spp.). The objective of this study was to determine if prescribed fires reduced the abundance or reproductive success of ground- and shrub-nesting Neotropical migrant bird species. The burned area and an adjacent unburned area were studied during the summers of 1996 and 1997. An unlimited-radius point count method was used to determine relative abundance. Nests were monitored to determine fledging success. Vegetation structure was quantified at nest sites and at random points to assess fire effects and bird nest-site selection. Abundance of birds in this nesting guild was greater in the unburned area during both years. The greatest difference in abundance was for ovenbird (Seiurus aurocappilus Linnaeus). The probability of nest success for all bird species in this nesting guild combined, determined by the Mayfield method, was significantly lower in the burned area (0.125) than in the unburned area (0.291). Abundance of the brood parasite brown-headed cowbird (Molothrus ater Boddaert) did not differ between burned and unburned areas. However, the probability of nest success for parasitized nests (0.140) was lower than that of unparasitized nests (0.735). The mean number of host young fledged from successful nests was significantly lower in parasitized nests (1.3) than from unparasitized nests (3.0). Prescribed fires significantly reduced vegetative cover in the burned area. Nest sites in the burned area had higher vegetative cover than random points, indicating that birds

may have selected nest sites that were less affected by the fire. While prescribed fires that burn in a 'natural' hit-or-miss pattern may retain nesting habitat for bird species in this nesting guild, lower nest success in the burned area indicates that management for desirable vegetation and for this nesting guild may not be compatible within the same forest stand at the same time. This argues for planning at a landscape level to attain objectives for both vegetation composition and maintenance of bird species diversity.
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990. **Effects of prickly pear control on survival and nest success of northern bobwhite in Texas.**
Hernandez, F.; Henke, S. E.; Silvy, N. J.; and Rollins, D.
Wildlife Society Bulletin 31(2): 521-527. (2003)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: bobwhite/ brush control/ Colinus virginianus/ Opuntia/ Quail/ birds/ cactus/ nesting success/ survival/ wildlife management/ Texas
Abstract: Control of prickly pear cactus (Opuntia spp.) with a tandem of prescribed fire and picloram (4-amino-3,5,6-trichloropicolinic acid) is a common practice in the Rolling Plains of Texas. The effects of such a practice on the northern bobwhite (Colinus virginianus) have not been documented. We evaluated the effect that prickly pear control (2-3 years post-treatment) has on survival and nest success of northern bobwhites. We captured and radiomarked 217 bobwhites (n=66 males, n=151 females) within 2 treated (burned and sprayed) and 2 nontreated pastures during spring and summer of 1997-1998 in Shackelford County, Texas. Treated pastures were burned in February 1995 and subsequently sprayed in April 1995 with 0.27 kg/ha of picloram. Season survival (15 Mar-15 Aug) did not differ between treated (0.17) and nontreated pastures (0.36) in 1997 (P=0.12) or 1998 (0.58 vs. 0.61, respectively; P=0.72). Eighty-one nests were located, 48 in treated pastures and 33 in nontreated pastures. Nest success did not differ between treated (46%) and nontreated (46%) sites (P=0.96). Prickly pear control did not affect seasonal survival or nest success of northern bobwhites 2-3 years post-treatment.
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991. **Effects of restoration techniques on breeding birds in a thermally-impacted bottomland hardwood forest.**
Buffington, J. M.; Kilgo, J. C.; Sargent, R. A.; Miller, K. V.; and Chapman, B. R.
Ecological Engineering 15(Suppl 1): S115-S120. (Sept. 2000)
NAL Call #: TD1.E26
Descriptors: breeding/ burning/ ecosystem disturbance/ ecosystem management/ environmental impact/ environmental restoration/ forests/ habitat improvement (biological)/ herbicides/ nuclear power plants/ revegetation/ vegetation cover/ water temperature/ Aves/ South Carolina/ Savannah R.
Abstract: We evaluated the effects of revegetation techniques on breeding bird communities in a bottomland hardwood forest impacted by thermal effluent. In 1993, sections of the Pen Branch bottomland on the Savannah River Site, South Carolina, were herbicide-treated (glyphosate), burned, and planted; other sections were planted only while others were unaltered and served as controls. Few differences in the avian community occurred at 1 and 2 years post-treatment among treatments. Plots that were herbicide-treated, burned, and planted had greater species richness in 1994 and abundance in 1995 than sections that were planted only (P < 0.05). Bird species composition differed slightly among treatments and White-eyed Vireos (Vireo griseus), Common Yellowthroats (Geothlypis trichas), Indigo Buntings (Passerina cyanea), and Red-winged Blackbirds (Agelaius phoeniceus) were the most abundant species in the corridor. Revegetation techniques used to restore this thermally-impacted bottomland had little effect on the avian communities 1 and 2 years post-treatment.
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992. **Effects of selection cutting and landscape-scale harvesting on the reproductive success of two neotropical migrant bird species.**
Bourque, Julie. and Villard, Marc Andre
Conservation Biology 15(1): 184-195. (2001)
NAL Call #: QH75.A1C5; ISSN: 0888-8892
Descriptors: commercial activities/ conservation measures/ reproduction/ terrestrial habitat/ land and freshwater zones/ North America/ Canada/ Dendroica caerulescens/ Seiurus aurocapillus (Parulidae): forestry/ harvesting intensity/ habitat management/ forest harvesting intensity/ reproductive productivity/ forest and woodland/ New Brunswick/ Riley Brook area/ reproductive success/ forest harvesting intensity effects/ Parulidae/ Passeriformes, Aves/ birds/ chordates/ vertebrates
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993. **Effects of selective logging on breeding bird communities in bottomland hardwood forests in Louisiana.**
Heltzel, Jeannie M. and Leberg, Paul L.
Journal of Wildlife Management 70(5): 1416-1424. (2006)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Passeriformes/ Fringillidae/ Tyrannidae/ Vireonidae/ Acadian flycatcher/ Empidonax virescens/ hooded warbler/ Kentucky warbler/ Limnothlypis swainsonii/ Oporornis formosus/ prothonotary warbler/ Protonotaria citrea/ Swainson's warbler/ Vireo griseus/ white-eyed vireo/ Wilsonia citrina/ Aves/ wildlife-human relationships/ bird abundance/ bottomland hardwood forests/ breeding productivity/ commercial enterprises/ communities/ disturbances/ habitat use/ ecosystems/ forestry practices/ habitat alterations/ habitat quality/ land zones/ logging/ Louisiana/ methods and techniques/ selective logging/ wildlife management/ canopy gaps/ forestry/ point counts/ silviculture/ songbirds/ success/ timber harvest/ birds/ biocenosis/ habitat/ forest/ vegetation/ field techniques
Abstract: Bottomland hardwood forests of the southeastern United States support a rich avifauna, including > 20 species of conservation concern; understanding the impact of land use practices on these communities is critical to their conservation. Selective timber harvesting is a common management practice in southern bottomland hardwood forests, but little research has examined impacts > 5 years after harvesting. We studied breeding bird communities in selectively harvested bottomland forests in northeastern Louisiana during 2003-2004. We conducted point counts in recently harvested stands (1-5 yr postharvest) and older harvests (1218 yr postharvest); we paired each with a reference stand that had not been harvested for > 30 years. Of 35 species with sufficient detections for analysis, we

found evidence that abundances of 17 species differed among treatments. Three species were sensitive to creation of canopy openings by timber harvests, including 2 species of concern in the Mississippi Alluvial Valley, USA, prothonotary warbler (Protonotaria citrea) and Acadian flycatcher (Empidonax virescens). However, 4 species of concern often associated with densely vegetated canopy gaps were more abundant in older harvests than in reference stands: Swainson's warbler (Limnothlypis swainsonii), hooded warbler (Wilsonia citrina), white-eyed vireo (Vireo griseus), and Kentucky warbler (Oporomis formosus). As expected, a suite of species typically associated with shrub and forest-edge habitats was more abundant in recent harvests than in reference stands. We conclude that selective logging has a strong influence on bird abundances in both recent and older harvests in bottomland forests. With the exception of Acadian flycatcher, older harvests and reference stands supported similar abundances of the species typically found in closed-canopy bottomland forests. In addition, older harvests supported substantially higher abundances of gap-dependent species than other treatments. Our results should be useful to land managers and conservation planners evaluating short- and long-term effects of timber management practices on breeding birds in the Mississippi Alluvial Valley. However, measures of breeding productivity are necessary to evaluate more fully the habitat quality of harvested forests.
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994. **The effects of selective logging on nest-site selection and productivity of hooded warblers (Wilsonia citrina) in Canada.**
Whittam, Rebecca M.; McCracken, Jon D.; Francis, Charles M.; and Gartshore, Mary E.
Canadian Journal of Zoology 80(4): 644-654. (2002)
NAL Call #: 470 C16D; ISSN: 0008-4301
Descriptors: Wilsonia citrina/ Passeriformes/ Parulidae/ behavior/ forestry practices/ habitat alterations/ reproduction/ wildlife management/ canopy height/ daily survival rate/ deciduous forest/ forest gaps/ forest management/ ground vegetation density/ nest basal area/ nest parasitism/ nest-site selection/ pine plantation/ productivity/ selective logging/ stump number/ tree stem number/ breeding grounds/ forests/ ecosystems/ habitat management/ habitat use/ nesting site selection/ Ontario/ selective forest logging/ Canada/ conservation/ wildlife management/ land zones/ North America/ breeding/ hooded warbler
Abstract: We examined nest-site selection by hooded warblers (Wilsonia citrina) in two forests differing in composition (extensive pine plantation versus largely deciduous) and management (recent selective logging versus minimal logging). We measured habitat at 52 nests and 66 controls in one forest and 57 nests and 41 controls in the second. Nests had denser ground vegetation, fewer tree stems, less basal area due to small trees and greater basal area due to large trees than controls in both forests. In the managed forest with extensive pine plantations, hooded warblers were in coniferous and logged stands more often than expected by chance, nests had more stumps and greater canopy height than controls, and 91% (52/57) of all nests were found in gaps, 84% of which were created by harvest. Gap age was 6.2 ±0.9 years (mean ±SE) in 1999, and 7.6 ±0.6 years in 2000. In the managed forest, 52% of 24 nests were parasitized in 1999 and 39% of 33 nests were parasitized in 2000. The daily survival rate was 0.936 ±0.019 in 1999 and 0.944 ±0.014 in 2000. Successful nests did not differ from unsuccessful nests in any habitat variable. To benefit hooded warblers, forest managers should mimic natural gap creation by using selective logging to create gaps no larger than 0.05 ha, and should leave a residual basal area of mature trees (>38 cm diameter at breast height) of at least 12 m^2/ha.
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995. **The effects of shelterwood logging on bird community composition in the Black Hills, Wyoming.**
Anderson, Stanley H. and Crompton, Bradley J.
Forest Science 48(2): 365-372. (2002)
NAL Call #: 99.8 F7632; ISSN: 0015-749X
Descriptors: Certhia americana/ Seiurus aurocapillus/ Sitta canadensis/ Passeriformes/ forestry practices/ habitat alterations/ terrestrial ecology/ shelterwood logging/ complex history/ frequent cool ground fires/ human disturbance/ intensive fire suppression/ natural disturbance/ open even-aged stands/ Black Hills National Forest/ forests/ ecosystems/ habitat management/ harvested forest/ status/ species diversity/ Wyoming/ wildlife-human relationships/ commercial enterprises/ communities/ conservation/ wildlife management/ disturbances/ habitat use/ land zones/ brown creeper/ ovenbird/ red-breasted nuthatch/ Pinus ponderosa/ ponderosa pine/ South Dakota
Abstract: The Black Hills of Wyoming and South Dakota are characterized by a complex history of both natural and human disturbance regimes. Historically, ponderosa pine (Pinus ponderosa) communities were characterized by frequent, cool ground fires. Intensive fire suppression and timber harvest throughout the past century have drastically altered the structure of existing forests. Today, much of the area has been harvested using shelterwood logging resulting in open even-aged stands. The goal of this study was to compare bird communities in treated (areas that have recently been harvested) and untreated (areas receiving minimal silvicultural treatment) in the past 40 yr. Of the 20 commonly observed bird species, 3 species [red-breasted nuthatch (Sitta Canadensis), brown creeper (Certhia Americana), and ovenbird (Seiurus aurocapillus)] were conspicuously less abundant in treated than in untreated stands. Eleven other species were more abundant in treated stands, while six species showed no response to treatment. Although bird species diversity and the abundance of birds were highest in treated stands, this does not imply that logging is beneficial to the entire bird community. The abundance of particular bird species may appear to have increased, but the composition of the bird community has been altered. As more of the forested areas are harvested, the bird community will shift from one with birds typical of both open pine and dense pine forest to one dominated by ground foraging species.
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996. **Effects of silvicultural activity on ecological processes in floodplain forests of the southern United States: A review of existing reports.**
Lockaby, B. G.; Stanturf, J. A.; and Messina, M. G.
Forest Ecology and Management 90(2-3): 93-100. (1997)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: functions/ harvests/ wetland forests

Abstract: Activities associated with timber harvesting have occurred within floodplain forests in the southern United States for nearly two hundred years. However, it is only in the last ten years that any information has become available about the effects of harvesting on the ecological functions of this valuable resource. Hydrology is the driving influence behind all ecological processes in floodplains, and timber harvesting alone usually has little long-term effect on hydroperiod. However, logging roads, built in association with harvest sites, can sometimes alter hydroperiod to the extent that vegetation productivity is raised or lowered. There is no evidence that harvesting followed by natural regeneration represents a threat to ground or surface water quality on flood plain sites, as long as 'best management practices' are followed. Harvested floodplains may increase or have little effect on decomposition rates of surface organic matter. The nature of the effect seems to be controlled by site wetness. Data from recently harvested sites (i.e. within the last ten years) suggest that vegetation productivity is maintained at levels similar to those observed prior to harvests. During the early stages of stand development, tree species composition is heavily influenced by harvest method. Similarly, amphibian populations (monitored as bioindicators of ecosystem recovery) seem to rebound rapidly following harvests, although species composition may be different from that of unharvested stands.
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997. **The effects of stand age on avian communities in aspen-dominated forests of central Saskatchewan, Canada.**
Hobson, K. A. and Bayne, E.
Forest Ecology and Management 136(1-3): 121-134. (2000)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land and freshwater zones/ Canada/ Aves: forestry/ aspen dominated forest/ forest management/ habitat management/ stand age/ breeding communities/ community structure/ forest and woodland/ Saskatchewan/ Prince Albert Model Forest Area/ Aves/ birds/ chordates/ vertebrates
Abstract: Timber harvest projections for aspen-dominated forests in the prairie region of Canada include a truncation of the current age distribution, whereby old stands of fire origin will become rarer on the landscape, while young, post-harvest stands will increase in abundance. To determine the effects this harvesting strategy might have on communities of breeding forest birds, we conducted point counts in young forests regenerated from clear-cutting (15-25 years), and mature (50-60 years), and old (80-110 years) forests regenerated from fire. Avian species richness was highest in old stands at the point-count station, forest stand, and landscape level. Increased species richness with forest age was associated with increases in the relative abundance of canopy- and cavity-nesting species. At local scales (station and stand), species richness of ground- and shrub-nesting birds was similar among forest age-classes. However, as determined by rarefaction analyses appropriate at the landscape scale, ground-nesting species were more common in young and old forests, while shrub-nesting species were more common in young and mature forests. Density of deciduous shrubs was an important factor influencing the abundance of species like American redstart, Canada warbler, and chestnut-sided warbler. An increase in conifer in old stands resulted in greater use by conifer- or mixedwood associated species such as bay-breasted warbler, magnolia warbler, and ruby-crowned kinglet. Our data indicate that vegetation and structural characteristics such as shrub density should be considered when prescribing sustainable forestry objectives.
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998. **Effects of stand-replacement fire and salvage logging on a cavity-nesting bird community in eastern Cascades, Washington.**
Haggard, M. and Gaines, W. L.
Northwest Science 75(4): 387-396. (2001)
NAL Call #: 470 N81; ISSN: 0029344X
Descriptors: avifauna/ cavity/ fire/ foraging behavior/ forest management/ logging (timber)/ nest site/ snag/ United States
Abstract: We monitored the response of cavity-nesting species to three snag density treatments (high = 37-80 snags/ha, medium = 15-35 snags/ha, and low = 0-12 snags/ha) during two breeding seasons 4-5 yr post-fire and logging in Douglas-fir- ponderosa pine forests in the eastern Cascades, Washington. Snag surveys were used to describe habitat, and both breeding bird surveys and nest surveys were used to characterize the bird community. Stands with the medium snag density treatment had the highest abundance, species richness, and nesting population of cavity nesters. The reasons for this may be: 1) snags were not evenly distributed within a stand such that both clumped and dispersed snag density habitats were interspersed in this treatment, and 2) a greater proportion of ponderosa pine snags in medium density treatments may have attracted species that prefer ponderosa pine for nesting and foraging. Ponderosa pine was preferred for nest sites and large snags (> 48 cm dbh) provided nesting habitat for more species than smaller snags. However, smaller snags were used for nesting and foraging by some species.
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999. **Effects of strip and single-tree selection cutting on birds and their habitat in a southwestern Quebec northern hardwood forest.**
Doyon, F.; Gagnon, D.; and Giroux, J. F.
Forest Ecology and Management 209(1-2): 101-116. (2005)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2005.01.005.
Descriptors: biodiversity/ coarse woody debris/ forest management/ low-impact silviculture/ passerines/ vertical and horizontal habitat structure/ cutting/ hardwoods/ forest habitats/ single-tree selection cutting/ woody debris/ forestry/ avifauna/ coarse woody debris/ ecological impact/ habitat structure/ harvesting/ selective logging/ silviculture/ birds/ forest strip/ forests/ hardwoods/ North America/ trees/ Canada/ North America/ Quebec [Canada]/ Aves/ Catharus ustulatus/ Dendroica pensylvanica/ Dendroica virens/ Galliformes/ Pheucticus ludovicianus/ Seiurus aurocapillus
Abstract: In the northern hardwood forest of northeastern North America, ecological and social perceptions call for forest management systems using reduced-impact silviculture such as single-tree selection cutting and small clearcuts. When applied over large areas, single-tree selection cut and small clearcut systems are likely to generate different local habitat structures and spatio-temporal habitat distribution in the landscape. This study

assessed the effects of strip cutting and single-tree selection cutting on forest breeding birds when extensively applied in a northern hardwood forest in southwestern Quebec, a decade after timber harvest. Birds were surveyed twice during two consecutive breeding seasons by 270 point counts, equally distributed in a single-tree selection cut forest, a strip cut forest, and an untreated forest. At each point count, habitat features and horizontal heterogeneity of these features were measured. Managed forest habitats had a much more developed understory, fewer snags and more downed woody debris. Horizontal heterogeneity was higher in the strip cut forest and lower in the single-tree selection cut forest. Of the 20 bird species analyzed, 13 showed a difference in abundance between at least two of the three treatments. Dendroica pensylvanica was mostly seen in the treated forests while Dendroica virens and Seiurus aurocapillus were more abundant in the untreated forest. Pheucticus ludovicianus was twice as abundant in the strip cut forest, while Catharus ustulatus was more frequently observed in the single-tree selection cut forest. Habitat vertical structure variables that differed among the three treatments were the most correlated with bird abundance. The results of this study support the use of a mix of silvicultural systems within the same forest in order to sustain habitat diversity for maintaining the regional avian cortege.
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1000. **Effects of structural complexity enhancement on eastern red-backed salamander (Plethodon cinereus) populations in northern hardwood forests.**
McKenny, Heather C.; Keeton, William S.; and Donovan, Therese M.
Forest Ecology and Management 230(1-3): 186-196. (2006)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: Caudata/ Lissamphibia/ Plethodontidae/ Plethodon cinereus/ abundance estimate/ wildlife-human relationships/ commercial enterprises/ wildlife management/ course woody debris/ disturbances/ habitat use/ forests/ ecosystems/ forest management/ forestry practices/ habitat alterations/ Green mountain range/ habitat conservation/ habitat management/ habitat size/ hardwood forest/ Hardwood forest structural complexity enhancement/ land zones/ density/ population ecology/ status/ silviculture/ structural complexity/ structural complexity enhancement/ structural habitat attribute/ Vermont
Abstract: Managing for stand structural complexity in northern hardwood forests has been proposed as a method for promoting microhabitat characteristics important to eastern red-backed salamanders (Plethodon cinereus). We evaluated the effects of alternate, structure-based silvicultural systems on red-backed salamander populations at two research sites in northwestern Vermont. Treatments included two uneven-aged approaches (single-tree selection and group-selection) and one unconventional approach, termed "structural complexity enhancement" (SCE), that promotes development of late-successional structure, including elevated levels of coarse woody debris (CWD). Treatments were applied to 2 ha units and were replicated two to four times depending on treatment. We surveyed red-backed salamanders with a natural cover search method of transects nested within vegetation plots 1 year after logging. Abundance estimates corrected for detection probability were calculated from survey data with a binomial mixture model. Abundance estimates differed between study areas and were influenced by forest structural characteristics. Model selection was conducted using Akaike Information Criteria, corrected for over-dispersed data and small sample size (QAICc). We found no difference in abundance as a response to treatment as a whole, suggesting that all of the uneven-aged silvicultural systems evaluated can maintain salamander populations after harvest. However, abundance was tied to specific structural habitat attributes associated with study plots within treatments. The most parsimonious model of habitat covariates included site, relative density of overstory trees, and density of more-decayed and less-decayed downed CWD. Abundance responded positively to the density of downed, well-decayed CWD and negatively to the density of poorly decayed CWD and to overstory relative density. CWD volume was not a strong predictor of salamander abundance. We conclude that structural complexity enhancement and the two uneven-aged approaches maintained important microhabitat characteristics for red-backed salamander populations in the short term. Over the long-term, given decay processes as a determinant of biological availability, forestry practices such as SCE that enhance CWD availability and recruitment may result in associated population responses. © 2006 Elsevier B.V. All rights reserved.
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1001. **The effects of thinning and prescribed fire on foraging patterns of bark-gleaning birds.**
Woolf, Jennifer C.
Intermountain Journal of Sciences 9(4): 145-146. (2003); ISSN: 1081-3519
Descriptors: birds/ forest management/ forest restoration/ Pinus ponderosa/ ponderosa pine/ snags/ cavity nesting/ woodpeckers/ nuthatches/ chickadees
Abstract: Fire suppression in western forests has changed the mosaic of successional stage of forest that once existed. In the western United States, recent large-scale, high-intensity fires have been attributed to the lack of fire in forest systems for the past century. The Montana Department of Natural Resources (DNRC) is integrating ponderosa pine forest restoration into their timber harvest program with a commercial thin that is combined with a selective cut and followed by a prescribed burn. Many studies have considered the effects of forest management practices on nest availability for cavity nesters, but little published information exists on how thinning combined with prescribed fire affects their foraging patterns. Snags can provide important nesting habitat for cavity nesters, but it has been suggested that food availability may be the limiting factor for woodpeckers. In this project, I examined the foraging patterns of bark-gleaning birds on sites treated by the DNRC versus untreated sites. I determined which tree characteristics are important in the selection of forage trees for five different species: red-breasted nuthatches, white-breasted nuthatches, mountain chickadees, hairy woodpeckers, and black-backed woodpeckers. Treated and untreated sites were analyzed separately to determine if the same tree characteristics were important on both sites. Selection of forage trees with certain characteristics occurred on both sites for most species.
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1002. **The effects of timber harvesting on neotropical migrants in cove hardwood forests in the southern Appalachian Mountains.**
Franzreb, Kathleen E.
In: Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference, General Technical Report-PSW 191/ Ralph, C. J. and Rich, T. D.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2005. pp. 301-311.
Notes: 0196-2094 (ISSN).
Descriptors: commercial activities/ conservation measures/ ecology/ community structure/ population dynamics/ terrestrial habitat/ land zones/ Aves: forestry/ timber harvesting/ species diversity/ breeding densities/ neotropical migrants/ cove hardwood forest/ habitat management/ population density/ forest and woodland/ North Carolina/ Southern Appalachian Mountains/ birds/ chordates/ vertebrates
Abstract: I compared avian species richness, density, and diversity for neotropical migrants, short distance migrants, and permanent residents following timber harvesting in cove hardwood forests in the Southern Appalachian Mountains of North Carolina. The forest stands were 4- 103 years old, had undergone a clearcut or selective tree removal, and represented four successional stages (early, sapling/pole, mid, and late). Neotropical migrants constituted 60.5 to 69.0 percent of species richness. Mean breeding bird density for all species was 225.1 pairs/40 ha ±16.3 SE) with an overall mean density for neotropical migrants of 186.2 pairs/40 ha ±5.4 SE). Late successional cove hardwood forest habitats provide for a significantly more diverse avifauna with respect to the entire avifauna, and, specifically the neotropical migrants, than does sapling/pole or midsuccessional forests. Neotropical migrants are the most substantial avian component of the highly diverse cove hardwood forest habitat, accounting for a minimum of 70 percent of the individual birds in each successional class. Therefore, their needs must not be overlooked in considering the consequences of habitat alterations and management activities.
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1003. **Effects of timber harvests on invertebrate biomass and avian nest success.**
Duguay, J. P.; Wood, P. B.; and Miller, G. W.
Wildlife Society Bulletin 28(4): 1123-1131. (2000)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Insect biomass/ nest predation/ nest survival/ silviculture/ timber management/ avifauna/ biomass/ invertebrate/ management practices/ nesting success/ population decline/ timber harvesting/ United States/ Hylochichla mustelina
Abstract: Concerns over declining songbird populations have led to investigations of effects of various timber management practices on breeding songbirds. We assessed the influence of 2 types of practices, two-age and clearcutting, on invertebrate biomass and avian daily nest survival in the Monongahela National Forest of West Virginia during summers of 1995 and 1996. We also examined relationships between invertebrate biomass, avian daily nest survival, and wood thrush (Hylocichla mustelina) nestling growth rates. Mean total invertebrate biomass collected per sample day and litter-dwelling invertebrates collected per sample day were 0.0614 g and 0.0254 g greater (P≤0.10), respectively, in the unharvested than clearcut treatment late in the season (2 Jun to 12 Jul) when most birds had young in the nest; whereas invertebrates that hide under tree bark during the day had greatest biomass (P=0.003) in the two-age treatment during this same time period (0.1355 g greater than clearcut and 0.0616 g greater than unharvested). In addition, daily nest survival rates (216 nests) were greater in the unharvested than two-age treatment (P≤0.05). The lesser daily nest survival rates of birds breeding in the harvested treatments may be due to increased predator activity within these areas and/or reduced food supplies. Significant positive correlations between invertebrate biomass and daily nest survival rates of breeding birds and faster growth rates of wood thrush nestlings in stands with a greater invertebrate biomass suggest that changes in invertebrate biomass caused by silvicultural practices have an influence on breeding birds within these areas.
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1004. **Effects of uneven-aged timber harvest on forest floor vertebrates in the Cascade Mountains of southern Washington.**
MacCracken, James G.
Forest Ecology and Management 208(1-3): 123-135. (2005)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: biogeography/ uneven-aged timber harvest/ species abundance/ air temperature/ precipitation/ tree cover/ body condition/ tree density/ breeding pond/ capture rate/ wetland buffer width/ Tsuga spp.
Abstract: I sampled amphibians and small mammals in noble fir-western hemlock (Abies procera-Tsuga heterophylla) stands following selective timber harvest and in reference stands from 1997 to 2001 in the Cascade Mountains of Washington. Forest stands surrounded a 25 ha wetland. Selective harvest had large, negative effects on tree density and cover and shrub cover, but large positive effects on herbaceous cover. Harvest effects on the abundance of all forest floor vertebrates (FFVs) were small, negative for most amphibians, and positive for most small mammals. Indices of body condition for species with adequate captures were also similar between harvested and reference stands. Annual changes in abundance of forest floor vertebrates in relation to trends in precipitation and air temperature, however, were much larger than those attributed to timber harvest. In addition, the distance of a trap site to breeding ponds had a moderate effect on capture rates of pond-breeding amphibians. Incomplete descriptions of timber harvest techniques in most studies complicated comparisons among studies and formulating generalizations about the effects of uneven-aged harvest on forest floor vertebrates. Wetland buffer width in this study (congruent to 61 m) maintained wetland associated species, but longer term (> 5 years) trends need study.
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1005. **Effects of wildfire on recruitment of Fraxinus pennsylvanica in eastern Montana woodlands.**
Lesica, P.
American Midland Naturalist 149(2): 258-267. (2003)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: habitat management/ prescribed burning/ recruitment/ regeneration/ restoration ecology/ wildfire/ woodland/ North America/ Fraxinus pennsylvanica

Abstract: Fraxinus pennsylvanica woodlands are an important component of the Northern Great Plains ecosystem and critical habitat for many species of birds, mammals and plants. Many F. pennsylvanica woodlands are decadent, declining from closed-canopy to open-canopy stands with few tall shrubs and a ground layer dominated by Eurasian meadow grasses. Fire has been suggested to facilitate regeneration of these woodlands. Understanding the effects of fire on tree recruitment is essential if controlled burning is to be used for regenerating F. pennsylvanica woodlands. In 2001 I subjectively chose one stand with evidence of ground fire and a similar unburned stand at each of seven sites where F. pennsylvanica woodlands had experienced warm-season wildfire between 1988 and 1998. I measured density of F. pennsylvanica seedlings and number and size of crown sprouts for each tree in 3-4 sample plots in each stand. Fire had a significant negative effect on Fraxinus pennsylvanica regeneration at most sites. Trees in burned stands had three times as many crown sprouts (P = 0.02) that were nearly twice as large in diameter (P = 0.09) than in unburned stands. However, seedlings averaged 75% fewer in burn plots compared to unburned (P = 0.06). Burn plots with live mature F. pennsylvanica trees remaining had twice as many seedlings compared to those in which all mature trees were top-killed (P = 0.08). A large number of F. pennsylvanica trees were apparently killed by fire at several of the study sites. This study did not support using fire to restore F. pennsylvanica woodlands in eastern Montana.
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1006. **Effects of wildlife stand improvements and prescribed burning on bat communities on the Buffalo Ranger District, Ozark National Forest.**
Jackson, Jeremy L.; Prescott, Shane R.; Whilhide, J. D.; and Wilhide, J. D.
Bat Research News 43(4): 155-156. (2002)
NAL Call #: QL737.C5 B328; ISSN: 0005-6227.
Notes: Conference: 32nd Annual North American Symposium on Bat Research, Burlington, VT, USA, November 06-09, 2002.
Descriptors: Chiroptera/ terrestrial ecology/ mist netting/ community ecology/ foraging areas/ forest management strategies/ movement areas/ open woodlands/ wildlife habitat/ forest stands
Abstract: Beginning in the year of 2001 managers of the Buffalo Ranger District (BRD) in the Ozark National Forest, Arkansas (Boston Mountains, of north central Arkansas) began using wildlife stand improvements (WSI) and prescribed burning (PB) as part of their management strategy in selected portions of the forest. One result of these management procedures is to alter the forest stands, from forests that contain many crowded, similarly aged trees to a considerably more open forest. We predicted that both the abundance of bats and the number of bat species would increase after a WSI that included PBs, since more open woodlands contain more potential foraging and movement areas for bats. To test this prediction, we compared bat abundance and species diversity between two intensively managed areas and two reference areas. Specifically, a WSI and PB were administered on a watershed located on the northwestern portion of the BRD during the fall of 2001 and spring of 2002. Similar management practices occurred in 1998 at treatment site two located on the eastern portion of the district. We selected two areas within the BRD, where little or no forest management has occurred in recent years to serve as reference areas. All four sites were approximately 5000 ha in size. Mist netting was conducted at a variety of water sources to assess bat abundance and diversity. We mist netted each area for an average of 23 nights (range 12-34 nights) in the summer of both 2001 and 2002 (one reference site was only sampled in 2002). Both bat species diversity and abundance was higher on the managed areas as compared to our reference sites. In addition a relationship was found between the number of bats captured and the density of trees (basal area). In general, more bats were captured in more open areas. These data suggest that forest management strategies incorporating WSI and PB may be beneficial to bat communities.
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1007. **Efficacy of herbicides and fire to improve vegetative conditions for northern bobwhites in mature pine forests.**
Jones, J. D. J. and Chamberlain, M. J.
Wildlife Society Bulletin 32(4): 1077-1084. (2004)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2004)032 [1077:EOHAFT]2.0.CO;2.
Descriptors: Colinus virginianus/ forest management/ glyphosate/ habitat management/ herbicide/ Imazapyr/ Louisiana/ northern bobwhite/ pine forest/ prescribed fire/ forest management/ gamebird/ habitat management/ herbicide/ prescribed burning/ species diversity/ vegetation structure/ Colinus/ Colinus virginianus
Abstract: Declining northern bobwhite (Colinus virginianus) populations during the past 30 years have prompted managers to seek ways to improve habitat quality for this species. Reductions in frequency of prescribed fire throughout considerable expanses of mature pine (Pinus spp.) forests have resulted in closed-canopy conditions, predominantly woody understory conditions, and a loss of early-successional habitats needed by bobwhites. Herbicides, particularly in conjunction with prescribed fire, may be useful for managing these pine forests to benefit the bobwhite and other early-successional species, but effects of herbicides in combination with fire are not well understood. Therefore, we used 3 similar-aged, mature pine stands to evaluate vegetative response to selective herbicides with prescribed fire with respect to bobwhite nesting and brood-rearing habitats. Our treatments were imazapyr with fire, imazapyr combined with glyphosate with fire, and dormant-season prescribed fire only. Plant diversity tended to decline on herbicide treatments during the first year but increased substantially on imazapyr plots during the second growing season following a burn. Bobwhite food plants increased following application of imazapyr during the first growing season and were greater for both herbicide treatments than burning alone during the second growing season. Abundance of hardwoods declined on both herbicide treatments. However, no treatments produced bare-ground percentages known to be selected by bobwhites, and only prescribed fire alone created and maintained suitable escape cover. Overall, imazapyr with fire provided the greatest net improvement in vegetative conditions for bobwhites and retained floristic diversity. We recommend that managers target areas in which vegetative conditions have progressed to where burning alone is incapable of restoring early-successional plant communities

needed by the bobwhite and other species and apply imazapyr with fire to create diverse, patchy habitat for bobwhites.
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1008. **Elevated numbers of flying insects and insectivorous birds in riparian buffer strips.**
Whitaker, D. M.; Carroll, A. L.; and Montevecchi, W. A.
Canadian Journal of Zoology 78(5): 740-747. (2000)
NAL Call #: 470 C16D; ISSN: 00084301
Descriptors: abundance/ avifauna/ buffer zone/ insect/ insectivore/ riparian zone/ Canada/ Abies balsamea/ Dendroica coronata/ Dendroica striata/ Diptera/ Hymenoptera
Abstract: We compared the abundances of flying insects along undisturbed lakeshores and riparian buffer strips in balsam fir (Abies balsamea) forests in western Newfoundland. Insects were collected in pan traps placed on the forest floor and tanglefoot (sticky) traps suspended within the live canopy. Significantly greater numbers of insects were captured in riparian buffer strips than in undisturbed shorelines for four of five size classes in the canopy and two of five size classes in the understory. Collections were dominated by adult Diptera and Hymenoptera. Mean capture rates along buffer strips were 120-200% of the mean capture rates along undisturbed shorelines. This increase was greatest for large-bodied insects. A likely explanation for our observations is that buffer strips act as windbreaks, collecting airborne insects blown in from adjacent clearcuts and lakes. This phenomenon has been widely documented in agricultural landscapes. Understory wind speed was generally greater along buffer strips than controls, which is a reflection of increased exposure caused by clear-cutting. A concurrent parallel study conducted at the same sites investigated the effects of riparian buffering on breeding bird assemblages. Ubiquitous insectivorous birds, including the yellow-rumped warbler (Dendroica coronata) and blackpoll warbler (Dendroica striata), were more abundant along buffer strips than undisturbed shorelines, possibly in response to increased prey availability. Increased food availability may in part explain the high numbers of insectivorous birds typically observed in riparian buffer strips in boreal forests.
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1009. **Environmental impacts of forest monocultures: Water use, acidification, wildlife conservation, and carbon storage.**
Cannell, M. G.
New Forests 17/18(1/3/1): 239-262. (1999)
NAL Call #: SD409.N48; ISSN: 0169-4286.
Notes: Literature review; Special issue: Planted forests: Contributions to the quest for sustainable societies/ edited by J. R. Boyle, J. Winjum, K. Kavanagh and E. Jensen. Paper presented at a symposium held June 1995, Portland, Oregon. Includes references.
Descriptors: forest plantations/ monoculture/ sustainability/ water use/ species diversity/ wildlife/ habitats/ wildlife conservation/ carbon/ carbon cycle/ evapotranspiration/ plant height/ pollutants/ surface water/ water pollution/ forest management/ volume/ yields/ plant succession/ botanical composition/ stand structure
Abstract: A broad assessment is given of the contentions that plantation forests are high consumers of water, increase acidification, sustain a low diversity of wildlife, and store more carbon than do unmanaged forests. The following conclusions are drawn: (1) Evapotranspiration from planted forest monocultures is greater than from short vegetation, as a result of greater interception loss. Water loss from conifer forests is usually greater than from deciduous hardwoods, but evapotranspiration from Eucalyptus in the dry tropics is often no greater than from native hardwoods. (2) Compared to short vegetation, forests can significantly increase the transfer of acidifying pollutants from the air to the soil and surface waters, and conifers are more likely to enhance acidification than are hardwoods. (3) There are normally sufficient plantation management options available to make most plantation landscapes the homes of a rich diversity of flora and fauna. (4) An area covered with a plantation managed for maximum volume yield will normally contain substantially less carbon than the same area of unmanaged forest. This citation is from AGRICOLA.

1010. **Establishment success of conservation tree plantations in relation to silvicultural practices in Indiana, USA.**
Jacobs, Douglass F.; Ross-Davis, Amy L.; and Davis, Anthony S.
New Forests 28(1): 23-36. (2004)
NAL Call #: SD409.N48 ; ISSN: 0169-4286
Descriptors: Odocoileus virginianus/ Cervidae/ Artiodactyla/ conservation/ forestry practices/ habitat alterations/ conservation planting/ tree establishment success/ white-tailed deer
Abstract: In the Central Hardwood Forest region of the United States, the variable and somewhat unpredictable establishment success of hardwood tree plantations has traditionally been attributed to competing vegetation and damage due to animal browse. We examined operational plantation establishment success (1-5 years following planting) as it relates to use of particular silvicultural practices. Silvicultural histories were obtained for 87 randomly selected plantations throughout Indiana and field data were collected from each to determine tree survival, tree vigor, and abundance of surrounding vegetation. Survival was highest at sites that were treated with herbicide prior to planting and that had been mechanically planted (as opposed to hand planted). The percentage of trees with evidence of dieback was highest on sites at which browse protection measures had been used, likely reflecting a combination of damage due to inherently high white-tailed deer (Odocoileus virginianus Zimmermann) populations at such sites and ineffectiveness of current browse protection measures. Sites planted by a professional forester and those with herbicide applied subsequent to planting had a higher percentage of trees deemed free-to-grow. Subsequent herbicide application did not reduce cover or height of competing vegetation; however, when used in conjunction with mechanical site preparation techniques, overall cover and height of herbaceous vegetation was reduced.
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1011. **Evaluating the effects of ecosystem management: A case study in a Missouri Ozark Forest.**
Gram, W. K.; Sork, V. L.; Marquis, R. J.; Renken, R. B.; Clawson, R. L.; Faaborg, J.; Fantz, D. K.; Le Corff, J.; Lill, J.; and Porneluzi, P. A.
Ecological Applications 11(6): 1667-1679. (2001)
NAL Call #: QH540.E23; ISSN: 10510761
Descriptors: animal communities/ community-level diversity/ ecosystem management/ even-aged vs. uneven-aged forest/ forest management/ meta-analysis/ Missouri Ozark Forest ecosystem Project/ Missouri Ozarks/ community structure/ ecosystem function/ ecosystem management/ sustainability/ Animalia/ Anura/ Aves
Abstract: Many federal and state management agencies have shifted from commodity-based management systems to multiple resource-based management systems that emphasize sustainable ecosystem management. Long-term sustainability of ecosystem functions and processes is at the core of ecosystem management, but a blueprint for assessing sustainability under different management strategies does not exist. Using the Missouri Ozark Forest Ecosystem Project (MOFEP) as a case study, we present one approach to evaluating the landscape-scale, short-term (one and two years posttreatment) consequences of even-aged and uneven-aged forest management treatments on community-level biological diversity. We chose changes in density of ecological species groups, representing groups of species with similar resource requirements, as our response variable. Changes in density are detectable before species completely disappear from an area, and these changes may be an early indicator of significant alterations to community structure and ecosystem function. Meta-analysis was used to statistically combine changes in densities across multiple species groups and assess the overall impacts of management treatments on the animal community. We also separately examined changes in density for each ecological species group. Our findings demonstrated that, in the short-term, even-aged and uneven-aged forest management treatments caused changes in animal community density in Missouri Ozark forests. Even-aged management sites showed greater changes than uneven-aged management sites after harvesting, and changes in species' densities were larger two years posttreatment (1998) than one year posttreatment (1997). Evaluation of treatment effects on individual ecological groups revealed that toads, forest interior birds, and edge/early successional birds were significantly affected by management treatments. We did not expect most species groups to exhibit treatment effects because relatively little forest biomass was removed per experimental site (only 10%), forest cover at the regional landscape level did not change and was generally high during the study, and the time scale was relatively short. The challenges facing ecosystem management evaluation parallel the challenges of ecological science in general: identifying appropriate variables, spatial and temporal scales, and experimental/management treatments. The integrative approach demonstrated in this paper is a first step toward the analysis of the effects of management treatments on multiple organisms within an ecosystem.
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1012. **Evaluating the effects of ecosystem management alternatives on elk, mule deer, and white-tailed deer in the interior Columbia River Basin, USA.**
Lehmkuhl, J. F.; Kie, J. G.; Bender, L. C.; Servheen, G.; and Nyberg, H.
Forest Ecology and Management 153(1-3): 89-104. (2001)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/S0378-1127(01)00455-8.
Descriptors: Bayesian model/ Cervus elaphus/ ecosystem management/ forest management/ Odocoileus hemionus/ Odocoileus virginianus/ environmental impact/ forestry/ land use/ mathematical models/ ocean habitats/ watersheds/ land management/ ecosystems/ Bayesian analysis/ ecological modeling/ ecosystem management/ ungulate/ animals/ United States
Abstract: Elk (Cervus elaphus), mule deer (Odocoileus hemionus), and white-tailed deer (Odocoileus virginianus) are highly valued for their game, aesthetic, and spiritual qualities by sportsman, wildlife enthusiasts, and Native Americans in North America. As part of the Interior Columbia Basin Ecosystem Management Project (ICBEMP) of the US Forest Service and Bureau of Land Management, we: (1) defined key habitat associations of those species that could be used for a broad-scale (58 million hectares) analysis of management practices and (2) determined how three ecosystem management alternatives of a supplemental draft environmental impact statement (SDEIS) might affect the regional distribution of habitat for those species across the Basin over the next 100 years. For the three species, we developed a Bayesian Belief Network model that used available SDEIS datasets to estimate historical, current, and future habitat capability under the management alternatives in each of the 7467 subwatersheds (mean 8000 ha) in the study area. The model quantified "inherent habitat capability" as a function primarily of forage habitat capability, with cover as a minor influence. Forage habitat capability was a function of the percentage area of rangeland and early seral forest community types, and the qualitative influences of livestock overgrazing, wildfire, and prescribed fire. For the current and future periods, an "adjusted habitat capability" was estimated by adjusting inherent habitat capability for the negative effects of poor security from human disturbance. Open road density, cover area, and a terrain relief index were used to estimate the security effect. Habitat capability was reported by 15 ecological regions within the study area as mean subwatershed capability. Under all management alternatives, habitat capability increased about 5% for all three ungulate species over the next 100 years. Limitations of the coarse analysis scale restrict application of the model to large-scale assessments. Lacking regional population data, verification of model output was not feasible at the scale of analysis. However, the model was considered useful for tracking regional changes given the available habitat data and regional-scale objectives of the effort.
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1013. **Evaluation of facilitated succession at Las Palomas Wildlife Management Area in south Texas.**
Judd, Frank W.; Lonard, Robert I.; and Waggerman, Gary L.
Texas Journal of Science 54(2): 163-176. (2002)
NAL Call #: 470 T31; ISSN: 0040-4403
Descriptors: conservation measures/ terrestrial habitat/

land and freshwater zones/ comprehensive zoology: habitat management/ revegetation program/ facilitated succession/ wildlife management areas/ forest and woodland/ native woodland/ Texas/ Las Palomas Wildlife Management Area/ revegetation programs

Abstract: This study examined the effectiveness of re-vegetation efforts which have been ongoing in the Lower Rio Grande Valley of Texas since 1958. Species composition, richness and diversity were evaluated in an undisturbed native woodland, a site planted with late successional species in 1961 (facilitated succession) and a farm field abandoned in 1974 (unaided succession) in northwestern Cameron County. Species richness and diversity for both trees and shrubs were greatest in the native woodland site. While there was greater similarity in species composition between the native woodland and the facilitated succession sites, species diversity in the tree and shrub layers of the facilitated succession site is still significantly lower than the native woodland site.

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1014. **Evaluation of reforestation in the Lower Mississippi River Alluvial Valley.**

King, S. L. and Keeland, B. D.

Restoration Ecology 7(4): 348-359. (1999)

NAL Call #: QH541.15.R45R515; ISSN: 1061-2971

Descriptors: reforestation/ forestry/ wildlife habitat/ habitat restoration/ Mississippi River valley

Abstract: Only about 2.8 million ha of an estimated original 10 million ha of bottomland hardwood forests still exist in the Lower Mississippi River Alluvial Valley (LMAV) of the United States. The U.S. Fish and Wildlife Service, the U.S. Forest Service, and state agencies initiated reforestation efforts in the late 1980s to improve wildlife habitat. We surveyed restorationists responsible for reforestation in the LMAV to determine the magnitude of past and future efforts and to identify major limiting factors. Over the past 10 years, 77,698 ha have been reforested by the agencies represented in our survey and an additional 89,009 ha are targeted in the next 5 years. Oaks are the most commonly planted species and bare-root seedlings are the most commonly used planting stock. Problems with seedling availability may increase the diversity of plantings in the future. Reforestation in the LMAV is based upon principles of landscape ecology; however, local problems such as herbivory, drought, and flooding often limit success. Broad-scale hydrologic restoration is needed to fully restore the structural and functional attributes of these systems, but because of drastic and widespread hydrologic alterations and socioeconomic constraints, this goal is generally not realistic. Local hydrologic restoration and creation of specific habitat features needed by some wildlife and fish species warrant attention. More extensive analyses of plantings are needed to evaluate functional success. The Wetland Reserve Program is a positive development, but policies that provide additional financial incentives to landowners for reforestation efforts should be seriously considered.

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1015. **An evaluation of research on the effects of timber harvest on bird populations.**

Sallabanks, R.; Arnett, E. B.; and Marzluff, J. M.

Wildlife Society Bulletin 28(4): 1144-1155. (2000)

NAL Call #: SK357.A1W5; ISSN: 00917648

Descriptors: bird populations/ cavity-nesting birds/ demography/ forest management/ forestry practices/ silviculture/ songbirds/ timber harvest/ abundance/ avifauna/ conservation management/ population density/ timber harvesting

Abstract: We reviewed 95 studies (published from 1972 to 1997) that examined relationships between timber harvest and populations of songbirds and cavity-nesting birds. We critique the way in which studies have been conducted, evaluate their usefulness to forest managers, and suggest new directions of study. The number of bird-forestry studies conducted increased throughout our review period and most appeared in The Journal of Wildlife Management (24%) and U.S. Department of Agriculture Forest Service technical publications (19%). More studies (32%) have occurred in the northeastern United States than elsewhere and most have examined effects of clearcutting (53%). Researchers typically collect data on all bird species, especially songbirds (78%), using common sampling protocols such as point-count surveys, line transects, and spot-mapping techniques to assess relative avian abundance (55%) and density (32%). Few studies (13%) measured avian demographic parameters such as nest success or survivorship. Most studies (68%) lasted only 1-2 years; only 7 (7%) lasted >4 years. Most studies (27%) had only one replicate/treatment. Research on effects of timber harvest on bird populations has been limited to mensurative (observational) studies in which treatment effects cannot be inferred statistically. Most research is correlational (84%) and does not address cause-and-effect relationships. Incorporating experimental treatments to provide pre- and post-timber-harvest comparisons is rare (16%). Future research should: 1) be more long-term; 2) incorporate rigorous experimental designs in which treatments are assigned randomly and better replicated; and 3) although difficult, measure parameters related to avian fitness and population viability. Rather than only documenting observed patterns, researchers need to focus on identifying causal mechanisms that can be translated into meaningful management recommendations to enhance conservation of forest avifauna.

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1016. **Evaluation of silvicultural management in Missouri oak-hickory forests: Immediate effects of even- and uneven-aged forest management on small mammal communities on state forests in southern Missouri's oak- hickory forest.**

Fantz, D. K. and Renken, R. B.

In: Missouri Department of Conservation Annual Report, 35, 2002.

Notes: Project no. MO W-013-54/JKob 3/ Study No. 35; 0085-3496 (ISSN).

Descriptors: abundance/ chipmunks/ cutting/ forest practices/ forests/ habitat changes/ habitat management/ hickory/ mammals/ mice, deer/ mice, white-footed/ oak/ pine/ rats, wood/ rodents/ species diversity/ squirrel, flying/ Carya spp./ Pinus spp./ Quercus spp./ Missouri/ Carter County/ Reynolds County/ Shannon County

Abstract: A capture-recapture study was conducted on northeast-facing slopes to determine the initial large-scale effects of even- and uneven-aged forest management as compared to no harvest management on species composition, species richness, and relative abundance of small mammal communities. Study sites were selected on the Current River and Peck Ranch Conservation Areas.
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1017. **An evaluation of tradeoffs between wood production and ecological integrity in the Oregon Coast Range.**
Spies, Thomas A.; Johnson, K. Norman; Reeves, Gordon; Bettinger, Pete; McGrath, Michael T.; Pabst, Robert; Burnett, Kelly; and Olsen, Keith
In: Congruent Management of Multiple Resources: Proceedings from the Wood Compatibility Initiative workshop, General Technical Report-PNW 563/ Johnson, Adelaide C.; Haynes, Richard W.; and Monserud, Robert A.; Portland, OR: Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 111-119.
Notes: 0363-6224 (ISSN).
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ land zones/ comprehensive zoology: forestry/ timber production/ ecological integrity trade offs in old growth forests/ evaluation/ habitat management/ forest management strategies/ ecological integrity and timber production trade offs in old growth forests/ forest and woodland/ old growth forests/ ecological integrity and wood production trade offs/ Oregon/ Coast range
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1018. **Evaluation of two forest management practices recommended for small mammals: Buffer strips and retention of woody debris.**
Billig, S. C. and Servello, F. A.
In: NCASI Proceedings.; Vol. 2.
Portsmouth, NH; pp. 371; 2000.
Descriptors: debris/ harvesting/ wood/ coarse woody debris (CWD)/ forestry/ fiber debris/ forest management/ harvesting/ mammals/
Abstract: Small mammal communities between upland buffer strips and forest stands in harvested landscapes were compared. The relationship between small mammal bundance and coarse woody debris was determined. Results indicated that upland buffer strips retained similar communities of common small mammals as unharvested forest and were useful management tool in harvested areas. Abundance was not related to measures of CWD for most species, but it was important for some species in specific habitat types.
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1019. **Experimental manipulation of spatial heterogeneity in Douglas-fir forests: Effects on squirrels.**
Carey, Andrew B.
Forest Ecology and Management 152(1-3): 13-30. (2001)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ conservation measures/ ecology/ community structure/ terrestrial habitat/ land and freshwater zones/ Glaucomys sabrinus/ Tamias townsendii/ Tamiasciurus douglasii (Sciuridae): forestry/ silvicultural practices/ habitat management/ relative abundance/ population dynamics/ silvicultural practices effect/ forest and woodland/ Washington/ Thurston County/ Fort Lewis Military Reservation/ silvicultural practices effect on populations/ Douglas fir forests/ Sciuridae/ Rodentia, Mammalia/ chordates/ mammals/ vertebrates
Abstract: Squirrel communities simultaneously composed of abundant populations of Glaucomys, Tamias, and Tamiasciurus are: (1) a result of high production of seeds and fruiting bodies by forest plants and fungi and complexity of ecosystem structure, composition, and function; (2) indicative of high carrying capacity for vertebrate predators and (3) characteristic of old, natural forests in the Pacific northwest, USA. I hypothesized that silvicultural manipulation of canopies of second-growth forests could result in spatial heterogeneity that would reproduce the biocomplexity and plant-fungal productivity associated with high squirrel populations. I predicted that accelerating biocomplexity would require ≥ 20 years, but short-term effects of induced heterogeneity would be apparent in 5 years: initial decreases followed by increases in Glaucomys populations, nonlinear increases in Tamias populations, and little change in Tamiasciurus populations. If my predictions proved accurate, confidence in long-term predictions would be enhanced. I chose 16 13-ha stands with two different management histories for a randomized block experiment and began measuring squirrel populations in 1991. Variable-density thinnings were implemented in spring 1993. Fall and spring populations were measured through fall 1998. Populations responded as predicted, except for a treatment-management history interaction. Previous conventional thinnings altered ecosystem function such that low Glaucomys populations failed to respond to treatment. Variable-density thinning, in conjunction with retention of biological legacies and management of decadence, could possibly accelerate biocomplexity in second-growth forest that mimics that in old, natural forests.
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1020. **Factors affecting avian species richness and density in riparian areas.**
Peak, R. G. and Thompson, F. R.
Journal of Wildlife Management 70: 173-179. (2006)
NAL Call #: 410 J827
Descriptors: wildlife habitats/ riparian areas/ riparian forests/ riparian buffers/ wild birds/ species diversity/ population density/ wildlife management/ Missouri/ natural resources, environment, general ecology, and wildlife conservation/ forestry related/ animal ecology and behavior
This citation is from AGRICOLA.

1021. **Factors affecting private forest landowner interest in ecosystem management: Linking spatial and survey data.**
Jacobson, Michael G.
Environmental Management 30(4): 577-583. (2002)
NAL Call #: HC79.E5E5 ; ISSN: 0364-152X
Descriptors: biodiversity/ conservation/ environmental sciences/ geographic information system/ GIS data/ ecosystem management/ forests/ ecosystems/ forestry practices/ habitat alterations/ habitat management/ South Carolina/ wildlife-human relationships/ commercial enterprises/ wildlife management/ disturbances/ land zones/ conservation of natural resources/ ownership/ private sector/ forestry [economics]/ data collection/ decision making/ ecosystem/ environment/ humans

Abstract: Many factors influence forest landowner management decisions. This study examines landowner decisions regarding participation in ecosystem management activities, such as a landscape corridor cutting across their private lands. Landscape corridors are recognized worldwide as an important tool in biodiversity conservation. For ecosystem management activities to occur in areas dominated by a multitude of small private forest landholdings, landowner participation and cooperation is necessary. Data from a survey of landowners combined with an analysis of their land's spatial attributes is used to assess their interest in ecosystem management. Results suggest that spatial attributes are not good predictors of an owner's interest in ecosystem management. Other factors such as attitudes and opinions about the environment are more effective in explaining landowner interest. The results have implications for any land manager using GIS data and implementing ecosystem management activities on private forestland.
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1022. **Factors determining the distribution of soil nematodes in a commercial forest landscape.**
Matlack, Glenn R.
Forest Ecology and Management 146(1-3): 129-143. (2001)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ ecology/ population dynamics/ terrestrial habitat/ land and freshwater zones/ Nematoda: forestry/ management impact on soil community ecology/ community structure/ population density/ distribution within habitat/ forest soils/ forest and woodland/ soil habitat/ forest community ecology/ Mississippi/ forest soil/ Helminths/ invertebrates/ nematodes
Abstract: Soil nematodes were censused at 99 forested sites in southern Mississippi, USA to examine the impact of forest management practices on the soil community. Taxonomic richness and numerical abundance in five feeding groups were linked to soil organic matter, phosphorus, shrub cover, and abundance of other nematode groups, consistent with limitation by availability of food items. Sites adjacent to streams showed significantly larger populations of plant feeders than nearby uplands. Sites plowed (bedded) for tree planting and sites recently excavated had significantly lower richness and abundance of plant feeders than undisturbed sites. Fungal feeder richness was depressed at excavated sites, which showed low concentrations of soil organic matter. Aboveground vegetation structure and landscape position appeared to have little influence on nematode distributions. Commercial plantations and sites with a history of frequent fire did not differ from undisturbed sites in soil properties or in any measure of the nematode community. No significant changes in soil properties or nematode fauna were observed over a 60-year chronosequence beginning at tree establishment. These findings suggest that aboveground disturbance affects the nematode community only to the extent that it influences the availability of potential hosts or prey in the soil. In contrast to aboveground events, disturbance of the soil had a clear impact on the nematode community, with a magnitude proportional to disturbance intensity.
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1023. **Factors influencing Acadian flycatcher nesting success in an intensively managed forest landscape.**
Hazler, K. R.; Amacher, A. J.; Lancia, R. A.; and Gerwin, J. A.
Journal of Wildlife Management 70(2): 532-538. (2006)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: Acadian flycatcher/ core area/ corridors/ ecological trap/ edge effect/ Empidonax virescens/ nesting success/ pine plantations/ South Carolina/ vegetation structure
Abstract: We examined factors affecting the nesting success of a migratory songbird, the Acadian flycatcher (Empidonax virescens), in loblolly pine plantations in the coastal plain of South Carolina, USA. From 1997-2000, we located and monitored 163 Acadian flycatcher nests in loblolly pine stands and corridors that were 18-27 years old. We used Mayfield logistic regression (Aebischer 1999, Hazler 2004) to model the effects of edge and stand-level vegetation structure on nest daily survival rate. There was no evidence of an effect of edge on nest survival, but nest survival was positively related to the height of the deciduous subcanopy and to the density of shrub cover. Although Acadian flycatchers are generally regarded as habitat specialists requiring mature hardwood forests, our data suggest that pine plantations can support breeding populations, provided that a substantial hardwood component is present. We believe that maintaining multiple vegetation strata and increasing the length of harvest rotations would improve the habitat value of pine plantations for Acadian flycatchers and presumably other species more typically associated with deciduous forests. Maintenance of a corridor network, as practiced by some industrial forest managers, is one means of providing more mature forest habitat, thereby fostering higher nesting success. Concern that these corridors might act as ecological traps seems to be unwarranted in our study area. Corridors thus appear to be a valuable management tool for promoting wildlife values within the context of an industrial forest landscape.
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1024. **Factors influencing amphibian and small mammal assemblages in central Appalachian forests.**
Mitchell, J. C.; Rinehart, S. C.; Pagels, J. F.; Buhlmann, K. A.; and Pague, C. A.
Forest Ecology and Management 96(1/2): 65-76. (1997)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: wetlands/ biodiversity/ species diversity/ community ecology/ forest management/ forest ecology/ small mammals/ deciduous forests/ forest plantations/ clear felling/ plant succession/ seral stages/ climax communities/ habitats/ stand characteristics/ synecology/ age of trees/ stand density/ mixed forests/ wild animals/ Amphibia/ frogs/ insectivores/ rodents/ Pinus strobus/ Quercus alba/ Quercus rubra/ Betula lenta/ Carya glabra/ Acer rubrum/ Soricidae/ Quercus montana
Abstract: Terrestrial amphibian and small mammal assemblages were studied using drift fences and pitfall traps in five forested stands during 1987-88 on Shenandoah Mountain in the George Washington National Forest, Virginia, USA. The stands were (1) recently clear felled (2 yr old, dominant species Pinus strobus, Quercus alba), (2) white pine (P. strobus) managed forest, (3) mixed hardwood forest (dominant species Q. rubra, Betula lenta), (4) oak/hickory forest (dominant species Q. prinus, Q. alba,

Carya glabra) and (5) climax hardwood forest (dominant species Q. rubra, Acer rubrum, Q. alba). Eleven species of salamanders, 5 species of frogs, 5 species of shrews, and 7 species of rodents were monitored. Amphibians were significantly more abundant in forest stands consisting of mature hardwoods than in the recently clear felled area and the white pine forest. Although there was considerable variation in abundance among species in the 5 stands, small mammal abundance was high in all the habitats studied. Amphibian species diversity (Shannon Index) was less than half that for small mammals because red-backed salamanders (Plethodon cinereus) were dominant in most assemblages. Amphibian and small mammal diversity and total species richness were not related to estimated stand age, total number of canopy trees, tree diversity, or frequency of underground rocks. Maintenance of amphibian biodiversity requires the combination of mature hardwoods and wetland habitats (e.g. wildlife ponds and seepages). Most of the small mammals encountered were habitat generalists. Management focus on mature hardwood forests would maintain populations of small mammals requiring cool, moist situations in upper-altitude habitats in the central Appalachian Mountains.
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1025. **Fallow discing for wildlife.**
Franklin, R. A.
Forest Landowner 60(1): 54. (2001)
NAL Call #: SD144.A15F67; ISSN: 1087-9110.
Notes: First published in http://www.clemson.edu/extfor/Landowner_tech_info/Spring%202000.pdf
(South Carolina Steward, Spring 2000).
Descriptors: Odocoileus virginianus/ Galliformes/ Odontophoridae/ Colinus virginianus/ agricultural practices/ habits-behavior/ birds/ foods-feeding/ habitat alterations/ habitat management/ habitat use/ mammals/ management/ nesting sites/ nests-nesting/ techniques/ wildlife/ white-tailed deer/ quail/ South Carolina
Abstract: The author encourages the use of fallow discing to manage and maintain wildlife openings in forests without having to go to the expense of clearing, fertilizing, and planting food patches. The process of fallow discing is described and its benefit to white-tailed deer and quail explained.
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1026. **The fine scale physical attributes of coarse woody debris and effects of surrounding stand structure on its utilization by ants (Hymenoptera: Formicidae) in British Columbia, Canada.**
Higgins, Robert J. and Lindgren, B. Staffan
In: Insect Biodiversity and Dead Wood: Proceedings of a Symposium for the 22nd International Congress of Entomology, General Technical Report-SRS 93/ Grove, Simon J. and Hanula, James L.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2006. pp. 67-74.
Notes: Symposium held August 15-21, 2004 at Brisbane, Australia.
http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs093/gtr_srs093.pdf
Descriptors: commercial activities/ conservation measures/ reproduction/ reproductive behavior/ ecology/ animal constructions/ terrestrial habitat/ abiotic factors/ land zones/ Canada/ Formicidae: forestry/ habitat management/ breeding site/ biological breakdown/ distribution within habitat/ habitat utilization/ nests/ forest and woodland/ coarse woody debris utilization/ forest stand structure/ physical factors/ British Columbia/ Houston area/ Insecta, Hymenoptera, Apocrita, Aculeata, Formicoidea/ arthropods/ Hymenopterans/ insects/ invertebrates
Abstract: Coarse woody debris (CWD) is increasingly recognized in Canada for its contribution toward biodiversity. It is a particularly vital resource in subboreal forests as nesting habitat for ants (Formicidae). Wood, which has low specific heat, provides a thermally favorable environment in this cool climate. Ants contribute to the physical breakdown of wood, and colonies are a significant food source for many vertebrates. However, this resource differs significantly between harvested and non-harvested stands. This study examined the physical attributes of CWD in 8-10 year old harvested and non-harvested stands while also examining the associated ant fauna. We found no significant difference in volume or total surface area between stand types. However, in harvested stands CWD is smaller in diameter, shorter, has less bark and has less evenly distributed decay classes as compared to non-harvested stands. In addition, the lack of earliest decay class and the physical damage evident on the majority of CWD pieces in harvested stands creates concern regarding the long term availability of CWD in harvested stands. Ants exploit available CWD in harvested stands but the community structure of this fauna appears to be young in these 8-10 year post-harvest stands. Larger ant species such as Camponotus herculeanus and Formica aserva were present but not common in these stands. They seem to require larger pieces of CWD and stumps for nesting habitat than is the average for CWD in harvested stands. The desirability of these ants as prey for bears and birds makes management of their nesting habitat of interest for conservation biology. Ants were largely excluded from non-harvested stands, probably because of cool and humid conditions. Historically, the ant fauna of this landscape was probably restricted to natural gaps and disturbed areas.
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1027. **Fire and amphibians in North America.**
Pilliod, D. S.; Bury, R. B.; Hyde, E. J.; Pearl, C. A.; and Corn, P. S.
Forest Ecology and Management 178(1-2): 163-181. (2003)
NAL Call #: SD1.F73; ISSN: 03781127
Descriptors: amphibians/ aquatic ecosystems/ fuel reduction/ prescribed fire/ wildland fire/ ecosystems/ fires/ forestry/ fuels/ fire management/ ecology/ aquatic ecosystem/ fire/ fire management/ population decline/ ecosystem fire history/ ecology/ ecosystems/ forest fires/ fuels/ water animals/ North America
Abstract: Information on amphibian responses to fire and fuel reduction practices is critically needed due to potential declines of species and the prevalence of new, more intensive fire management practices in North American forests. The goals of this review are to summarize the known and potential effects of fire and fuels management on amphibians and their aquatic habitats, and to identify information gaps to help direct future scientific research. Amphibians as a group are taxonomically and ecologically diverse; in turn, responses to fire and associated habitat alteration are expected to vary widely among species and among geographic regions. Available data suggest that amphibian responses to fire are spatially and temporally

variable and incompletely understood. Much of the limited research has addressed short-term (1-3 years) effects of prescribed fire on terrestrial life stages of amphibians in the southeastern United States. Information on the long-term negative effects of fire on amphibians and the importance of fire for maintaining amphibian communities is sparse for the majority of taxa in North America. Given the size and severity of recent wildland fires and the national effort to reduce fuels on federal lands, future studies are needed to examine the effects of these landscape disturbances on amphibians. We encourage studies to address population-level responses of amphibians to fire by examining how different life stages are affected by changes in aquatic, riparian, and upland habitats. Research designs need to be credible and provide information that is relevant for fire managers and those responsible for assessing the potential effects of various fuel reduction alternatives on rare, sensitive, and endangered amphibian species.
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1028. **Fire and birds in maritime Pacific Northwest.**
Huff, Mark H.; Seavy, Nathaniel E.; Alexander, John D.; and Ralph, C. John
Studies in Avian Biology 30: 46-62. (2005)
NAL Call #: QL671.S8; ISSN: 0197-9922.
Notes: Literature review.
Descriptors: conservation measures/ ecology/ abiotic factors/ physical factors/ land zones/ habitat management/ prescribed burning/ fire/ United States, Maritime Pacific Northwest/ Aves/ birds/ chordates/ vertebrates
Abstract: Resource managers face the challenge of understanding how numerous factors, including fire and fire suppression, influence habitat composition and animal communities. We summarize information on fire effects on major vegetation types and bird/fire relations within the maritime Pacific Northwest, and pose management-related questions and research considerations. Information on how fire affects birds is limited for the maritime Pacific Northwest, even though fire is an essential process within natural vegetation communities throughout the region. We describe fire regimes, vegetation succession patterns, bird communities, and fire effects on birds for 12 major vegetation types in the region. Fire regimes and fire effects vary considerably within this region due to its diverse topography and climate. Seven of the types have a low- to moderate-severity fire regime and five have a high-severity fire regime with fire-return intervals that span several centuries. Bird communities and effects of fire are best known from the western hemlock type, which has a high-severity fire regime. The postfire stand-initiation stage in this type supports a reasonably distinct avifauna compared to other successional stages, a phenomenon that has been documented for high-severity fire regimes in other regions. In general, there is a high turnover of species after high-severity fires, with a shift primarily from canopy-dwelling to ground-, shrub-, and snag-dwelling species that mostly are not associated with other successional stages. No studies exist that directly address how bird communities are affected by habitat changes from fire suppression in this region. The most likely bird communities vulnerable to these changes are in low-severity, high-frequency fire regimes that include the Douglas-fir type, drier portions of the white fir type, Oregon-oak woodlands and savannas, native grasslands and sclerophyllous shrublands. In general, prescribed fire is not being used for bird conservation in this region. Where prescribed fire is being used to restore fire as an ecological process or more often for reducing potentially hazardous fuels, bird conservation objectives can be achieved as a secondary benefit. New land management polices that will greatly accelerate fuel reduction activities throughout the Pacific Northwest, including use of prescribed fire, are currently being undertaken with limited scientific information on the ecological consequences for bird communities.
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1029. **Fire and fire surrogate treatment effects on leaf litter arthropods in a western Sierra Nevada mixed-conifer forest.**
Apigian, K. O.; Dahlsten, D. L.; and Stephens, S. L.
Forest Ecology and Management 221(1-3): 110-122. (2006)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2005.09.009.
Descriptors: forest restoration/ leaf litter arthropods/ pitfall trapping/ prescribed burn/ biodiversity/ forestry/ mastication/ leaf litter arthropods/ pitfall trapping/ fires/ arthropod/ fire/ forest management/ habitat management/ restoration ecology/ species richness/ fires/ forestry/ Araneae/ Arthropoda/ Coleoptera/ Coniferophyta/ Formicidae
Abstract: Frequent, low-intensity fires were a common feature of Sierran forest ecosystems, but suppression policies over the past century have left many forests at risk for catastrophic wildfires. Recent policies highlight the use of prescribed burning or harvesting as fire risk reduction tools, but few studies have investigated the impacts of these management practices on the leaf litter fauna of Sierran forests. This study examines how three fire and "fire surrogate" treatments, prescribed burning, overstory thinning with understory mastication, and combined thinning and burning, impact diversity and abundance of Coleoptera and other leaf litter arthropods. Pitfall trapping was used to collect litter arthropods before and immediately after treatments in replicated forest compartments. The diverse Coleoptera assemblage was dominated by only a few common species, with many rare species represented by only one or two individuals. Rank-abundance diagrams indicated that much of the change in the beetle assemblage due to the treatments was a result of changes in the numbers of rare species. Indicator species analysis showed several species closely allied with the treated compartments, but few with the untreated controls. Both NMS and CCA ordination show considerable change in overall assemblage structure on compartments treated with fire, but less change in the thinned compartments. Coleoptera species richness was slightly higher in burned compartments. Some common beetle species, families of beetles, and other common groups such as ants and spiders showed changes in abundance due to the treatments, but the changes were taxon-specific and showed no general pattern. Overall impacts of the treatments appear to be moderate, and the increased habitat heterogeneity at the compartment level may provide additional habitat for many rare species to coexist. We conclude that the use of fire and fire surrogate treatments in Sierran mixed-conifer forests is justified from the standpoint of their effects on leaf litter arthropods, but the history of management at the site and the scale of treatments must be carefully considered.
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1030. **Fire ecology and management of the major ecosystems of southern Utah.**
Hood, Sharon M. and Miller, Melanie
Fort Collins, CO: Rocky Mountain Research Station, Forest Service, U.S. Department of Agriculture; General Technical Report-RMRS 202, 2007. 110 p.
http://www.fs.fed.us/rm/pubs/rmrs_gtr202.pdf
Descriptors: fire/ forest management/ prescribed burning/ wildlife/ Utah
Abstract: This document provides managers with a literature synthesis of the historical conditions, current conditions, fire regime condition classes (FRCC), and recommended treatments for the major ecosystems in southern Utah. Sections are by ecosystems and include: 1) coniferous forests (ponderosa pine, mixed conifer, and Engelmann spruce-subalpine fir), 2) aspen, 3) pinyon-juniper, 4) big and black sagebrush, and 5) desert shrubs (creosotebush, blackbrush, and interior chaparral). Southern Utah is at the ecological crossroads for much of the western United States. It contains steep environmental gradients and a broad range of fuels and fire regimes associated with vegetation types representative of the Rocky Mountains, the Great Basin, Northern Arizona and New Mexico, and the Mohave Desert. The Southern Utah Demonstration Area consists of contiguous state and federal lands within the administrative boundaries of the Bureau of Land Management (BLM), Fishlake and Dixie National Forests, National Park Sevice, and State of Utah, roughly encompassing the southern 15 percent of Utah (3.24 million ha). The vegetation types described are similar in species composition, stand structure, and ecologic function, including fire regime to vegetation types found on hundreds of millions of hectares in the 11 western states.

1031. **Fire impact to small mammals in Piedmont oak-shelterwoods.**
Keyser, P. D.; Sausville, D. J.; Ford, W. M.; Mengak, M. T.; Brose, P.; and Van Lear, D. H.
Southeastern Association of Fish and Wildlife Agencies, Proceedings 55: 375-381. (2001).
Notes: Published Wildlife Report.
Descriptors: abundance/ burning/ fire/ forests/ habitat management/ hardwoods/ mammals/ mice, white-footed/ oak/ rodents/ seasons/ shrews/ trapping/ wildlife management areas/ Quercus spp./ Virginia/ Buckingham County/ Piedmont Region
Abstract: As part of a larger study examining the role of presecribed fire in regenerating upland oaks, seasonal prescribed burns were applied to first-stage shelterwood harvested stands on Horsepen WMA in the Virginia Piedmont in 1995. Small mammal communities in these stands were surveyed to assess the impact of such fires on this component of the fauna.
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1032. **Florida scrub jay habitat restoration utilizing a fuel wood timber harvest: The planning phase.**
Alshouse, Alan W.; Neal, Harry V.; Lala, Ruth; and Shaw, Susan
Proceedings of the Annual Conference on Ecosystems Restoration and Creation 28: 93-99. (2001).
http://images.library.wisc.edu/EcoNatRes/EFacs/Wetlands/Wetlands28/reference/econatres.wetlands28.aalshouse.pdf
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ land zones/ Aphelocoma coerulescens coerulescens: forestry/ fuel wood timber harvest/ habitat management/ xeric scrub restoration/ use of fuel wood timber harvest/ scrub/ Florida/ Seminole County/ Aves, Passeriformes, Corvidae/ birds/ chordates/ vertebrates
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1033. **Foliage structure influences foraging of insectivorous forest birds: An experimental study.**
Whelan, C. J.
Ecology 82(1): 219-231. (2001)
NAL Call #: 410 Ec7; ISSN: 00129658
Descriptors: aviary experiment/ bird community structure/ deciduous foliage/ foliage structure/ foraging behavior/ Insectivorous birds/ New Hampshire/ northern hardwoods/ Parulidae/ vegetation structure/ warblers/ avifauna/ foraging behavior/ habitat structure/ insectivory/ leaf morphology/ Acer saccharum/ Betula alleghaniensis/ Dendroica caerulescens/ Dendroica virens/ Setophaga ruticilla
Abstract: Preferences for foraging in particular tree species have been well documented in a variety of bird species, but underlying reasons remain little investigated. Understanding the causal bases for such patterns of habitat use can help to elucidate mechanisms of habitat selection and, therefore, community organization and structure. I experimentally tested the hypothesis that fine-scale foliage structure of two deciduous tree species influences the foraging behavior of three small, insectivorous bird species. On sugar maple (Acer saccharum), with its orbicular leaves elevated above the branch, Black-throated Blue Warblers (Dendroica caerulescens) and American Redstarts (Setophaga ruticilla) captured prey predominantly from lower leaf surfaces, whereas Black-throated Green Warblers (Dendroica virens) captured prey predominantly from upper leaf surfaces. In contrast, on yellow birch (Betula alleghaniensis), with its oblong-ovate leaves held within the plane of the supporting branch, all three bird species captured prey disproportionately from upper leaf surfaces. Overall, aerial maneuvers were used more frequently to capture prey from upper than from lower leaf surfaces on sugar maple, but the opposite occurred on yellow birch, where non-aerial maneuvers were used more frequently to capture prey from upper than from lower leaf surfaces. Those results indicate that the leaf surface from which prey are more easily captured (with less energetically costly non-aerial maneuvers) differs between those tree species. Experimental manipulation of leaf dispersion and distance to prey demonstrated that leaf dispersion is the chief determinant of prey capture location (upper vs. lower leaf surfaces), and that distance to prey is the chief determinant of prey capture maneuver (aerial vs. non-aerial). When foraging on artificial branches in which vertical distance between branches was systematically increased experimentally, Black-throated Green Warblers captured a significantly smaller proportion of prey from lower surfaces of leaves on the upper branch than did Black-throated Blue Warblers. Taken together, these results indicate that different tree species, as well as different locations within tree species, present insectivorous birds with distinct foraging environments and, therefore, constitute distinct foraging microhabitats. Furthermore, even closely related bird species that are generally similar morphologically respond in behaviorally unique ways to differences in foliage structure. For those reasons, forest management practices that enhance tree species diversity could concomitantly enhance foraging opportunities (niche

diversity) for forest insectivores and may thus help to promote high bird species diversity and maintain abundant populations.
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1034. **Food availability versus preference of wild turkey poults in intensively-managed pine stands in Mississippi.**
Iglay, Raymond B.; Leopold, Bruce D.; Burger, Loren W.; and Miller, Darren A.
Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies 59: 100-113. (2005)
NAL Call #: SK1.S6; ISSN: 0276-7929
Descriptors: nutrition/ diet/ feeding behavior/ life cycle and development/ development/ ecology/ population dynamics/ predators/ terrestrial habitat/ land zones/ Invertebrata: population density/ prey resource selection/ gamebird young/ intensively managed pine stands/ avian predators/ Meleagris gallopavo silvestris/ distribution within habitat/ forest and woodland/ Mississippi/ Kemper County/ Interior Flatwoods Resource Area/ Aves, Galliformes, Phasianidae/ birds/ chordates/ invertebrates/ vertebrates
Abstract: Importance of invertebrates to growth and development of eastern wild turkey (Meleagris gallopavo silvestris) poults has been well documented. However, few studies have investigated direct invertebrate use by poults, specifically in relation to alternative forest management regimes. Therefore, we measured invertebrate selection by turkey poults in thinned, mid-rotation loblolly pine (Pinus taeda) plantations, treated with factorial combinations of prescribed burning and a selective herbicide, in east-central Mississippi in 2000 and 2001. Using suction sampling and human-imprinted turkey poults, we quantified invertebrate use by poults relative to availability. Turkey poults exhibited heterogeneous use of invertebrate Orders among broods across all treatments and years of study (P < 0.001). Additionally, poults did not select invertebrates relative to availability across all treatments and years of study (P < 0.001). Consistent with previous research, poults exhibited selection of five Orders (Coleoptera, Diptera, Gastropoda, Homoptera, Hymenoptera) and avoided four Orders (Araneae, Hemiptera, Orthoptera, and 'other'). Future research better defining relationships between poults, vegetation structure, and food availability may assist managers in achieving quality brood habitat.
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1035. **Forage production after thinning a natural loblolly pine-hardwood stand to different basal areas.**
Peitz, David G.; Shelton, Michael G.; and Tappe, Philip A.
Wildlife Society Bulletin 29(2): 697-705. (2001)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: loblolly pine/ Pinus taeda/ habitat management/ wildlife/ habitat alterations/ forestry practices/ food supply/ ecosystems/ forests, mixed/ loblolly pine/ forests, deciduous/ silviculture/ stress/ cover/ food s/ feeding/ vegetation/ Arkansas: Drew County
Abstract: Mixed pine (Pinus spp.)-hardwood forests are common in the southern United States (U.S.), but little quantitative information exists on the response of understory forage to reductions in basal area from thinning. The authors determined understory forage characteristics before thinning and two and four years after thinning a 35-years-old natural loblolly pine (P. taeda)-hardwood stand (initially 27 m^2/ha of pine and 8 m^2/ha of hardwood basal area). A combination of three loblolly pine (15, 18, and 21 m^2/ha) and three hardwood (0, 3.5, and 7 m^2/ha) basal areas was replicated three times, resulting in 27 0.08-ha plots. Understory coverage and forage biomass were determined on 25 understory plots systematically located within each plot, with data analyzed using analysis of variance and regression. Herbaceous forage biomass and coverage and light intensity were correlated negatively (P<0.05) with retained pine and hardwood basal areas, with hardwood basal area being the more important factor. Stand thinning improved herbaceous forage availability for wildlife, but the response was time-dependent. Forage from woody browse and vines also increased following stand thinning although responses were not as time-dependent as herbaceous forages. Results of this study indicate that managers can manipulate forage production by thinning stands to prescribed basal areas and compositions.
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1036. **Foraging area size and habitat use by red bats (Lasiurus borealis) in an intensively managed pine landscape in Mississippi.**
Elmore, L. W.; Miller, D. A.; and Vilella, F. J.
American Midland Naturalist 153(2): 405-417. (2005)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: activity patterns/ bats/ best management practices/ BMPs/ conservation planning/ foraging behavior/ forest management/ habitat use/ Mississippi/ Lasiurus borealis/ Riparia
Abstract: Forest managers are increasingly expected to incorporate biodiversity objectives within forest landscapes devoted to timber production. However, reliable data on which to base management recommendations for bats within these systems are extremely limited. Although the red bat (Lasiurus borealis) is a widespread common species in temperate forests of North America, little is known of its ecology within intensively managed pine (Pinus spp.) forests of the southeastern United States. Therefore, we investigated size of foraging areas and habitat use by red bats during summer 2000 and 2001 in an intensively managed pine landscape in east-central Mississippi, USA. We captured bats using four-tier mist nets placed over water and attached radiotransmitters to red bats. Radiotagged red bats (n = 16) used habitat types randomly at the study area and foraging area scale. Mean size of foraging areas and mean maximum distance traveled between diurnal roosts and foraging locations were not different (P < 0.05) among adult male, adult female, juvenile male or juvenile females (n = 18). Most foraging areas contained a reliable source of water and all but one diurnal roost was located within foraging areas. Location of diurnal roosts may dictate location of foraging areas. Open canopy conditions in intensively managed pine stands (young, open canopy stands, thinned stands and riparian hardwood stands) likely provide appropriate foraging habitat for red bats. Landscape context may influence size of foraging areas and commuting distances of red bats. Provision of appropriate aged forest stands for diurnal roosts may be the best management action for red bats within intensively managed pine landscapes.
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1037. **Foraging by bats in cleared, thinned and unharvested boreal forest.**
Patriquin, Krista J. and Barclay, Robert M. R.
Journal of Applied Ecology 40(4): 646-657. (2003)
NAL Call #: 410 J828; ISSN: 0021-8901
Descriptors: Chiroptera/ Lasionycteris noctivagans/ Myotis lucifugus/ Myotis septentrionalis/ Vespertilionidae/ Microchiroptera/ Lasionycteris noctivagan/ Lasionycteris noctivagans/ behavior/ terrestrial ecology/ wing/ selective harvesting/ body size/ boreal forests/ Alberta/ cleared, thinned and unharvested forest/ foods-feeding/ forests/ ecosystems/ forestry practices/ habitat alterations/ habitat management/ habitat use/ Peace River area/ wings/ wildlife-human relationships/ morphology/ biometrics/ Canada/ commercial enterprises/ conservation/ wildlife management/ disturbances/ land zones/ nutrition/ chiroptera/ clear-cut/ forestry/ logging/ silviculture/ thinning/ Microchiroptera/ forest/ habitat change/ dispersion/ abundance
Abstract: 1. Modern silvicultural methods employ various styles of selective harvesting in addition to traditional clear-cutting. This can create a mosaic of patches with different tree densities that may influence habitat use by foraging bats. Use of forest patches may also vary among bat species due to variation in their manoeuvrability. Apart from studies investigating use of clear-cuts, few have tested for differences in use of forest patches by bats, or for differences among bat species. 2. We investigated the influence of various harvesting regimes, which created forest patches of different tree densities, on habitat selection by foraging bats in the boreal mixed-wood forest of Alberta, Canada. We also tested for variation in habitat selection among species related to differences in body size and wing morphology. 3. Over two summers we assessed habitat use by bats using ultrasonic detectors to count the echolocation passes of foraging bats. We measured activity in three forest types and four tree densities, ranging from intact (unharvested) forests to clear-cuts. 4. Smaller, more manoeuvrable, species (Myotis spp.) were less affected by tree density than the larger, less manoeuvrable, Lasionycteris noctivagans. Two Myotis spp. differed in their habitat use. Myotis lucifugus, an aerial insectivore, preferred to forage along the edge of clear-cuts, while M. septentrionalis, a species that gleans prey from surfaces, did not forage in clear-cuts but preferred intact forest. 5. The largest species in our study, L. noctivagans, preferred clear-cuts and avoided intact patches. There were therefore differences in habitat selection by foraging bats among the species in our study area, and these were correlated with size and wing morphology. 6. Synthesis and applications. Our results suggest that, in the short term, thinning has minimal effect on habitat use by bats. They also indicate that silvicultural methods have different immediate effects on different species of bats that may be obscured if the community is studied as a single entity. Management for forest-dwelling bats must take such species-specific effects into consideration. Harvesting that creates a mosaic of patches with different tree densities is likely to satisfy the requirements of more species than a system with less diverse harvesting styles.
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1038. **Foraging patterns of pileated woodpeckers in a managed Acadian forest: A resource selection function.**
Lemaitre, Jerome and Villard, Marc Andre
Canadian Journal of Forest Research 35(10): 2387-2393. (2005)
NAL Call #: SD13.C35; ISSN: 0045-5067
Descriptors: Picidae/ Piciformes/ Dryocopus pileatus/ wildlife-human relationships/ Canada/ commercial enterprises/ conservation/ wildlife management/ diameter at breast height/ disturbances/ study methods/ techniques/ habitat use/ food habits studies/ foods-feeding/ foraging pattern/ forests/ ecosystems/ forestry practices/ habitat alterations/ habitat management/ habitat quality/ land zones/ New Brunswick/ North America/ Northwest, Black Brook District/ nutrition/ resource selection function/ terrestrial ecology/ ecological requirements/ habitat/ forest/ vegetation/ silviculture/ food/ Fagus spp.
Abstract: We analyzed the relative influence of foraging substrate characteristics as predictors of the probability of use by the pileated woodpecker (Dryocopus pileatus L.) and determined threshold values for significant predictors. We sampled used and available substrates around 126 stations distributed in an intensively managed forest in northwestern New Brunswick, Canada. We developed a resource selection function (RSF), validated by a resampling procedure, and compared selection ratios for significant predictors. Diameter at breast height (DBH) of trees and snags was the most significant predictor, probably reflecting nesting selection by its main prey, carpenter ants (Camponotus spp.). The pileated woodpecker preferred deciduous substrates with DBH > 35 cm and coniferous substrates with DBH > 30 cm. Among deciduous substrates, it preferred snags over living trees, but there was no such preference for coniferous substrates. American beech (Fagus grandifolia Ehrh.) was clearly preferred over all other species. The RSF we developed and the thresholds we obtained should help forest managers and conservation planners assess habitat quality for this keystone species.
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1039. **Forest bird response to partial cutting in lodgepole pine forests on caribou winter range in west-central British Columbia.**
Waterhouse, Michaela J. and Armleder, Harold M.
British Columbia Journal of Ecosystems and Management 8(1): 75-91. (2007)
NAL Call #: SD146.B7 B34; ISSN: 1488-4674.
http://www.forrex.org/jem/ISS39/vol8_no1_art6.pdf
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land zones/ North America/ Canada/ Aves: forestry/ partial cutting of forest/ community structure and habitat use effect/ habitat management implications/ forest/ habitat management/ community structure and habitat use response to partial cutting of forest significance/ community structure/ partial cutting of forest effect/ habitat utilization/ forest and woodland/ community structure and habitat use/ influence of partial cutting of forest/ conservation implications/ Chilcotin Plateau/ Aves/ birds/ chordates/ vertebrates
Abstract: Breeding birds were surveyed 1 year pre-harvest (1995) and 4 years post-harvest (1996-2001) to measure the response to partial cutting in old lodgepole pine (Pinus contorta Dougl.) forests on the Chilcotin Plateau of British

Columbia. The irregular group shelterwood and group selection systems recommended to manage northern caribou (Rangifer tarandus caribou Gmelin) habitat did not negatively affect the breeding bird community. In some years within the post-harvest period, dark-eyed juncos (Junco hyemalis L.), red crossbills (Loxia curvirostra L.), yellow-rumped warblers (Dendroica coronata L.), and gray jays (Perisoreus canadensis L.) showed significant (α = 0.05) increases in use of the partial-cutting treatments compared with the no-harvest treatment. No species decreased significantly in any of the partial-cutting treatments. The increased observations of mostly common species resulted in significantly (α = 0.05) higher species richness, and increased frequency of observations for the bird community in some years in the partial cuts. Partial cutting of caribou habitat will maintain bird communities typical of mature to older lodgepole pine forests.
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1040. **Forest clearings management: Insects and vegetation for wild turkey broods.**
Lafon, Nelson W.; Norman, Gary W.; Jeffreys, Jay C.; Steffen, David E.; and Fell, Richard D.
Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies 55: 547-559. (2001)
NAL Call #: SK1.S6; ISSN: 0276-7929
Descriptors: conservation measures/ nutrition/ diet/ prey/ ecology/ predators/ terrestrial habitat/ land zones/ Insecta: habitat management/ forest clearing management/ prey availability/ avian predators/ Meleagris gallopavo sylvestris/ prey availability in brood habitat/ forest and woodland/ Virginia/ George Washington and Jefferson National Forests/ arthropods/ birds/ chordates/ insects/ invertebrates/ vertebrates
Abstract: Insects and herbaceous vegetation important to young eastern wild turkeys (Meleagris gallopavo sylvestris) may be enhanced in forested areas by managing clearings. Natural resource agencies in Virginia and other eastern states have committed significant resources to create and maintain forest clearings to provide habitat for wild turkey broods in predominantly forested areas. However, techniques used to manage clearings often lack definitive ecological justifications. We compared effectiveness of 4 management regimes on forest clearings typical of those used by wildlife managers in the eastern United States to produce insects and vegetation beneficial to turkey broods. Ranging from low to high intensity in development and maintenance, treatments were 1) mowing; 2) disking and liming; 3) planting ladino clover (Trifolium repens latum), mowing, and liming; and 4) planting a perennial grass-forb mixture, mowing and liming. Insect production did not differ between high intensity (3 and 4 above) and low intensity (1 and 2 above) treatments (P=0.19). Mowing may have suppressed insect numbers briefly before increasing them, while disking apparently delayed insect production. We observed several year and period differences in insect dry weights perhaps attributable to timing of vegetation treatments or natural environmental fluctuations. Areas receiving high intensity treatments had higher clover cover estimates (P=0.08 1) and more plant species per plot (P=0.036). All treated areas had adequate brood vegetation dry weight, plant height, and herbaceous cover estimates. Herbaceous vegetation and insects associated with forest clearings may be important for other wildlife species besides wild turkeys. Managers should consider effects on all species of interest as they weigh potential gains from intensive management practices against the extra cost and labor involved with those treatments. Managers can promote herbaceous ground cover and insects useable by wild turkey broods with simple, low-intensity management techniques.
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1041. **Forest decision making under uncertainty: Adaptive management for the conservation of bird populations on a national wildlife refuge (Picoides borealis, Hylocichla mustelina, Georgia).**
Moore, Clinton Thomas. University of Georgia, 2002.
Notes: Advisor: Conroy, Michael J.
Descriptors: birds/ uncertainty/ decision-making/ forest management / habitat management/ red-cockaded woodpecker/ Picoides borealis/ wood thrush/ Hylocichla mustelina
Abstract: I constructed a stochastic, spatially-explicit landscape model to seek optimal forest management decisions for long-term persistence of populations of red-cockaded woodpecker (Picoides borealis) and wood thrush (Hylocichla mustelina) on the Piedmont National Wildlife Refuge in Georgia, USA. I addressed uncertainty in decision making by considering alternative model forms that expressed different mechanisms of response by the forest and the bird populations to silvicultural actions. The implication of model uncertainty in this system is that conservation tradeoffs for both species differ according to choice of model. Decision variables in each model were the spatial scheduling of forest compartments for silvicultural treatments and the average periodicity of prescribed burning in compartments. Model responses were the number of active woodpecker clusters and abundance of wood thrushes. Additionally, I obtained a composite response as the average of the two abundance responses, each scaled by its standard error. I simulated each model under extremes of the decision alternatives, and I found a near-optimal management schedule for each model and for each of the responses. I also found near-optimal schedules for the case of complete uncertainty with regard to all models in the model set. Forest and bird monitoring data collected on the Refuge are the means by which measures of belief in each model are updated and decisions are adaptively improved. In nearly all models, both species responded strongly, but in opposite directions, to burning, and woodpeckers were sensitive to compartment scheduling. Consequently, optimal decisions were mostly similar among models, and values of information computed for each response suggested that little would be gained in management performance by resolving uncertainty among these models. However, fundamental uncertainties in the management of this system were probably not captured in this model set, and adaptive approaches therefore still hold promise for Refuge management. Current impediments to conducting adaptive management on the Refuge are (1) uncertainties regarding objectives, (2) lack of a comprehensive forest monitoring system, (3) inadequate system models, and (4) constraints in the expression and breadth of decision alternatives. I discuss critical information needed for the adaptive management of this and similar resource systems.
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1042. **Forest habitat associations of the golden-mantled ground squirrel: Implications for fuels management.**
Shick, Katharine R.; Pearson, Dean E.; and Ruggiero, Leonard F.
Northwest Science 80(2): 133-139. (2006)
NAL Call #: 470 N81; ISSN: 0029-344X
Descriptors: Mustelidae/ Carnivora/ Sciuridae/ Rodentia/ Falconiformes/ wildlife-human relationships/ commercial enterprises/ conservation/ wildlife management/ disturbances/ habitat use/ forests/ ecosystems/ forest habitat association/ forest health restoration practices/ forestry practices/ habitat alterations/ fuel management/ habitat management/ land zones/ Montana/ pine and larch stands/ population ecology/ status/ terrestrial ecology/ United States, western region/ Larix spp./ Pinus ponderosa/ ponderosa pine
Abstract: Golden-mantled ground squirrels are commonly associated with high-elevation habitats near or above upper timberline. This species also occurs in fire-adapted, low-elevation forests that are targeted for forest health restoration (FHR) treatments intended to remove encroaching understory trees and thin overstory trees. Hence, the golden-mantled ground squirrel may be affected by FHR treatments, but little is known about its habitat associations within these forest types. We sampled mature western larch and ponderosa pine forests in western Montana to determine the macro- and microhabitat associations of this ground squirrel. At the macrohabitat scale, golden-mantled ground squirrels were absent from western larch stands which consistently had a denser understory. Because we did not detect golden-mantled ground squirrels within larch stands, it is unclear whether FHR treatments in this forest type would improve habitat conditions for these ground squirrels. In contrast, golden-mantled ground squirrels were common in ponderosa pine stands and favored more open conditions there. At the microhabitat scale within ponderosa pine stands. golden-mantled ground squirrels were captured at trap stations with fewer canopy trees, more rock cover, and less grass and forb cover compared to stations without captures. Thus, FHR treatments that open the understory of ponderosa pine stands while maintaining-mature pines similar to historic conditions may increase golden-mantled ground squirrel populations. However, the extent to which golden-mantled ground squirrels are positively affected by FHR treatments in ponderosa pine stand types may be limited by the degree of their dependence on rocky structure.
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1043. **Forest management activities for improved wildlife habitat.**
Dougherty, D. S.
Forest Landowner 63(1): 36-38. (2004)
NAL Call #: SD144.A15F67; ISSN: 10879110
Descriptors: agriculture/ ecosystems/ environmental protection/ hardwoods/ land use/ management/ softwoods/ strategic planning/ timber/ hardwood stands/ timber management/ wildlife habitat/ wildlife management/ forestry/ agriculture/ forest management/ forestry/ forests/ hardwoods/ land use/ Pinus/ thinning/ wildlife/ Quercus phellos/ Salix
Abstract: When Arthur Dick bought a farm which he named Willow Oaks Plantation, he retained his District Manager Nate Farrior of Dougherty and Dougherty Forestry in Wallace, NC to help in managing the wildlife successfully. Arthur assigned Farrior the following goals: 1) prepare a 12-month proposed activity schedule and budget; 2) implement the proposed activities and; 3) produce a long-term land management plan. Farrior responded by first evaluating the existing wildlife habitat conditions for each land use or timber stand type on the property, assessing the potential for each land use type, and, completing activities in each stand type to improve the habitat. With this kind of management, it is expected that the wildlife will be a mosaic of well-interspersed, forage producing stand types capable of contributing to an abundance of high-quality hunting memories.
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1044. **Forest management and bird populations: An introduction.**
Sallabanks, Rex and Marzluff, John M.
Wildlife Society Bulletin 28(4): 1086-1087. (2000)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: birds/ communities/ ecosystems/ forestry practices/ habitat management/ management/ wildlife/ wildlife-habitat relationships
Abstract: The authors discuss the organization and objectives of a symposium entitled "Contemporary research on the effects of forest management on bird populations" held during the fall of 1997 in conjunction with the fourth Annual Conference of The Wildlife Society in Showmass Village, Colorado. Objectives of the symposium were: 1) to bring the scientific community up to date on the current state of knowledge on how forest management practices, such as timber harvest, influence bird populations; 2) to set standards for future research by providing results from studies that have taken an experimental of mechanistic approach and therefore have the greatest utility for on-the-ground management; and 3) to provide targets for the next decade of research by identifying the information gaps that still exist for researchers and managers working in forested ecosystems.
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1045. **Forest management and female black bear denning.**
White T. H.; Bowman, J. L.; Jacobson, H. A.; Leopold, B. D.; and Smith, W. P.
Journal of Wildlife Management 65(1): 34-40. (2001)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: batture/ black bear/ denning/ elevation/ flooding/ forest management/ Mississippi Alluvial Valley/ reproduction/ topography/ Ursus americanus/ den/ flooding/ habitat selection/ United States/ Ursus americanus
Abstract: Most habitats available to black bear (Ursus americanus) in the Mississippi Alluvial Valley (MAV) consist of seasonally flooded commercial forests where lack of suitable dens may limit population growth. We studied interactions between forest management and flooding relative to female black bear denning. Denning behavior differed between commercial and noncommercial forests. Females used tree dens exclusively on noncommercial forests, whereas on commercial forests, most (83%) were ground dens. Variations in ground den elevation resulted in differing inundation probabilities, altering survival probabilities for neonates. On commercial forests, ground

dens with similar inundation probabilities as tree dens allowed successful reproduction to occur. Management practices that enhance suitable cover in areas of minimal inundation probability may mitigate for lack of den trees in flood-prone landscapes.
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1046. **Forest management and the dead wood resource in ponderosa pine forests: Effects on small mammals.**
Chambers, Carol L.
In: Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests, General Technical Report-PSW 181/ Laudenslayer, W. F.; Shea, P. J.; Valentine, B. E.; Weatherspoon, C. P.; and Lisle, T. E.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 679-693.
Notes: 0196-2094 (ISSN); Symposium held November 2-4, 1999 in Reno, NV.
http://www.fs.fed.us/psw/publications/documents/gtr-181/
Descriptors: commercial activities/ conservation measures/ ecology/ habitat utilization/ terrestrial habitat/ land zones/ Peromyscus boylii/ Peromyscus maniculatus/ Peromyscus truei: forestry/ forest restoration treatments/ habitat management/ habitat utilization/ Dead wood use/ forest management implications/ habitat preference/ forest and woodland/ Arizona/ Colorado River/ Arizona strip/ Mount Trumbull/ Mammalia, Rodentia, Muridae/ chordates/ mammals/ rodents/ vertebrates
Abstract: Changes in vegetation structure and composition affect habitat for wildlife. Species such as small mammals that are restricted to small home ranges and are relatively immobile may be most affected since it is more difficult to find and move to new habitat. In the southwestern United States, forest management treatments (thinning and prescribed burning) are being implemented to alter structure and function of ponderosa pine (Pinus ponderosa) ecosystems and recreate pre-settlement (ca. 1870) tree species composition and size class distribution. These forest restoration treatments will affect the availability of dead wood to wildlife (e.g., prescribed fires may consume dead wood, forest operations may create snags and logs). I live-trapped small mammals in a northern Arizona ponderosa pine forest prior to restoration treatment and found that mouse species (Peromyscus species) were associated with some dead wood elements (e.g., Gambel oak [Quercus gambelii] snags, ponderosa pine snags, ponderosa pine stumps).
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1047. **Forest management and wildlife in forested wetlands of the southern Appalachians.**
Wigley, T. Bently and Roberts, Thomas H.
Water, Air and Soil Pollution 77(3-4): 445-456. (1994)
NAL Call #: TD172.W36; ISSN: 0049-6979
Descriptors: forested wetlands/ wildlife/ Appalacian Mountains/ Animalia/ Plantae/ animals/ plants/ biodiversity/ ecology/ environmental protection/ forestry/ habitat/ resource management
Abstract: The southern Appalachian region contains a variety of forested wetland types. Among the more prevalent types are riparian and bottomland hardwood forests. In this paper we discuss the temporal and spatial changes in wildlife diversity and abundance often associated with forest management practices within bottomland and riparian forests. Common silvicultural practices within the southern Appalachians are diameter-limit cutting, clearcutting, single-tree selection, and group selection. These practices alter forest composition, structure, and spatial heterogeneity, thereby changing the composition, abundance, and diversity of wildlife communities. They also can impact special habitat features such as snags, den trees, and dead and down woody material. The value of wetland forests as habitat also is affected by characteristics of adjacent habitats. More research is needed to fully understand the impacts of forest management in wetlands of the southern Appalachians.
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1048. **Forest management for spotted owls on Rayonier lands of the Olympic Peninsula: The wildlife plan area.**
Varland, Daniel E.
Northwestern Naturalist 81(2): 89. (2000)
NAL Call #: QL671.M8; ISSN: 1051-1733
Descriptors: Strigidae/ Strigiformes/ Strix occidentalis/ habits-behavior/ birds/ dispersal/ endangered-threatened species/ habitat management/ habitat use/ land use/ management/ snags/ study methods/ techniques/ wildlife
Abstract: The Wildlife Agreement between the Washington State Department of Fish and Wildlife and Rayonier for 66,000 acres of Rayonier land on the northwest Olympic Peninsula is designed primarily to create spotted owl dispersal habitat between the Olympic National Park Interior and the park Coastal Strip. Through this cooperative agreement, Rayonier is performing landscape management practices to create more dispersal habitat and is co-sponsoring a snag research program to provide more habitat for bird and mammal species. The duration of the agreement is 30 years, with options for two extensions of 10 years each.
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1049. **Forest management guidelines for forest-dwelling caribou in Quebec.**
Courtois, R.; Ouellet, J. P.; Dussault, C.; and Gingras, A.
Forestry Chronicle 80: 598-607. (Sept. 2004-Oct. 2004)
NAL Call #: 99.8 F7623
Descriptors: caribou/ forest management/ habitat management/ Quebec/ Canada
Abstract: The forest-dwelling ecotype of woodland caribou (Rangifer tarandus caribou) is vulnerable to predation, hunting, and disturbances due to anthropogenic activities. Its strategies of space and habitat use are oriented towards reducing the effects of these limiting factors. Caribou occupy large home ranges, undertake extensive movements, and avoid fragmented areas. They use various habitats, but especially mature and over-mature conifer stands with irregular structure, which are less suitable for other ungulates, wolves and black bears. In order to protect habitat for forest-dwelling caribou, we suggest an ecosystem approach based on the protection of large forested blocks, the concentration of forest harvesting in large management blocks, and the maintenance of habitat connectivity. This strategy focuses on short-term conservation of minimum caribou habitats in the protected blocks, a medium-term habitat recovery in the management blocks, the maintenance of forest activities, and facilitation of seasonal and dispersal movements. Within the management blocks, we recommend creation of an irregular forest structure similar to the pattern created by natural disturbances inherent to spruce-moss forests.

These guidelines have been tested in Quebec for the last few years and were well received by forest and wildlife agencies as well as the forest industry.
This citation is from AGRICOLA.

1050. **Forest management strategy, spatial heterogeneity, and winter birds in Washington.**
Haveri, Bruce A. and Carey, Andrew B.
Wildlife Society Bulletin 28(3): 643-652. (2000)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Aves/ wildlife-habitat relationships/ wildlife/ species diversity/ overwintering/ management/ habitat management/ habitat alterations/ forests/ forestry practices/ ecosystems/ Douglas fir/ conservation/ birds/ behavior/ silviculture/ fauna/ diversity/ dead wood/ Pseudotsuga spp./ Washington: Thurston County
Abstract: Ecological management of second-growth forest holds great promise for conservation of biodiversity, yet little experimental evidence exists to compare alternative management approaches. Wintering birds are one of several groups of species most likely to be influenced by forest management activities. The authors compared species richness and proportion of stand area used over time by wintering birds in 16 second-growth Douglas-fir (Pseudotsuga menziesii) stands to determine the effects of management strategy and experimental variable-density thinnings. Management strategies were retaining legacies (large live, dead, and fallen trees from the previous old-growth stand) with long rotations and managing for high-quality timber with multiple thinnings and removal of defective trees. Experimental thinnings were designed to reduce inter-tree competition and monopolization of light, moisture, and nutrients by trees at the expense of other growth forms; reproduce the within-stand spatial heterogeneity found in old-growth forests; and accelerate development of habitat breadth. Proportion of area used and species richness increased with experimental thinnings. Two of the eight most common winter species increased their use of experimentally thinned stands. No species exhibited greater use of unthinned, competitive-exclusion-stage stands over thinned stands. Variable-density thinnings, in conjunction with other conservation measures (legacy retention, decadence management, and long rotations), should provide habitat for abundant and diverse birds.
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1051. **Forest management under uncertainty for multiple bird population objectives.**
Moore, C. T.; Plummer, W. T.; and Conroy, M. J.
In: Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference, General Technical Report-PSW 191; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2005. pp. 373-380.
Notes: Bibliography.
http://www.fs.fed.us/psw/publications/documents/psw_gtr191/Asilomar/pdfs/373-380.pdf
Descriptors: Aves/ birds/ habitat management/ habitat/ forest/ theory-model/ simulation/ Georgia
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1052. **Forest restoration in a global context.**
Stanturf, J. A.
In: Proceedings of a Conference on Sustainability of Wetlands and Water Resources: How Well Can Riverine Wetlands Continue to Support Society into the 21st Century?, General Technical Report-SRS 50/ Holland, Marjorie M.; Warren, Melvin L.; and Stanturf, John A.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 160-167.
Notes: , Southern Research Station, USDA Forest Service.
http://www.forestdisturbance.net/publications/ForestRestGolbal-Stanturf.pdf
Descriptors: afforestation/ agricultural land/ bottomland forests/ choice of species/ degraded forests/ degraded land/ forest plantations/ forests/ land use/ reclamation/ rehabilitation/ silviculture
Abstract: Forest restoration on land cleared for agriculture is occurring around the world. Often land was abandoned because of infertility, frequent flooding, or other site limitations. In some countries, market forces or changing trade policies drive conversion of cleared land to plantations of exotic or native tree species. The objective of this paper is to introduce the special session on restoration of bottomland hardwoods by placing efforts in the Lower Mississippi Alluvial Valley into a global context. The challenges of forest restoration are surprisingly similar: overcoming site degradation, prescribing appropriate species, and applying cost-effective establishment methods. While plantation forestry remains the most effective approach to large-scale restoration, the trend is toward plantations that are more complex. This trend is characterized by more intimate association with other land uses, more diverse goals for species composition and vegetation structure in restoration planting, and more direct involvement by landowners in both the conception and implementation of restoration schemes. Benefits of restoration planting include reduced soil erosion; improved water quality; increased wildlife habitat; and increased supply of wood for fuel, lumber, and fiber. Increasingly, objectives of restoration planting include carbon sequestration.
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1053. **Forest vertebrate responses to landscape-level changes in Ontario.**
Voigt, Dennis R.; Baker, James A.; Rempel, Robert S.; and Thompson, Ian D.
In: Ecology of a managed terrestrial landscape: Patterns and processes of forest landscapes in Ontario/ Euler, David; Perera, Ajith H.; Thompson, I. D.; and Ontario Ministry of Natural Resources.
Vancouver, B.C.: UBC Press, 2000; pp. 198-234.
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ abiotic factors/ land and freshwater zones/ Canada/ Vertebrata: forestry/ habitat management/ landscape level management/ forest fauna/ population dynamics/ forest and woodland/ physical factors/ Ontario/ forest taxa responses/ chordates/ vertebrates
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1054. **Forestry herbicide influences on biodiversity and wildlife habitat in southern forests.**
Miller, K. V. and Miller, J. H.
Wildlife Society Bulletin 32(4): 1049-1060. (2004)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2004)032
[1049:FHIOBA]2.0.CO;2.
Descriptors: biodiversity/ habitat/ herbicide/ release treatment/ site preparation/ United States, southeastern region/ wildlife/ biodiversity/ forest management/ habitat quality/ herbicide/ species richness/ yield
Abstract: In the southern United States, herbicide use continues to increase for timber management in commercial pine (Pinus spp.) plantations, for modifying wildlife habitats, and for invasive plant control. Several studies have reported that single applications of forestry herbicides at stand initiation have minor and temporary impacts on plant communities and wildlife habitat conditions, with some reports of enhanced habitat conditions for both game and nongame species. Due to the high resiliency of floral communities, plant species richness and diversity rebound rapidly after single herbicide treatments, with short- and long-term compositional shifts according to the selectivity and efficacy of the herbicide used. Recently, however, a shift to the Southeast in North American timber supplies has resulted in increased forest management intensity. Current site-preparation techniques rely on herbicide combinations, often coupled with mechanical treatments and ≥ 1 years of post-planting applications to enhance the spectrum and duration of vegetation control. This near-total control of associated vegetation at establishment and more rapid pine canopy closure, coupled with shortened and repeated rotations, likely will affect plant diversity and wildlife habitat quality. Development of mitigation methods at the stand and landscape levels will be required to minimize vegetative and wildlife impacts while allowing continued improvement in pine productivity. More uncertain are long-term impactsof increasing invasive plant occupation and the projected increase in herbicide use that will be needed to reverse this worsening situation. In addition, the potential of herbicides to meet wildlife management objectives in areas where traditional techniques have high social costs (e.g., prescribed fire) should be fully explored.
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1055. **Forestry matters: Decline of oaks will impact wildlife in hardwood forests.**
McShea, William J.; Healy, William M.; Devers, Patrick; Fearer, Todd; Koch, Frank H.; Stauffer, Dean; and Waldon, Jeff
Journal of Wildlife Management 71(5): 1717-1728. (2007)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: habitat use/ forests/ ecosystems/ habitat management/ hardwood forest habitats/ conservation/ wildlife management/ land zones/ Quercus spp.
Abstract: Acorn production by oaks (Quercus spp.) is an important food resource for wildlife in many deciduous forests. Its role as a hard mast crop that can be either stored or used to build fat reserves for winter survival cannot be replaced by most other potential foods. Changes in forest management, introduced pests and pathogens, and increased deer populations have resulted in significant changes in the demography of oaks in eastern North America, as evident in Forest Inventory and Analysis data. Specifically, maples (Acer spp.) are replacing oaks in many forests through dominance of the younger age classes. These changes are not yet obvious in mast production but will take decades to reverse. Effective forest management for mast production is arguably one of the more important tasks facing wildlife professionals, yet receives scant attention by both public and private land managers. Public forests need to explicitly include mast production in their forest planning and reduce adversarial relationships over forest management. Market forces are driving commercial forests toward forest certification. Private forests compose 80% of our oak forests and are the hardest group to influence. States have not been able to effectively market forest plans and we recommend joining with advocacy groups more adept at motivating the public. Increased communication between wildlife and forestry professionals is needed through agency restructuring and joint meetings of professional agencies at the state level. Professional wildlife and forest managers are encouraged to make increased use of monitoring data and form a multiagency cooperative using a joint venture model, which has been successful for other organizations.
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1056. **Forests, fungi, and small mammals: The impact of fire and thinning on a tri-trophic mutualism.**
Meyer, Marc Datu
Davis, CA: University of California, Davis, 2004.
Notes: Degree: PhD; Advisor: Kelt, Douglas
Descriptors: ecology/ forestry/ wildlife/ fire/ mutualism/ selective harvesting/ forest management/ flying squirrels/ spotted owls/ chipmunks
Abstract: A fundamental question of forest management in North America is whether selective timber harvest mimics the effects of a natural fire regime. Understanding such effects on forest structure, ecological interactions, and wildlife within forest ecosystems is crucial to effective forest management. in Chapters 1 and 2, I identify significant habitat features of the northern flying squirrel (Glaucomys sabrinus), the primary prey of the California Spotted Owl (Strix occidentalis Occidentalis), in a mixed-conifer and red fir forest of the southern Sierra Nevada. in Chapters 3 and 4, I report on the short-term effects of mechanical thinning (light, heavy, and none) and prescribed burning (burned vs. unburned) on the interaction between truffle-producing mycorrhizal fungi and truffle-consuming lodgepole chipmunks (Tamias speciosus). Northern flying squirrels were strongly associated with perennial creeks. this association could be partly explained by the greater availability of truffles, the main food resource of flying squirrels, adjacent to creeks (Chapter 1). Flying squirrels selected nest trees that were larger in diameter, taller, and closer to riparian habitat than random or large neighboring trees. Flying squirrels also showed a preference for snags over live trees and selected red fir (Abies magnifica) but avoided incense cedar (Calocedrus decurrens, Chapter 2). Forest management practices that remove these preferred habitat elements could impact this important prey species of the California Spotted Owl. Prescribed burning and mechanical thinning had very different effects on forest structure (e.g. canopy cover, large tree density, shrub and herbaceous plant cover, soil depth), but both treatments had similar impacts on truffle production (no significant impact) and consumption of truffles by lodgepole chipmunks (both significantly reduced consumption). In

addition, neither treatment had a significant effect on the densities or demographic parameters of T. speciosus (Chapter 4). Different intensities of thinning also had similar impacts on T. speciosus densities and demographic parameters. These results suggest that burning and thinning have similar short-term effects on T. speciosus. However, longer-term data are needed to thoroughly evaluate the relative impacts of prescribed burning versus mechanical thinning on forest wildlife and their interactions.
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1057. **Fuel reduction treatment and wildfire influence on carabid and tenebrionid community assemblages in the ponderosa pine forest of northern Arizona, USA.**
Chen, Z.; Grady, K.; Stephens, S.; Villa-Castillo, J.; and Wagner, M. R.
Forest Ecology and Management 225(1-3): 168-177. (2006)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2005.12.043.
Descriptors: biodiversity/ Carabidae/ ecological indicators/ fuel reduction treatment/ ponderosa pine/ Tenebrionidae/ wildfire
Abstract: We investigated the response of community assemblages of carabids (Coleoptera: Carabidae) and tenebrionids (Coleoptera: Tenebrionidae) from June to August in 2003 and 2004 on ponderosa pine forest stands of various conditions that were created by fuel reduction treatments (thinning, and thinning plus prescribed burning) and wildfires between 1987 and 1996 in northern Arizona. We found that richness and abundance increased for carabids but decreased for tenebrionid significantly from June (the driest season of the year) to August (wet monsoon season of the year), a temporal partition for ecological niches in ponderosa pine forests. For both taxa, wildfire burned stands had the highest species richness and diversity; whereas the thinned stands had the highest species evenness. Both fuel reduction treatment and wildfire resulted in significantly different community assemblages of carabids and tenebrionids compared to unmanaged stands. Results showed that carabids from the genera of Amara, Anisodactylus, Cicindela, Harpalus, Radine, and tenebrionids in the genus of Eleodes were ecological indicators for wildfire stands. However, Synuchus dubius, and Coelocnemis spp.1 were indicator species for thinned stands, and unmanaged stands, respectively. We concluded that the richness and diversity of both taxa tended to increase after fuel reduction treatment and wildfire, and that some species from both taxa were suitable as ecological indicators for the structural change of ponderosa pine forests. Creating a mosaic of heterogeneous landscape through mechanical fuel reduction treatments is an important management strategy to maintain high invertebrate species diversity in ponderosa pine forest ecosystems in the southwestern US.
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1058. **Gopher tortoise response to habitat management by prescribed burning.**
Yager, L. Y.; Hinderliter, M. G.; Heise, C. D.; and Epperson, D. M.
Journal of Wildlife Management 71(2): 428-434. (Apr. 2007)
NAL Call #: 410 J827
Descriptors: prescribed burning/ habitat management/ Gopherus polyphemus/ gopher tortoises/ longleaf pines/ Pinus palustris
Abstract: As quality of forested habitat declines from altered fire regimes, gopher tortoises (Gopherus polyphemus) often move into ruderal areas to the detriment of the animal and land manager. We evaluated effects of a dormant-and-growing-season prescribed fire on habitat and gopher tortoise use of degraded longleaf pine (Pinus palustris) forests surrounding military training areas. We burned 4 of 8 sites in winter 2001-2002 and again in April 2003. Changes in vegetation measured during 2001-2004 indicated that burn treatments did not increase herbaceous vegetation. Similarly, movement patterns, burrow usage, and home range of tortoises radiotracked from 2002-2004 did not differ between treatments. Woody cover initially was reduced in the forests postburn, and we found more new burrows in burned forest sites. Once shrub cover was reduced, tortoises started using forested habitat that had become overgrown. However, shrub reduction may be temporary, as woody stem densities increased postburn. Thus, the one-time use of fire to manage tortoise habitat may not rapidly restore the open canopy, sparse woody midstory, and abundant herbaceous vegetation that this species requires. Repeated prescribed fires or additional management techniques may be needed for complete restoration.
This citation is from AGRICOLA.

1059. **Grassland bird response to harvesting switchgrass as a biomass energy crop.**
Roth, A. M.; Sample, D. W.; Ribic, C. A.; Paine, L.; Undersander, D. J.; and Bartelt, G. A.
Biomass and Bioenergy 28(5): 490-498. (2005); ISSN: 09619534.
Notes: doi: 10.1016/j.biombioe.2004.11.001.
Descriptors: biomass energy/ grassland birds/ panicum virgatum/ switchgrass/ combustion/ composition/ electric power generation/ energy utilization/ fuels/ vegetation/ biofuels/ habitat/ landscape/ biomass/ avifauna/ behavioral response/ energy crop/ grassland/ Wisconsin/ Ammodramus henslowii/ Aves/ Cistothorus platensis/ Panicum virgatum/ Troglodytes troglodytes
Abstract: The combustion of perennial grass biomass to generate electricity may be a promising renewable energy option. Switchgrass (Panicum virgatum) grown as a biofuel has the potential to provide a cash crop for farmers and quality nesting cover for grassland birds. In southwestern Wisconsin (near lat. 42°52', long. 90°08'), we investigated the impact of an August harvest of switchgrass for bioenergy on community composition and abundance of Wisconsin grassland bird species of management concern. Harvesting the switchgrass in August resulted in changes in vegetation structure and bird species composition the following nesting season. In harvested transects, residual vegetation was shorter and the litter layer was reduced in the year following harvest. Grassland bird species that preferred vegetation of short to moderate height and low to moderate density were found in harvested areas. Unharvested areas provided tall, dense vegetation structure that was especially attractive to tall-grass bird species, such as sedge wren (Cistothorus platensis) and Henslow's sparrow (Ammodramus henslowii). When considering wildlife habitat value in harvest management of switchgrass for biofuel, leaving some fields unharvested each year would be a good compromise, providing some habitat for a larger number of grassland bird species of management concern than if all fields were harvested annually. In areas

where most idle grassland habitat present on the landscape is tallgrass, harvest of switchgrass for biofuel has the potential to increase the local diversity of grassland birds.
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1060. **Grazing management of wet pastures in an environmentally sensitive area.**
Mallon, E. D.; McAdam, J. H.; and Montgomery, W. I.
In: Vegetation management in forestry, amenity and conservation areas: Managing for multiple objectives; Series: Aspects of Applied Biology 44.
Warwick: Association of Applied Biologists, 1996; pp. 245-250.
Notes: ISSN: 0265-1491.
NAL Call #: QH301.A76 no.44
Descriptors: natural resource management/ wildlife management/ forestry/ habitat/ pastures/ grazing management/ wetlands
This citation is from AGRICOLA.

1061. **Ground beetle (Coleoptera: Carabidae) species assemblage as an indicator of forest condition in northern Arizona ponderosa pine forests.**
Villa-Castillo, J. and Wagner, M. R.
Environmental Entomology 31(2): 242-252. (2002)
NAL Call #: QL461.E532; ISSN: 0046225X
Descriptors: Carabidae/ forest health/ forest management/ Pinus ponderosa/ prescribed fire/ thinning/ beetle/ forest health/ forest management/ prescribed burning/ thinning/ canopy thinning/ community structure/ fire ecology/ forest/ growing season/ habitat quality/ indicator organism/ native species/ organismal community/ plant stand structure/ species reintroduction/ United States/ United States/ Amara/ Carabidae/ Coleoptera/ Cyclotrachelus constrictus/ Harpalus/ Pinus ponderosa/ Synuchus dubius
Abstract: Reintroduction of fire and thinning have been suggested as the main practices to regain forest health in northern Arizona ponderosa pine (Pinus ponderosa Dougl. ex Lawson) forests. Criteria for assessing the impact of such management practices in the forest are based on benchmark reconstructed conditions resembling pre-European forest stand structure and on the enhancement of tree vigor. A range of forest conditions currently exists including stands that have been unmanaged, thinned only, thinned plus prescribed burned and burned by wildfire. A surrogate taxon was used to assess forest condition under criteria of maintaining habitat for native species operating at the soil level. We assessed changes occurring in ground beetle assemblages at the stand scale as related to changes that had occurred in forest stands previously treated with the above treatments. A pitfall-trapping scheme was deployed during the summer months of 1998, 1999, and 2000. A total of 4,452 specimens was caught representing 1.5 genera and 20 species of ground beetles. We found that species diversity increased as the level of disturbance increased. The indicator species assemblage found on the wildfire treatment was represented by species in the genera Amara and Harpalus that are characteristic of dry-open habitats. Unmanaged stands generally had the lowest diversity and the assemblage was dominated by the species Synuchus dubius (Leconte). The thinned only stands did not significantly vary from unmanaged stands in species assemblage. Cyclotrachelus constrictus (Say) was indicative of the thinning plus broadcast burned stands. Stands that were thinned plus burned were richer than both unmanaged and thinned only stands without a shift toward an open-area dominant assemblage as occurred in the stands burned by wildfire.
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1062. **Habitat and landscape correlates of presence, density, and species richness of birds wintering in forest fragments in Ohio.**
Doherty, P. F. and Grubb, T. C.
Wilson Bulletin 112(3): 388-394. (2000)
NAL Call #: 413.8 W692; ISSN: 00435643
Descriptors: avifauna/ community structure/ habitat fragmentation/ habitat structure/ landscape structure/ United States
Abstract: We investigated the distribution of wintering woodland bird species in 47 very small, isolated, woodland fragments (0.54-6.01 ha) within an agricultural landscape in north-central Ohio. Our objectives were to determine correlations between temporal, habitat, and landscape variables and avian presence, density, and species richness within the smallest woodlots occupied by such species. Our results suggest that even common species are sensitive to variation in habitat, landscape, and season. Woodlot area explained the most variation in presence, density, and species richness. Shrub cover was also an important predictor variable for presence of the smallest resident birds. Shrub cover might function as both a refuge from predators and as a windbreak, reducing thermal costs in a flat, open landscape. Landscape factors related to isolation and connectedness were also correlated with species presence and density. The species composition of the community changed through the winter, as did the density of individual species, suggesting that the winter season may play an important role in determining the distributions of bird populations across woodlots. The models presented here for Ohio birds in this specific landscape may have biological inference for other species in similar landscapes.
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1063. **Habitat and population ecology of northern bobwhite in northern Mississippi (Colinus virginianus).**
Szukaitis, Scott J. Mississippi State University, 2002.
Notes: Degree: MS; Advisor: Burger, Loren W.
Descriptors: population ecology/ breeding/ wildlife management/ habitat management/ mortality/ survival/ habitat use/ Colinus virginianus/ northern bobwhite quail/ Mississippi/ Black prairie wildlife management
Abstract: To further the understanding of the population processes involved in population response to habitat management by northern bobwhite Colinus virginianus, I studied changes in survival, reproductive effort, reproductive strategies, nest success, and chick survival and recruitment during the 3 and 4 years of habitat management on Black Prairie Wildlife Management Area, in North-Central Mississippi, 1999-2001. I radio-collared 253 bobwhite (146 male and 107 female) and monitored breeding season survival, cause-specific mortality, reproductive effort, reproductive success, nest site vegetative characteristics, habitat use, and brood survival. Breeding season survival was 23.8%. Mammalian (31.6%), avian (25.9%), and unknown predators (16.3%) accounted for most of the natural mortality. Males accounted for 30.43% of total nesting effort, whereas female first nests and renests accounted for 52.17% and 17.39%,

respectively. Overall nest survival extended to include the length of the mean laying period (15 days) and the 23-day incubation period (38 days) was 15.97%. Brood recruitment to fall was estimated at 46.62% and 19.0% for 1999 and 2000, respectively.
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1064. **Habitat associations of black-backed and three-toed woodpeckers in the boreal forest of Alberta.**
Hoyt, J. S. and Hannon, S. J.
Canadian Journal of Forest Research 32(10): 1881-1888. (2002)
NAL Call #: SD13.C35; ISSN: 00455067.
Notes: doi: 10.1139/x02-109.
Descriptors: fires/ flame retardants/ fire suppression/ forestry/ birds/ boreal forest/ conservation management/ ecological impact/ habitat use/ logging (timber)/ prescribed burning/ silviculture/ Canada/ Aves/ Coniferophyta/ Picea/ Picidae/ Picoides/ Picoides arcticus/ Picoides tridactylus/ Tridactylus
Abstract: Recent studies suggest that black-backed (Picoides arcticus) and three-toed woodpeckers (Picoides tridactylus) might decrease in abundance because of habitat loss from fire suppression and short-rotation logging in landscapes managed for forestry. We examined black-backed and three-toed woodpecker occupancy of stands in a 2-year post-fire forest, mature and old-growth spruce and pine forests, and six post-fire coniferous forests of different ages. Three-toeds were detected in old stands and in the 2-year-old burn, and their probability of occupancy of burned forests decreased between 3 and 8 years post-fire. Within 50 km of the 2-year-old burn, black-backs were only detected in the burn and not in old-growth or mature conifer stands. However, they did occupy old coniferous stands located 75 and 150 km from the recent burn. They had a similar probability of occupying stands in the 3-, 4-, and 8-year-old burns but were not detected in the 16-year-old burn. The persistence of three-toed woodpeckers in boreal Alberta will likely depend on the presence of both old-growth and recently burned coniferous forests or forests with old-growth structural characteristics. Black-backed woodpeckers appear to be more burn dependent than three-toeds, and their long-term persistence may depend on the frequency of recently burned forests within their dispersal range.
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1065. **Habitat associations of gopher tortoise burrows on industrial timberlands.**
Jones, Jeanne C. and Dorr, Brian
Wildlife Society Bulletin 32(2): 456-464. (2004)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Chelonia/ Anapsida/ Cryptodira/ Testudines/ Testudinidae/ Gopherus polyphemus/ biogeography/ canopy coverage/ commercial forest management/ foraging conditions/ intermediate forest stand thinning/ loam soil/ midstory control/ nesting/ population decline/ prescribed fire/ sandy soil/ timber industry/ Alabama/ corporate timberlands/ forests/ ecosystems/ habitat management/ habitat use/ Mississippi/ conservation/ wildlife management/ land zones/ Pinus palustris
Abstract: The western population of the gopher tortoise (Gopherus polyphemus) was listed as threatened under the Endangered Species Act in 1987 due to extensive population declines. Declines have been linked to site conversion of native pine (Pinus spp.) forests for urban development, agriculture, and commercial forest management. We conducted surveys to detect tortoise burrows on corporate timberlands in southern Mississippi and southwestern Alabama during summer 1994. We surveyed 2,759 0.5-ha strip transects on soil types of 9 different suitability categories for gopher tortoises. We found 460 active and 264 abandoned burrows on the 1,380 ha surveyed. Edaphic and vegetative conditions, such as sandy soils and total and midstory canopy coverage, influenced gopher tortoise occurrence. Logistic regression analyses revealed that active burrow occurrence was related positively to deep, sandy soils and related negatively to total canopy closure and fine loam soils with limited sand content. Abandoned burrow occurrence was related positively to increasing midstory canopy closure and selected soil types. Sandy soils and open overstory canopy that created favorable burrowing, nesting, and foraging conditions were important influences in active burrow occurrence. Vegetation management techniques, such as prescribed fire, midstory control, and intermediate forest stand thinning, are recommended on gopher tortoise conservation areas and connective corridor habitats on commercial timberlands. We theorize that restoration of longleaf pine (P. palustris) forests on sandy ridges can produce desirable core habitats and dispersal corridors for gopher tortoises in landscapes dominated by intensively managed pine plantations.
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1066. **Habitat characteristics in the core breeding range of the Swainson's warbler.**
Graves, G. R.
Wilson Bulletin 114(2): 210-220. (2002)
NAL Call #: 413.8 W692; ISSN: 00435643
Descriptors: breeding site/ habitat management/ habitat selection/ passerines/ United States/ Arundinaria gigantea/ Limnothlypis swainsonii
Abstract: I investigated the physiognomic and floristic characteristics of Swainson's Warbler (Limnothlypis swainsonii) territories at five localities within its core breeding range in Arkansas, Mississippi, Louisiana, and Florida. The warbler attained its greatest abundance (10-20 territorial males/ km^2) in floodplain forest characterized by small (<25 cm dbh) trees (ca 620-820 stems/ha) and understory thickets of saplings, vines, and shrubs (ca 35,000-48,000 small woody stems/ha). Territories in mature forest typically were associated with disturbance gaps. Canopy height, basal area, and floristics appear to be relatively unimportant factors in habitat selection, provided that understory requirements are met, which explains the warbler's occurrence in regenerating clearcuts as well as in relic tracts of old growth forest. Giant cane (Arundinaria gigantea), hypothesized to be an essential habitat requisite along the northern periphery of its breeding range, was sparse or absent in the prime breeding locations surveyed in this study. Selective thinning and clearcutting are viable habitat management techniques for the Swainson's Warbler.
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1067. **Habitat islands, forest edge and spring-active invertebrate assemblages.**
Pearce, J. L.; Venier, L. A.; Eccles, G.; Pedlar, J.; and McKenney, D.
Biodiversity and Conservation 14(12): 2949-2969. (2005)
NAL Call #: QH75.A1B562; ISSN: 0960-3115
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land zones/ North America/ Canada/ Araneae/ Carabidae: forestry/ clearcutting/ logging activity/ habitat management/ spruce forest management/ community structure/ spring active assemblage composition/ clearcut matrix/ forest and woodland/ Ontario/ Thunder Bay/ Rinker Lake Research Area/ arachnids/ arthropods/ beetles/ Chelicerates/ insects/ invertebrates
Abstract: Forest management results in forest patches of varying sizes within a clearcut matrix. The result is a large amount of edge habitat and many small patches across the landscape. Here we describe the spring-active epigeal spider and carabid fauna found at the forest-clearcut edge of spruce forest in northern Ontario, Canada. We include two types of edge: the forest-clearcut interface and the small habitat patches formed by forest residuals within the clearcut. Spring-active forest spiders and carabids appear little affected by adjacent clearcutting activity, and some forest species, such as Agyneta olivacea (Emetron), Diplocentria bidentata (Emetron) and Microneta viaria (Blackwall), are more prevalent at the forested edge. Common and abundant spider species were equally recorded in forest interior and forest edge. Generally, no invasion of open-habitat species was observed within the forest, although smaller forest patches may be at higher risk.
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1068. **Habitat preferences of primary cavity excavators in Washington's East Cascades.**
Bevis, Kenneth R. and Martin, Sandra K.
In: Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests, General Technical Report-PSW 181/ Laudenslayer, W. F.; Shea, P. J.; Valentine, B. E.; Weatherspoon, C. P.; and Lisle, T. E.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 207-221.
Notes: 0196-2094 (ISSN); Symposium held November 2-4, 1999 in Reno, NV.
http://www.fs.fed.us/psw/publications/documents/gtr-181/
Descriptors: commercial activities/ ecology/ population dynamics/ habitat utilization/ terrestrial habitat/ land zones/ Aves: forestry/ habitat preference/ abundance/ primary cavity excavators/ forest/ population density/ forest management treatments/ dead tree characteristics/ habitat preference/ forest and woodland/ Washington/ East Cascades/ Cle Elum/ Aves/ birds/ chordates/ vertebrates
Abstract: Primary cavity excavator (PCE) bird densities and habitat preferences in relation to forest management treatments and snag characteristics were investigated in grand fir forests of eastern Washington. PCE birds selected large diameter, broken top snags for feeding and nesting. They selected western larch and Douglas-fir for feeding excavations and ponderosa pine and Douglas-fir for nest cavity snags. Grand fir were also utilized as available on managed plots. Soft snags with advanced wood decay were particularly important for nest sites. Species composition of PCE birds varied significantly in different forest management treatments, with unique species groups associated with unmanaged and heavily managed sites. Total population densities of PCE birds were most closely associated with snag density, particularly large diameter snags (> 25 cm DBH).
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1069. **Habitat quality and reproductive behavior in chickadees and tits: Potential for habitat matrix use in forest generalists.**
Otter, Ken A.; van Oort, Harry; and Fort, Kevin T.
In: Ecology and behavior of chickadees and titmice: An integrated approach/ Otter, Ken A.
Oxford: Oxford University Press, 2007.
Notes: ISBN: 9780198569992.
NAL Call #: QL696.P2615 E26
Descriptors: conservation measures/ reproduction/ ecology/ habitat utilization/ terrestrial habitat/ Paridae: habitat management/ potential use of managed matrix vegetation to improve breeding success/ reproductive behavior/ relationships with habitat quality/ potential use of managed matrix vegetation/ reproductive productivity/ breeding success/ enhancement through potential use of managed matrix vegetation/ habitat preference/ habitat quality and reproductive behavior/ forest and woodland/ Aves, Passeriformes/ birds/ chordates/ vertebrates
Abstract: Habitat destruction and fragmentation poses one of the most serious threats to biodiversity in conservation biology. What distinguishes habitat fragments is that the intervening gaps are often vegetated, rather than open expanses of ocean. This intervening habitat, referred to as 'the matrix', differs in species composition or age and/or structure of the vegetation so as to be sufficiently distinct from the remnant habitat islands they surround. Matrix habitat is considered less hospitable for remnant-dwelling species, yet terrestrial matrices may not be quite as impermeable as open oceans. This chapter addresses the potential for breeding in altered habitats, such as those found in managed habitat matrices that separate remnant, native forest. Using studies on both Eurasian tits and North American chickadees, analyses investigating breeding in forests of divergent habitat quality are paralleled with proposed management of matrix vegetation as alternative breeding habitat for matrix-tolerating species.
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1070. **Habitat restoration across large areas: Assessing wildlife responses in the Clearwater Basin, Idaho.**
Svancara, L. K.; Servheen, G.; Melquist, W.; Davis, D.; and Scott, J. M.
Western Journal of Applied Forestry 19(2): 123-132. (2004)
NAL Call #: SD388.W6; ISSN: 0885-6095
Descriptors: modeling/ ecosystem management/ habitat management/ restoration
Abstract: Over the past century, fire suppression and prevention have altered disturbance regimes across the Pacific Northwest, resulting in a significant divergence of historical and current conditions in forested habitats. To address this continuing trend in habitat changes and begin restoring historical patterns of disturbance, the Clearwater Basin Elk Habitat Initiative (CEI) proposes relatively extensive management actions in the Clearwater basin of north-central Idaho. We attempted to evaluate potential effects of such management actions on selected wildlife species using extant data sets and suggest ways to improve such projects with respect to a multispecies and

adaptive management approach. Although there is increased interest in ecosystem management over large areas, the increased scale of analysis and implementation require a substantial increase in the level of species information beyond what currently exists. We conclude that baseline information required for an effective multispecies land-management policy in the Clearwater basin does not exist for many terrestrial wildlife species. To implement a true multispecies or ecosystem approach, wildlife and land managers should cooperate to increase existing population data and modeling efforts for wildlife species in the basin and develop a sustainable monitoring program to evaluate habitat management changes and their influence on wildlife populations within the context of adaptive management theory. Management actions to restore disturbance patterns should attempt spatial and temporal scales that are biologically relevant to the population ecology of species being affected.
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1071. **Habitat selection and home range size of ruffed grouse in Rhode Island.**
Endrulat, E. G.; McWilliams, S. R.; and Tefft, B. C.
Northeastern Naturalist 12(4): 411-424. (2005)
NAL Call #: QH105.M2M36; ISSN: 10926194.
Notes: doi: 10.1656/1092-6194(2005)012 [0411:HSAHRS]2.0.CO;2.
Descriptors: Bonasa umbellus/ Carya/ Coniferophyta/ Phasianidae
Abstract: Bonasa umbellus (Ruffed Grouse) are one of many wildlife species that require early successional forest and whose populations have declined as New England forests have matured. We studied habitat selection and home range size of Ruffed Grouse in oak-hickory forests in Rhode Island to determine the importance of different habitat types for grouse. Home range size did not significantly differ by age or gender (mean = 103 ± 24.91 ha). Habitat selection was assessed at two spatial scales: home range and study area scale. At the study area scale, grouse selected early successional forest, mixed deciduous-conifer stands, deciduous forest, and forested roads, whereas grouse avoided evergreen forests and developed areas. Given that grouse selected early successional forests at a relatively large spatial scale, we suggest that the conservation and restoration of early successional forested habitats will benefit Ruffed Grouse and many other associated wildlife.
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1072. **Habitat selection by Swainson's warblers breeding in loblolly pine plantations in southeastern Louisiana.**
Bassett-Touchell, C. A. and Stouffer, P. C.
Journal of Wildlife Management 70(4): 1013-1019. (2006)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2006)70 [1013:HSBSWB]2.0.CO;2.
Descriptors: habitat selection/ habitat structure/ Limnothlypis swainsonii/ Louisiana/ pine plantations/ Pinus taeda/ Swainson's warbler/ thinning/ vegetation characteristics
Abstract: Although Swainson's warbler (Limnothlypis swainsonii) is typically associated with bottomland hardwood forests, they also breed in even-age pine (Pinus spp.) plantations. We used mist nets and point counts from 1998-2000 to survey intensively managed even-age loblolly pine (P. taeda) plantations of different age classes and management histories to determine breeding status and stand structure preferences of Swainson's warbler in southeastern Louisiana, USA. We detected Swainson's warblers in 23 of 124 sampled loblolly pine stands. We also confirmed breeding in 7-24-year-old pine stands. We found Swainson's warblers in pine stands that had well-developed canopy closure, abundant understory vegetation, and sparse live ground cover. Floristic differences between hardwood and pine breeding habitats demonstrate that Swainson's warblers do not require specific vegetation composition, although they discriminate within habitats based on physical structure of vegetation. Although management of Swainson's warblers has generally been directed at bottomland hardwood forests, widespread use of pine plantations may offer additional management opportunities for this species of concern.
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1073. **Habitat selection models for eastern wild turkeys in central Mississippi.**
Miller, D. A.; Leopold, B. D.; Hurst, G. A.; and Gerard, P. D.
Journal of Wildlife Management 64(3): 765-776. (2000)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: eastern wild turkey/ habitat models/ habitat use/ logistic regression/ Meleagris gallopavo silvestris/ Mississippi/ predictive models/ ecological modeling/ gamebird/ habitat selection/ habitat use/ United States/ Meleagris gallopavo
Abstract: Few quantitative models of habitat use exist for eastern wild turkey (Meleagris gallopavo silvestris). We used logistic regression to build and cross-validate sex- and season-specific multivariate models of habitat selection for wild turkeys in central Mississippi. We examined 4 models: successfully nesting and unsuccessfully nesting females during preincubation, spring males, and summer males. Preincubation females were associated with riparian corridors, perhaps to travel from bottomland areas to upland nesting sites. During preincubation, successfully nesting females were more closely associated with potential nesting habitat than unsuccessfully nesting females. Habitat selection by males during spring corresponded with habitat use of females. During summer, males were nonselective in their habitat choices. Models developed were consistent with and complemented data from previous studies on this area. Our modeling procedure may be useful for other studies of wild turkey habitat selection. We recommend using habitat models in conjunction with habitat use analyses (e.g., use versus availability) to maximize information gained from habitat selection studies. Habitat management for turkeys in a predominantly forested area should include maintenance of riparian corridors and habitat diversity, with a preponderance of mature (>40-yr-old) timber stands, and a 3-4-year burning rotation in mature pine stands.
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1074. **Habitat selection of female turkeys in a managed pine landscape in Mississippi.**
Miller, D. A. and Conner, L. M.
Journal of Wildlife Management 71(3): 744-751. (May 2007)
NAL Call #: 410 J827
Descriptors: coniferous forests/ wildlife habitats/ wild birds/ game birds/ turkeys/ forest management/ habitat

preferences/ animal preferences/ estimation/ females/ wildlife management/ Pinus/ autumn/ winter/ agricultural land/ montane forests/ hardwood forests/ lowland forests/ spring/ summer/ forest roads/ forest thinning/ forest stands/ prescribed burning/ regression analysis/ Mississippi/ Meleagris gallopavo silvestris

Abstract: Intensive pine (Pinus spp.) management is a dominant form of forest management in the southeastern United States. Previous research has shown that managed pine forests provide suitable habitat for eastern wild turkeys (Meleagris gallopavo silvestris), but little research has examined seasonal habitat selection for female wild turkeys from a landscape perspective, particularly within managed pine landscapes. Therefore, we used a long-term (1986-1993) data set to describe seasonal habitat selection by female wild turkeys, using an information-theoretic approach from a landscape perspective, on an intensively managed pine landscape. Habitat use patterns during preincubation and autumn-winter were indicative of female wild turkeys moving between a bottomland hardwood-agricultural field complex during autumn-winter and upland managed pine stands during the remainder of the year. During spring and summer, female wild turkeys used landscapes primarily composed of intensively managed pine, including thinned and burned stands and roadsides. Our results confirm results of short-term, stand-based habitat analyses on our study area. We recommend variable fire return intervals of 3 to 7 years to improve habitat conditions for wild turkeys within intensively managed pine forests. Further research is needed to examine management actions, such as thinning, prescribed fire, and herbicide use, within the context of wild turkey use of intensively managed pine landscapes.

This citation is from AGRICOLA.

1075. **Harvest-related edge effects on prey availability and foraging of hooded warblers in a bottomland hardwood forest.**

Kilgo, John C.

Condor 107(3): 627-636. (2005)

NAL Call #: QL671.C6; ISSN: 0010-5422

Descriptors: commercial activities/ nutrition/ diet/ feeding behavior/ ecology/ population dynamics/ predators/ terrestrial habitat/ land zones/ Arthropoda: forestry/ strategies/ abundance effects/ avian predator foraging efficincy relations/ forest habitat/ population size/ forestry strategies effects/ avian predator foraging efficiency relations/ avian predators/ Wilsonia citrina/ predator foraging efficiency/ forestry strategies effect on prey abundance relations/ forest and woodland/ Hardwood forest habitat/ avian predator foraging efficiency/ South Carolina/ Aiken/ Allendale and Barnwell counties/ abundance/ Aves, Passeriformes, Parulidae/ arthropods/ birds/ chordates/ invertebrates/ vertebrates

Abstract: The effects of harvest-created canopy gaps in bottomland hardwood forests on arthropod abundance and, hence, the foraging ecology of birds are poorly understood. I predicted that arthropod abundance would be high near edges of group-selection harvest gaps and lower in the surrounding forest, and that male Hooded Warblers (Wilsonia citrina) foraging near gaps would find more prey per unit time than those foraging in the surrounding forest. In fact, arthropod abundance was greater >100 m from a gap edge than at 0-30 m or 30-100 m from an edge, due to their abundance on switchcane (Arundinaria gigantea); arthropods did not differ in abundance among distances from gaps on oaks (Quercus spp.) or red maple (Acer rubrum). Similarly, Hooded Warbler foraging attack rates were not higher near gap edges: when foraging for fledglings, attack rate did not differ among distances from gaps, but when foraging for themselves, attack rates actually were lower 0-30 m from gap edges than 30-100 m or >100 m from a gap edge. Foraging attack rate was positively associated with arthropod abundance. Hooded Warblers apparently encountered fewer prey and presumably foraged less efficiently where arthropods were least abundant, i.e., near gaps. That attack rates among birds foraging for fledglings were not affected by distance from gap (and hence arthropod abundance) suggests that prey availability may not be limiting at any location across the forest, despite the depressing effects of gaps on arthropod abundance.

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1076. **Harvest retention patches are insufficient as stand analogues of fire residuals for litter-dwelling beetles in northern coniferous forests.**

Gandhi, K. J. K.; Spence, J. R.; Langor, D. W.; Morgantini, L. E.; and Cryer, K. J.

Canadian Journal of Forest Research 34: 1319-1329. (June 2004)

NAL Call #: SD13.C35

Descriptors: conifers/ forest stands/ forest trees/ canopy gaps/ habitat fragmentation/ forest insects/ forest litter/ Coleoptera/ fauna/ species diversity/ logging/ forest fires/ insect ecology/ forest habitats/ refuge habitats/ stand structure/ forest succession/ population size/ conservation practices/ Alberta/ residual size/ residual shape/ plant ecology/ forestry related/ animal ecology and behavior/ natural resources, environment, general ecology, and wildlife conservation

Abstract: We compared litter-dwelling beetle assemblages of <1- to 2-ha unharvested coniferous patches embedded in 1-year-old clearcuts with beetle assemblages from <1- to 10-ha unburned fire residuals within 15- and 37-year-old burned forests. Our primary objective was to determine whether unharvested patches retain biotic elements that are similar to those of the surrounding uncut forests and to those of patches of forest skipped by wildfires. Beetle assemblages of the harvest residuals were similar to those of the uncut forest, suggesting that harvest residuals retain elements of the mature forest. However, beetle assemblages of harvest residuals differed from those of fire residuals. Thus, harvest residuals sited without regard to microhabitat characteristics or stand structure in fire residuals are insufficient analogues for the late successional habitats provided by fire residuals. There was no relationship between size of harvest residuals and either beetle catch or diversity. Beetle catches were higher in round harvest residuals, and a number of forest species also appeared to be aggregated in round residuals. Forest managers may preserve biotic elements of young uncut forest by leaving round harvest residuals in clearcuts; however, a closer habitat match between harvest and fire residuals is likely required to preserve and maintain landscape-level forest biodiversity.

This citation is from AGRICOLA.

1077. **Harvesting impacts on selected floral and faunal communities in the Mississippi River batture lands: Pre-treatment measurements.**
Lockhart, Brian R.; Thompson, Lynne C.; Tappe, Philip A.; Peitz, David G.; Weih, Robert C.; Guo, Yanfei; Brown, Nicholas R.; Lawson, Edwin R.; and Ku, Timothy T.
In: Proceedings of the southern forested wetlands ecology and management conference/ Flynn, Kathryn M.
Clemson: Consortium for Research on Southern Forested Wetlands, 1996; pp. 30-35.
Descriptors: commercial activities/ ecology/ terrestrial habitat/ land and freshwater zones/ Carabidae/ Aves: forestry/ practices/ community structure relationship/ community structure/ forestry practices effect/ forest and woodland/ Mississippi/ Issaquena County/ Pittman Island/ influence of forestry practices/ bottomland forest/ Carabidae/ Caraboidea, Adephaga, Coleoptera, Insecta/ arthropods/ birds/ chordates/ coleopterans/ beetles/ insects/ invertebrates/ vertebrates
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1078. **Herpetofaunal assemblages in relation to forestry practices on wildlife management areas in northeast Louisiana.**
Dixson, Marcie. University of Louisiana at Monroe, 2006.
Notes: Degree: MS; Advisor: Carr, John L.
Descriptors: forestry practices/ bottomland hardwood forests/ wildlife management/ reforestation/ Bayou Lafourche/ Louisiana/ Ouachita Parish
Abstract: Ouachita (Owma) and Russell Sage Wildlife Management Areas (RSWMA) are state-owned and managed public lands in Ouachita Parish, northeast Louisiana. Both are comprised of bottomland hardwood forest within the Bayou Lafourche floodplain, although OWMA also has extensive areas of reforested agricultural fields. Between the two WMAs, twenty-six 500-meter transects were marked. Visual encounter surveys (VES), and drift fence surveys were conducted along transects, whereas anuran call surveys were conducted at points independent of the transects. Surveys conducted from April 2003 through November 2004 resulted in 40 species at OWMA and 42 species at RSWMA. Both VES and drift fence sampling individually accounted for a little over half (55-68%) of the total species known from each WMA. the two techniques produced very similar indices of overall similarity. Significant differences in diversity were found among treatments at Owma between the reforested and forested tracts, with the reforested areas having less diversity. at RSWMA there were no significant effects of timber treatment management.
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1079. **Herpetofaunal species richness responses to forest landscape structure in Arkansas.**
Loehle, Craig; Wigley, T. Bently; Shipman, Paul A.; Fox, Stanley F.; Rutzmoser, Scott; Thill, Ronald E.; and Melchiors, M. Anthony
Forest Ecology and Management 209(3): 293-308. (2005)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ ecology/ community structure/ terrestrial habitat/ land zones/ Amphibia/ Reptilia: forestry/ management strategies effect on species diversity/ species diversity/ forest habitat characteristics and management strategies relations/ forest and woodland/ habitat characteristics and management strategies/ species diversity relations/ Arkansas/ Amphibia/ amphibians/ chordates/ reptiles/ vertebrates
Abstract: Species accumulation curves were used to study relationships between herpetofaunal richness and habitat characteristics on four watersheds in Arkansas that differed markedly with respect to management intensity. Selected habitat characteristics were estimated for stands containing the sample points and within buffers with radii of 250, 500 m, and 1 km surrounding the sample points. Richness of all three herpetofarmal groups (amphibians, reptiles, and all herpetofauna) was greater in hardwood forests than in pine or mixed pine-hardwood. For all three groups, the youngest forest age class had the most species. For amphibians and total herpetofauna, richness declined as stand ages increased. Reptiles had the highest richness at sample points with the lowest class of stand basal area (BA), whereas amphibians were richest at points having the highest BA. In contrast to expectations, there was no effect of distance from water on richness of any taxa; however, we may have had incomplete data on the spatial distribution of small ponds outside the sample plots because they were not recorded in the GIS data. Results for distance to roads were ambiguous, but with more separation of compared curves as more plots were sampled. a positive influence of road proximity was suggested. There was a positive effect of buffer age diversity at the 250 m scale for all three herpetofaunal groups, but less so at scales >250 m except for amphibians, which also showed a positive effect at the 1 km scale. The two most intensively managed watersheds had higher species richness than the two less intensively managed watersheds for reptiles, amphibians, and both groups combined. In this study landscape, where urban and agricultural influences were minimal, we did not observe negative impacts of forest management and associated activities, and local habitat heterogeneity created by silviculture often had a positive effect on herpetofaunal species richness. © 2005 Elsevier B.V. All rights reserved.
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1080. **Herpetological habitat relations in the Ouachita Mountains, Arkansas.**
Crosswhite, D. L.; Fox, S. F.; and Thill, R. E.
In: Ouachita and Ozark Mountains Symposium: Ecosystem Management Research, General Technical Report-SRS 74/ Guldin, J. M.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2004. pp. 273-282.
Descriptors: canopy/ clear felling/ dead wood/ forest litter/ forest management/ forests/ ground cover/ habitats/ mixed forests/ mountain areas/ mountain forests/ rotations/ selective felling/ silvicultural systems/ wild animals/ wildlife conservation/ Amphibia/ Pinus echinata/ Quercus/ reptiles
Abstract: We studied habitat relationships of the herpetofauna inhabiting managed pine-oak woodlands of the Ouachita Mountains, Arkansas. We used drift fence arrays with pitfall and double-ended funnel traps to sample two replications each of three treatments: young clearcuts, selectively harvested stands, and late-rotation untreated controls. Our objectives were to compare herpetofaunal communities among these treatments and to quantify habitat relationships. Ninety-one days of trapping over two field seasons yielded 633 captures representing 35 species. Canonical correspondence analysis indicated that species composition differed significantly among

treatments. The most distinct separation of species groups was between reptiles and amphibians; reptiles were far more abundant in the young, xeric clearcuts, while amphibians were most abundant in the other two treatments. Four habitat parameters (canopy coverage, litter depth, woody plant cover, and large, woody debris) explained much of the variation in species composition among sample sites. Several species showed clear preferences for particular habitats.
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1081. **Heterospecific facilitation of forest-boundary crossing by mobbing understory birds in north-central Florida.**
Sieving, K. E.; Contreras, T. A.; and Maute, K. L.
Auk 121(3): 738-751. (2004)
NAL Call #: 413.8 AU4; ISSN: 00048038
Descriptors: Megascops asio/ Florida/ birds/ forest birds/ predation risk/ predation management/ forest habitat
Abstract: Perception of predation risk by animals living in habitat mosaics moderates movement behaviors, potentially influencing the connectivity of landscapes. Perception of risk varies with environmental factors, which opens the possibility of managing connectivity for animals in fragmented landscapes. Observing understory forest birds wintering in north-central Florida, we tested the hypothesis that the presence of the Tufted Titmouse (Baeolophus bicolor), a vigilant, socially dominant flocking species, would increase the propensity of multispecies flocks engaged in mobbing to cross forest boundaries and move into open areas. Eastern Screech-Owl (Megascops asio) calls were broadcast next to an owl model at sites within continuous oak forest habitats (control) or just outside of forest in either old-field habitats with clustered saplings and shrub cover (shrub treatment) or in early successional habitats (open treatment; 11 trials in each habitat). In both treatments (forest adjacent to open or shrub), models were positioned 15 m from forest boundaries in nonforest habitat. For each individual responding to the playback (i.e. that entered a 30-m radius around the model), we recorded the species and its proximity to the model using three distance classes: within 15 m (at the forest edge), 10 m (out in the open), and 1 m (at the model). Both greater vegetative cover and presence of titmice were significantly correlated with proportion of responding individuals and species that approached and crossed forest boundaries, and the effects were additive. We show experimentally that socially dominant titmice can facilitate forest-boundary crossing by other bird species, which suggests a potential mechanism defining connectivity in fragmented landscapes for wintering forest birds.
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1082. **Home range and survival characteristics of male Bachman's sparrows in an old-growth forest managed with breeding season burns.**
Cox, James A. and Jones, Clark D.
Journal of Field Ornithology 78(3): 263-269. (2007)
NAL Call #: 413.8 B534; ISSN: 0273-8570
Descriptors: Fringillidae/ Passeriformes/ Aimophila aestivalis/ Bachman's sparrow/ longleaf pine/ Pinus palustris/ survival/ site fidelity/ prescribed burning/ home range/ Georgia
Abstract: Prescribed burning is essential for maintaining suitable habitat for Bachman's Sparrows (Aimophila aestivalis), but burns conducted during the breeding season may lead to site abandonment and low survival or productivity. We monitored a color-banded population of Bachman's Sparrow in Georgia for four breeding seasons to assess home range size, site fidelity, and survival in an area managed primarily using breeding season burns. Our study area was one of the last remaining tracts of old-growth longleaf pine (Pinus palustris), and alternating halves of the tract were burned during the breeding season during each year of our study. Mean home range size for males (N= 46) during the breeding season was 3.1 ha based on 95% fixed kernel analysis and 1.8 ha based on minimum convex polygons. Breeding season burning had no effect on male site fidelity and home range characteristics. The proportion of males remaining on burned areas was similar to the proportion remaining on unburned areas. Shifts in home range centroids pre- and postburn were also similar for males on unburned (median = 49.7 m) and burned (median = 65.6 m) areas. In addition, the size of home ranges that were burned (ha) was similar to that of home ranges that were not burned (ha). Estimated annual survival for males was 0.59. The median shift in annual home range centers calculated for 38 males observed during multiple breeding seasons was 63 m and, coupled with our survival estimates, suggest greater site fidelity than previously reported. These results suggest that breeding season burns were not as detrimental to Bachman's Sparrows as reported at other locations, and such burns may be helpful in maintaining suitable habitat.
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1083. **Home range and survival of breeding painted buntings on Sapelo Island, Georgia.**
Springborn, E. G. and Meyers, J. M.
Wildlife Society Bulletin 33(4): 1432-1439. (2005)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Georgia/ home range/ maritime shrub/ movement/ painted bunting/ Passerina ciris/ pine-oak forest/ Sapelo Island/ wetlands
Abstract: The southeastern United States population of the painted bunting (Passerina ciris) has decreased approximately 75% from 1966-1996 based on Breeding Bird Survey trends. Partners in Flight guidelines recommend painted bunting conservation as a high priority with a need for management by state and federal agencies. Basic information on home range and survival of breeding painted buntings will provide managers with required habitat types and estimates of land areas necessary to maintain minimum population sizes for this species. We radiotracked after-second-year male and after-hatching-year female buntings on Sapelo Island, Georgia, during the breeding seasons (late April-early August) of 1997 and 1998. We used the animal movement extension in ArcView to determine fixed-kernel home range in an unmanaged maritime shrub and managed 60-80-year-old pine (Pinus spp.)-oak (Quercus spp.) forest. Using the Kaplan-Meier method, we estimated an adult breeding season survival of 1.00 for males (n = 36) and 0.94 (SE = 0.18) for females (n = 27). Painted bunting home ranges were smaller in unmanaged maritime shrub (female: kernel x = 3.5 ha [95% CI: 2.5-4.5]; male: kernel x = 3.1 ha [95% CI: 2.3-3.9]) compared to those in managed pine-oak forests (female: kernel x = 4.7 ha [95% CI: 2.8-6.6]; male: kernel x = 7.0 ha [95% CI: 4.9-9.1]). Buntings nesting in the managed pine-oak forest flew long distances (≥ 300 m) to

forage in salt marshes, freshwater wetlands, and moist forest clearings. In maritime shrub buntings occupied a compact area and rarely moved long distances. The painted bunting population of Sapelo Island requires conservation of maritime shrub as potential optimum nesting habitat and management of nesting habitat in open-canopy pine-oak sawtimber forests by periodic prescribed fire (every 4-6 years) and timber thinning within a landscape that contains salt marsh or freshwater wetland openings within 700 m of those forests.
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1084. **How dead trees sustain live organisms in western forests.**
Bunnell, Fred L.; Houde, Isabelle; Johnston, Barb; and Wind, Elke
In: Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests, General Technical Report-PSW 181/ Laudenslayer, W. F.; Shea, P. J.; Valentine, B. E.; Weatherspoon, C. P.; and Lisle, T. E.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 291-318.
Notes: 0196-2094 (ISSN); Symposium held November 2-4, 1999 in Reno, NV.
http://www.fs.fed.us/psw/publications/documents/gtr-181/
Descriptors: conservation measures/ nutrition/ feeding behavior/ reproduction/ reproductive behavior/ ecology/ terrestrial habitat/ land zones/ Vertebrata: habitat management/ dead tree use/ dead wood use/ forest/ foraging/ breeding site/ habitat utilization/ forest and woodland/ North America/ Pacific Northwest/ chordates/ vertebrates
Abstract: Dead wood contributes to biological richness as substrate, cavity sites, foraging sites, and shelter or cover. In the Pacific Northwest, 69 vertebrate species commonly use cavities, 47species respond positively to down wood, and prevalence of both uses is related to natural fir regimes. Almost 80 percent of nests of weak excavators are in dead trees; strong excavators make greater use of live trees. Most bat roosts are in dead trees, whereas carnivores use mostly declining, living trees. Selection of both cavity and foraging sites is governed by decay patterns. Some species prefer large pieces of down wood. Management implications are discussed.
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1085. **How should we spatially distribute dying and dead wood?**
Bunnell, Fred L.; Boyland, Mark; and Wind, Elke
In: Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests, General Technical Report-PSW 181/ Laudenslayer, W. F.; Shea, P. J.; Valentine, B. E.; Weatherspoon, C. P.; and Lisle, T. E.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 739-752.
Notes: 0196-2094 (ISSN); Symposium held November 2-4, 1999 in Reno, NV.
http://www.fs.fed.us/psw/publications/documents/gtr-181/
Descriptors: commercial activities/ conservation measures/ ecology/ habitat utilization/ terrestrial habitat/ land zones/ Vertebrata: forestry/ habitat use/ spatial distribution/ dead wood density/ habitat management/ habitat utilization/ habitat preference/ forest and woodland/ North America/ Pacific Northwest/ chordates/ vertebrates
Abstract: We consider density and degree of aggregation of dead wood. Cavity nesters as a group respond asymptotically to snag density and attain half their maximum density at about 2.4 large snags/hectare. However, individual species show different responses, and there is no apparent effect of territoriality among smaller species. Dispersed retention of trees and snags strongly favors secondary cavity nesters and increases their abundance above that found in mature or old-growth forests: large patches favor primary nesters. Despite good operational and biological reasons for patchwise retention of dead wood, there are negative effects on some species.
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1086. **Hypothetical response of mixed Douglas-fir tan oak forests to different fire intensity-severity levels: Implications for terrestrial salamanders and their habitats.**
Major, Don J. and Edwards, Thomas C.
Northwestern Naturalist 84(2): 105. (2003)
NAL Call #: QL671.M8; ISSN: 1051-1733
Descriptors: Plethodon spp./ forest ecosystems/ fire regimes/ salamanders/ Douglas fir/ tan oak/ Pseudotsuga menzeseii/ Lithocarpus densifloris/ Pacific Northwest region
Abstract: Fire suppression activities in many forested ecosystems have dramatically altered stand structure and ensuing fire regimes of fire-dependent ecosystems. In the Pacific Northwest, the effect of fire suppression on stand structure and composition is likely to be most dramatic in fire-dependent systems characterized by short fire return intervals and mixed severity fire regimes. Prescribed burning has been identified as an effective management strategy to both reduce excessive fuel loadings (short-term) and successfully maintain (long-term) the fire-dependent mixed Douglas-fir (Pseudotsuga menzeseii) tan oak (Lithocarpus densifloris) forests of the Klamath-Siskiyou region. These forests are also the home to two endemic terrestrial salamanders (Plethodon spp.). The direct and indirect effects of natural (wildland fire) and prescribed burning activities on these resident terrestrial salamanders and their habitats remain unknown. We examined the effect of different fire intensity-severity levels on post-fire stand structure and composition in mixed Douglas-fir-tan oak forests with the use of a conceptual model of pre- and post-fire response profiles describing stand and forest floor structure-composition. This information was combined with preliminary observations from our current work and published ecological requirements of these terrestrial salamanders to identify potential fire-mediated changes in important habitat components. Stand-level dynamics resulting from the identified response profiles were explored to provide insights on potential fine- and coarse-scale impacts of fire as well as identify specific knowledge gaps in fire-salamander relationships.
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1087. **Identifying habitat linkages for American black bears in North Carolina, USA.**
Kindall, Jason L. and Van Manen, Frank T.
Journal of Wildlife Management 71(2): 487-495. (2007)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Carnivora/ Ursidae/ Ursus americanus/ wildlife management/ habitat linkage/ forests/ ecosystems/ forest cohesion and agriculture edge density/ habitat management/ habitat use/ highway underpass positioning/

home range-territory/ North Carolina/ Washington County, Albemarle-Pamlico Peninsula/ behavior/ conservation/ wildlife management/ land zones
Abstract: Understanding landscape structure and the role of habitat linkages is important to managing wildlife populations in fragmented landscapes. We present a data-based method for identifying local- and regional-scale habitat linkages for American black bears (Ursus americanus) on the Albemarle-Pamlico Peninsula of North Carolina, USA. We used weights-of-evidence, a discrete multivariate technique for combining spatial data, to make predictions about bear habitat use from 1,771 telemetry locations on 2 study areas (n = 35 bears). The model included 3 variables measured at a 0.2-km(2) scale: forest cohesion, forest diversity, and forest-agriculture edge density, adequately describing important habitat characteristics for bears on our study area. We used 2 categories of unique habitat conditions to delineate favorable bear habitat, which correctly classified 79.5% of the bear locations in a 10-fold model validation. Forest cohesion and forest-agriculture edge density were the most powerful predictors of black bear habitat use. We used predicted probabilities of bear occurrence from the model to delineate habitat linkages among local and regional areas where bear densities were relatively high. Our models clearly identified 2 of the 3 sites previously recommended for wildlife underpasses on a new, 4-lane highway in the study area. Our approach yielded insights into how landscape metrics can be integrated to identify linkages suitable as habitat and dispersal routes.
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1088. **Immediate, landscape-scale impacts of even-aged and uneven-aged forest management on herpetofaunal communities of the Missouri Ozark Forest ecosystem project.**
Renken, Rochelle B. and Fantz, Debby K.
In: Proceedings of the Second Missouri Ozark Forest Ecosystem Project Symposium: Post-treatment Results of the Landscape Experiment, General Technical Report-NC 227/ Shifely, S. R. and Kabrick, J. M.; St. Paul, MN: North Central Forest Experiment Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 171-182.
Notes: 0363-616X (ISSN).
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Reptilia: habitat management/ forest management/ immediate landscape scale impacts/ community structure/ forest management/ forest and woodland/ Missouri/ Ozarks/ Amphibia/ amphibians/ chordates/ reptiles/ vertebrates
Abstract: We examined the immediate, landscape-scale impacts of even-aged and uneven-aged forest management on the species composition, species richness, and relative abundance of herpetofaunal communities and selected focal groups of species during the second and third years following initial tree harvest on Missouri Ozark Forest ' Ecosystem Project (MOFEP) sites in southern Missouri. We compared these measures of the pre-treatment (1992-1995) community to measures of the 1998 and 1999 post-treatment communities. We did not observe changes in species composition, species richness, and overall amphibian and reptile relative abundance in 1998 or 1999 because of the first-entry harvest within sites. Landscape-scale impacts also were not observed in the relative abundances of woodland salamanders (Plethodon spp.) and a group of small snakes (prairie ring-necked snake (Diaclophis punctatus arnyi), northern red-bellied snake (Storeria occipitomaculata occipitomaculata), and western smooth earthsnake (Virginia valeriae elegans)). We did observe a landscape-scale effect on pond-breeding salamanders (Ambystoma spp.) and skinks (Eumeces spp.). Even-aged and uneven-aged forest management appeared to dampen a natural oscillation in Ambystoma relative abundance estimates on southwest-facing slopes and resulted in an increase in Eumeces relative abundance on northeast-facing slopes in 1998. Potential mechanisms for these observed impacts and future analysis plans are discussed.
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1089. **Impact of forest type and management strategy on avian densities in the Mississippi Alluvial Valley, USA.**
Twedt, D. J.; Wilson, R. R.; Henne-Kerr, J. L.; and Hamilton, R. B.
Forest Ecology and Management 123(2-3): 261-274. (1999)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: agro-forestry/ avian density/ bottomland hardwood forests/ cottonwood plantations/ forest birds/ forest management effects/ silviculture/ avifauna/ density/ forest management/ species richness/ United States/ Geothlypis trichas/ Hylochichla mustelina/ Icteria virens/ Passerina cyanea/ Populus deltoides/ Vireo griseus
Abstract: Avian territory densities were determined from 20 Breeding Bird Censuses in mature (>30 years) bottomland hardwood stands and 18 Breeding Bird Censuses in young (6-9 years old) cottonwood (Populus deltoides) plantations in the Mississippi Alluvial Valley. Avian species richness, diversity, and territory density were greater ($p < 0.01$) in bottomland hardwood stands than in intensively-managed cottonwood stands but these parameters were not impacted by selective timber harvest within bottomland hardwood stands nor by method of regeneration within cottonwood plantations ($p > 0.05$). Even so, detrended correspondence analysis based on avian territory densities readily segregated forest types and silvicultural treatments. Timber harvest within bottomland hardwood stands resulted in a shift in bird communities toward those found in cottonwood stands by increasing the densities of early-successional species such as Indigo Bunting (Passerina cyanea), Yellow-breasted Chat (Icteria virens), and Common Yellowthroat (Geothlypis trichas). Conversely, regenerating cottonwood stands from root sprouts; rather than planting stem cuttings, resulted in a shift in bird communities toward those found in bottomland hardwood stands by increasing densities of species such as White-eyed Vireo (Vireo griseus) and Wood Thrush (Hylocichla mustelina). Tree species diversity, angular canopy cover, and midstory density were positively associated with bird species assemblages in bottomland hardwood stands, whereas vegetation density at ground level was positively associated with bird communities in cottonwood plantations. Conversion of agricultural fields to short-rotation cottonwood plantations results in increased breeding bird populations by adding up to 140 additional territories 40 ha^{-1}. Even so, relative conservation values, derived from indicator species analysis and Partners in Flight concern scores, suggest that mature bottomland hardwood forests are twice as 'valuable' for bird conservation as are cottonwood plantations.
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1090. **The impact of the timing of brush management on the nutritional value of woody browse for moose, Alces alces.**
Rea, Roy V. and Gillingham, Michael P.
Journal of Applied Ecology 38(4): 710-719. (2001)
NAL Call #: 410 J828; ISSN: 0021-8901
Descriptors: commercial activities/ nutrition/ diet/ land and freshwater zones/ Canada/ Alces alces (Cervidae): forestry/ brush management timing/ food plants/ Salix scouleriana (Scouler's willow)/ woody browse/ nutritional value/ British Columbia/ Vanderhoof/ Cervidae/ Artiodactyla, Mammalia/ chordates/ mammals/ vertebrates
Abstract: 1. We examined how the removal of above-ground biomass (mechanical brushing) at different times of the year affected the nutritional value of regenerating shoots of Scouler's willow Salix scouleriana for moose for two winters after brushing. 2. Brushing trials were conducted throughout the 1996 and 1997 growing seasons in central British Columbia on a 10-year-old regenerating clear-cut replanted in lodgepole pine Pinus contorta var. latifolia. 3. We assessed the nutritional value of the browse in relation to length, diameter, mass, digestible energy, digestible protein, tannin and lignin content of current annual growth shoots in winter, as well as the phenology of plant leafing. 4. One winter after brushing, willows brushed in early July had shoots that were lower in lignin, higher in digestible protein and lower or not different in tannin content compared with shoots from earlier brushed or unbrushed willows. Willows brushed in early July also had long, heavy, shoots that were high in digestible energy and delayed leaf senescence. 5. In the second winter after brushing, willows that were brushed in July had larger shoots that were lower in digestible energy, digestible protein, tannin and lignin content and delayed leaf senescence compared with several other treatments. Willows brushed after July regenerated negligible shoot material in the first year after brushing. Willows brushed in September delayed leaf flush in the first post-brushing spring. 6. To increase the nutritional value of woody browse for cervids, we suggest that brushing should be performed in early to mid-July (mid-summer). 7. Reductions in browse quality and quantity may negatively affect many mammalian species. Therefore, we recommend that the needs of other fauna potentially affected by changes in shrub architecture, shoot morphology and shoot chemistry be considered when planning the timing of brush management activities.
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1091. **Impact of timber harvest on species accumulation curves for oak herbivore communities of the Missouri Ozarks.**
Marquis, Robert J.; Forkner, Rebecca; Lill, John T.; and Le Corff, Josiane
In: Proceedings of the Second Missouri Ozark Forest Ecosystem Project Symposium: Post-treatment Results of the Landscape Experiment, General Technical Report-NC 227/ Shifely, S. R. and Kabrick, J. M.; St. Paul, MN: North Central Forest Experiment Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 183-195.
Notes: 0363-616X (ISSN).
Descriptors: conservation measures/ nutrition/ diet/ parasites diseases and disorders/ hosts/ ecology/ community structure/ land zones/ Insecta: habitat management/ forest management/ timber harvest methods/ oak herbivore diversity/ food plants/ Quercus alba/ Quercus velutina/ herbivore diversity/ plant hosts/ species diversity/ Missouri/ Ozarks/ Insecta/ arthropods/ insects/ invertebrates
Abstract: We report the effects of two timber harvest methods, even-aged and uneven-aged harvest, versus no harvest on species accumulation curves for leaf-chewing herbivores of Quercus alba and Q. velutina in the Missouri Ozarks. The study was part of a larger project, the Missouri Ozark Forest Ecosystem Project (MOFEP). Herbivores were sampled four times during the year (early May, June, July, and late August) for each of 4 years after cutting. Species accumulation curves were generated by plotting the total number of species recorded per leaf area sampled in all stands (N=6 stands/site) within a site in May 1997, the first census of the first year following cutting, and then adding the number of new species encountered in each subsequent census through the end of 2000, Treatment effects first became apparent in 1998. Uneven-aged management tended to reduce the rate of species accumulation across years for Q. alba compared to no harvest (control) and even-aged management, although marginally so. In contrast, even-aged management significantly increased the rate of species accumulation on Q. velutina compared to no harvest, with uneven-aged curves lower than no harvest. The May and June censuses contributed most to the treatment effect for Q. alba and Q. velutina, respectively. We interpret these results to mean that the treatments either increased or decreased population size relative to controls, thus resulting in an increased or decreased probability, respectively, of sampling a species. Species accumulation curves were lower for younger forests, suggesting that continued cutting, regardless of harvesting method, will reduce species richness of this herbivore fauna.
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1092. **Impacts of alternative timber harvest practices on leaf-chewing herbivores of oak.**
Forkner, Rebecca E.; Marquis, Robert J.; Lill, John T.; and Le Corff, Josiane
Conservation Biology 20(2): 429-440. (2006)
NAL Call #: QH75.A1C5; ISSN: 0888-8892
Descriptors: commercial activities/ conservation measures/ nutrition/ diet/ ecology/ population dynamics/ terrestrial habitat/ land zones/ Lepidoptera: forestry/ alternative timber harvest practices/ leaf chewing communities/ oak forests/ habitat management/ food plants/ Quercus alba/ Quercus vetulina/ community structure/ population density/ forest and woodland/ Missouri/ Ozark Forest/ Insecta/ arthropods/ insects/ invertebrates/ lepidopterans
Abstract: Studies of the effects of logging on Lepidoptera rarely address landscape-level effects or effects on larval, leaf-feeding stages. We examined the impacts of uneven-aged and even-aged logging on the abundance, richness, and community structure of leaf-chewing insects of white (Quercus alba L.) and black (Q. velutina L.) oak trees remaining in unharvested areas by sampling 3 years before and 7 years after harvest. After harvest, white oaks in uneven-aged sites had 32% fewer species of leaf-chewing insects than control sites. This reduction in species richness may have resulted from changes in microclimate (reducing plant quality and/or changing leaf phenology) that affected a much larger total area of each site than did even-aged cuts. For black oak after harvest, species richness in uneven- and even-aged sites increased relative to levels before harvest. Harvesting did not alter total insect density

or community structure in the unlogged habitat for either oak species with one exception: insect density on black oak increased in the oldest forest block. Community structure of herbivores of black and white oaks in clearcut gaps differed from that of oaks in intact areas of even-aged sites. Furthermore, both richness and total insect density of black oaks were reduced in clearcut gaps. We suggest that low-level harvests alter herbivore species richness at the landscape level. Treatment effects were subtle because we sampled untreated areas of logged landscapes, only one harvest had occurred, and large temporal and spatial variation in abundance and richness existed. Although the effects of logging were greater in uneven-aged sites, the effects of even-aged management are likely to increase as harvesting continues.
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1093. **Impacts of land management practices on a population of nine-banded armadillos in northern Florida.**
McDonough, C. M. and Loughry, W. J.
Wildlife Society Bulletin 33(4): 1198-1209. (2005)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: armadillo/ Dasypus novemcinctus/ fire/ Florida/ hardwood removal
Abstract: Over a 12-year period (1992-2003), we examined the impact of prescribed burning and hardwood removal on a population of nine-banded armadillos (Dasypus novemcinctus) located at Tall Timbers Research Station just north of Tallahassee, Florida. Although these armadillos are often found in close proximity to humans, there currently are no data on how they are affected by human impacts on the environment. Responses to annual burns between 1992-1997 indicated that in some years armadillos, particularly adults, avoided areas that had been burned, but effects were inconsistent and relatively weak. In contrast, hardwood removal during 1998-2000 coincided with a significant decline in population numbers that continued through 2003. However, interpretation of hardwood removal effects was complicated by the occurrence of a severe drought during the same time period. Comparisons between animals in logged and unlogged parts of the study area during the period of hardwood removal revealed few differences, suggesting drought was an important influence. However, because our population continued to decline after the drought ended, it seems likely that hardwood removal generated more persistent effects that were temporarily masked by the drought. We observed armadillos frequently in logged areas, probably because few other habitat choices were available. Armadillos weighed less during and after hardwood removal than prior to it. Although adult reproductive behavior appeared largely unaffected by logging, numbers of juveniles captured and recruited declined significantly with the onset of hardwood removal. There was no evidence that the disturbance from logging caused increases in distances moved by animals that remained in the study area. Our results may have broader implications for predicting how armadillo populations in Latin America will be affected by similar land management practices.
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1094. **Implementing the expanded prescribed fire program on the Gila National Forest, New Mexico: Implications for snag management.**
Boucher, Paul F.; Block, William M.; Benavidez, Gary V.; and Wiebe, L. E.
NMOS Bulletin 29(2): 25-26. (2001).
Notes: Published by the New Mexico Ornithological Society.
Descriptors: birds/ ecosystems/ snags/ habitat management/ forests, coniferous/ ponderosa pine/ fires-burns/ wildlife-habitat relationships/ habitat use/ Pinus ponderosa/ Pinus spp./ New Mexico/ Gila National Forest
Abstract: Efforts to return natural fire to the Gila National Forest, New Mexico, have resulted in controversy regarding management of snags (standing dead trees). The importance of snags for wildlife, especially cavity-dependent birds, is well documented. Although general uses of snags by birds are known (nesting, roosting, perching, and foraging), the authors know little about the optimum number of snags that would persist under a natural fire regime. Recently, efforts were initiated to understand relationships among snags, birds, and fire in fire-adapted ponderosa pine forests of the southwestern United States. Preliminary results suggest that fire exclusion has resulted in large numbers of old snags (dead >or= six years), but few recent snags (dead < six years). In contrast, fewer old snags but more recent snags were found on areas experiencing a recent fire. Understanding snag dynamics under conditions that emulate natural fire regimes is key to understanding the ramifications of management efforts. For example, snags may need to be removed in order to hold a prescribed fire within the maximum manageable area. Although some existing snags are lost, replacement snags are created as a result of the fire. Information that details the range of variation of snag dynamics follow natural fire events may help guide key management decisions made during the fire and satisfy ecological and safety concerns.
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1095. **Importance of coarse woody debris to avian communities in loblolly pine forests.**
Lohr, S. M.; Gauthreaux, S. A.; and Kilgo, J. C.
Conservation Biology 16(3): 767-777. (2002)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1046/j.1523-1739.2002.01019.x.
Descriptors: avifauna/ coarse woody debris/ community composition/ habitat management/ habitat use/ nesting/ snag/ Aves/ Galliformes/ Melanerpes/ Melanerpes erythrocephalus/ Myiarchus/ Myiarchus crinitus/ Picidae/ Pinus taeda/ Pipilo/ Pipilo erythrophthalmus/ Thryothorus/ Thryothorus ludovicianus/ Troglodytes troglodytes
Abstract: To investigate the importance of standing (snags) and down coarse woody debris (DCWD) to bird communities in loblolly pine (Pinus taeda) forests, we compared breeding (1997-1999) and nonbreeding (1997-1998, 1998-1999) responses of birds among two coarse woody debris (CWD) removal and control treatments. In each of four blocks, we established four experimental units: (1) DCWD removed, (2) snags and DCWD removed, and (3) and (4) unmodified control plots. We quantified vegetation layers to determine their effects on the experimental outcome. Total breeding bird abundance, abundance of resident species, breeding bird diversity, breeding species richness, and abundance of Great

Crested Flycatchers (Myiarchus crinitus) were reduced by the removal of DCWD and snags. Total woodpecker and Carolina Wren (Thryothorus ludovicianus) breeding territories were reduced by snag removal Weak excavating and secondary cavity-nesting species, Neotropical migrants, and Eastern Towhees (Pipilio erythrophthalmus) had fewer breeding territories on plots where DCWD was removed. Red-headed Woodpeckers (Melanerpes erythrocephalus) and midstory and canopy-nesting species were at lowest densities on plots where all CWD had been removed. The CWD removal had no effect on the nonbreeding bird community. Most breeding and nonbreeding species used habitats with sparse midstory and well-developed understory, whereas sparse canopy cover and dense midstory were important to some nonbreeding species. Snag and DCWD retention, and practices that maintain a dense understory and sparse midstory and canopy, will create favorable breeding habitat for many bird species of loblolly pine forests.
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1096. **Importance of early successional habitat to ruffed grouse and American woodcock.**
Dessecker, D. R. and McAuley, D. G.
Wildlife Society Bulletin 29(2): 456-465. (2001)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: American woodcock/ aspen/ Bonasa umbellus/ early successional habitat/ even-age management/ Ruffed grouse/ Scolopax minor/ abundance/ forest management/ gamebird/ population decline/ United States/ Bonasa umbellus/ Scolopax minor
Abstract: Ruffled grouse (Bonasa umbellus) and American woodcock (Scolopax minor) provide of days of recreation each year for people in the eastern United States (U.S). These popular game birds depend on early successional forest habitats throughout much of the year. Ruffed grouse and woodcock populations are declining in the eastern United States as an abundance of shrub-dominated and young forest habitats decrease in most of the region. Continued decreases in early successional forest habitats are likely on nonindustrial private forest lands as ownership fragmentation increases and tract size decreases and on public forest lands due to societal attitudes toward proactive forest management, especially even-age treatments.
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1097. **Importance of patch scale vs. landscape scale on selected forest birds.**
Lee, M.; Fahrig, L.; Freemark, K.; and Currie, D. J.
Oikos 96(1): 110-118. (2002)
NAL Call #: 410 OI4; ISSN: 0030-1299
Descriptors: Aves/ abundance/ birds/ data analysis/ dispersion/ field technique/ forest/ habitat management/ Ontario/ Canada
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1098. **Increasing canopy heterogeneity to create structural and biological complexity in young, managed forests.**
Wilson, Todd M.
Northwestern Naturalist 87(2): 193. (2006)
NAL Call #: QL671.M8; ISSN: 1051-1733.
Notes: Conference: 2006 Annual Meetings of the Society for Northwestern Vertebrate Biology and the Washington Chapter of the Wildlife Society, held jointly at Evergreen State College, Washington, March 27-April 1, 2006.
Descriptors: forest management/ birds/ invertebrates/ mammals/ wildlife/ habitat management/ monitoring/ forest canopy/ thinning/ Pacific Northwest
Abstract: Young, simplified forests currently dominate much of the managed landscape in the Pacific Northwest. Increasing canopy heterogeneity through variable-density thinning (VDT) has been suggested as one way to help stimulate key ecological processes in these forests that, over time, can lead to structurally and biologically complex forests that provide habitat for a wide range of organisms, including old growth associated species like northern spotted owls (Strix occidentalis caurina). Two large-scale experimental studies, The Forest Ecosystem Study in the Puget Trough and the Olympic Habitat Development Study on the Olympic Peninsula, were initiated in the early 1990s to test this hypothesis. Treatment effects were measured by monitoring key biotic communities in 51 stands, including arboreal rodents (squirrels and chipmunks), forest-floor small mammals (mice, voles, and shrews), resident and neotropical birds, terrestrial amphibians, mycorrhizal fungi, litter invertebrates,a nd under-, mid-, and over-story vegetation. Overall results to date suggest that 1) VDT had positive or neutral effects for most (but not all) organisms two to 11 y post-thinning, 2) prior management history had a major influence on treatment effects and stand trajectories, 3) future success in accelerating complexity may depend on managing for site-specific issues such as laminated root rot and competitive exclusion by clonal natives, and 4) VDT appears promising as part of a suite of new eco-silviculture tools to create healthy forests that provide sustainable habitats for a wide range of plant and wildlife communities, including threatened and endangered species.
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1099. **Influence of a granivorous diversionary food on population dynamics of montane voles (Microtus montanus), deer mice (Peromyscus maniculatus), and western harvest mice (Reithrodontomys megalotis).**
Sullivan, T. P. and Sullivan, D. S.
Crop Protection 23(3): 191-200. (2004); ISSN: 02612194.
Notes: doi: 10.1016/j.cropro.2003.08.005.
Descriptors: deer mice/ diversionary food/ feeding damage/ Microtus/ Peromyscus maniculatus/ population dynamics/ Reithrodontomys megalotis/ Sunflower seed/ voles/ Western harvest mice/ food supplementation/ forest/ pest control/ pest damage/ population dynamics/ rodent/ British Columbia/ Canada/ North America/ summerland/ Microtus montanus/ Peromyscus maniculatus/ Pinus contorta/ Reithrodontomys megalotis
Abstract: Feeding damage to forest and agricultural crops by voles of the genera Microtus and Clethrionomys occurs periodically in temperate and boreal ecosystems. Application of diversionary food is an alternative management practice that does not rely on a reduction in the target population. This study tested two hypotheses that a granivorous diversionary food, sunflower seeds, would (1) reduce feeding damage to tree seedlings by montane voles (Microtus montanus) without enhancing abundance or other population attributes and (2) enhance population dynamics of non-target deer mice (Peromyscus maniculatus) and western harvest mice (Reithrodontomys megalotis) in old field habitats at Summerland, British Columbia, Canada in 1993-1995. Small mammal populations were intensively

live-trapped on replicate control and food sites pre- and post-treatment in two (A and B) experiments (food application rates of 68.1 and 113.5kg/ha). Mean abundance and recruitment of voles/ha were similar between control and treatment sites. Mean abundance and recruitment of deer mice was higher on treatment than control sites in Experiment B but not in A. Mean abundance and recruitment of western harvest mice was similar between control and treatment sites. Overall survival (28-day), early juvenile survival, and body mass showed no patterns for any of the species when comparing control and treatment sites. This granivorous diversionary food did not reduce feeding damage by voles to lodgepole pine (Pinus contorta) seedlings. The supply of sunflower seed was likely insufficient to divert voles from feeding on trees through the overwinter (5-6 months) period. The predicted increase in numbers of deer mice and western harvest mice appeared only as brief pulses of animals, and hence may not have increased the intensity of competition with voles.
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1100. **Influence of conventional and chemical thinning on stand structure and diversity of plant and mammal communities in young lodgepole pine forest.**
Sullivan, T. P.; Sullivan, D. S.; Lindgren, P. M. F.; and Boateng, J. O.
Forest Ecology and Management 170(1-3): 173-187. (2002)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/S0378-1127(01)00775-7.
Descriptors: glyphosate herbicide/ lodgepole pine/ pre-commercial thinning/ small mammal communities/ species diversity/ stand structure/ understory vegetation/ biodiversity/ ecosystems/ plants (botany)/ vegetation/ silviculture practices/ forestry/ habitat use/ herbivore/ mammal/ silviculture/ stand structure/ thinning/ understory/ Canada/ Alces alces/ Cervidae/ Lepus/ Lepus americanus/ Mammalia/ Odocoileus/ Odocoileus hemionus/ Pinus contorta
Abstract: Silvicultural practices that provide a wide variety of vegetative composition and structure (habitats) in young stands should help manage for biological diversity across forested landscapes. This study was designed to test the hypotheses that: (i) abundance and diversity of stand structure attributes (species diversity and structural diversity of herb, shrub and tree layers) and forest floor small mammal communities, and (ii) relative habitat use by large herbivores, will increase from unthinned to conventionally thinned to chemically thinned stands of young lodgepole pine (Pinus contorta) forest. Replicate study areas were located near Summerland, Kelowna and Williams Lake in south-central British Columbia, Canada. Each study area had three treatments: a conventionally thinned, a chemically thinned and an unthinned stand. Pre-commercial thinning was conducted in 1993. Coniferous stand structure and understory vegetation were measured prior to thinning in 1993 and 5 years later in 1998. Small mammal populations were sampled intensively from 1993 to 1998. Relative habitat use by large herbivores was sampled in 1998. Our results indicate that chemical thinning of young lodgepole pine stands produced an aggregated pattern of crop trees compared with stands subjected to conventional thinning. Diameter growth of crop trees in the chemically thinned stands was similar to that in the conventionally thinned, but also to that in unthinned stands. Although horizontal stratification (aggregates of trees) was enhanced, vertical stratification (structural diversity of vegetation) was less in the chemically than conventionally thinned stands. Abundance and diversity of understory vegetation and small mammal communities were generally unaffected by stand thinning in these particular installations. Relative habitat use by mule deer (Odocoileus hemionus) occurred in a gradient from highest in the conventionally thinned stand to lowest in the unthinned stand. Habitat use by snowshoe hares (Lepus americanus) tended to have the opposite trend. Moose (Alces alces) exhibited no difference in habitat use among stands. Thus, although there were few differences among treatment stands, chemical thinning could be used to develop an aggregated pattern of crop trees in pre-commercially thinned stands to maintain habitat for herbivores such as snowshoe hares and mule deer. Understory plant and forest floor small mammal communities would be maintained in these stands as well.
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1101. **Influence of habitat characteristics on detected site occupancy of the New Mexico endemic Sacramento Mountains salamander, Aneides hardii.**
Haan, S. S.; Desmond, M. J.; Gould, W. R.; and Ward, J. P.
Journal of Herpetology 41(1): 1-8. (2007)
NAL Call #: QL640.J6; ISSN: 00221511.
Notes: doi: 10.1670/0022-1511(2007) 41 [1:IOHCOD]2.0.CO;2.
Descriptors: salamanders/ Aneides hardii/ canopy cover/ forest management/ amphibians/ wildlife habitat/ New Mexico
Abstract: The Sacramento Mountains Salamander (Aneides hardii) is a state-listed threatened species endemic to three mountain ranges in south-central New Mexico. Information about the ecological requirements of this species is inadequate for managers to make informed conservation decisions, yet changes in management practices are needed throughout the species range because of poor forest health. During summer 2004, we examined patterns of A. hardii distribution in relation to several abiotic and biotic parameters on 36 plots, each of which was 9.6-ha in area and located in mixed conifer forest. We evaluated 18 a priori logistic regression models using Akaike's Information Criterion corrected for small-sample bias (AIC_c). The model with the highest ranking (lowest AIC_c) value) included soil moisture and soil temperature, and the second highest ranked model ($\Delta AIC_c = 0.05$) included only soil temperature. Soil temperature was lower, and soil moisture was higher on plots where salamanders were detected. The relative importance of canopy cover and log volume was low in this study likely because the study plots, all of which had sufficient canopy cover and log volume, hadsimilar disturbance history. We recommend managers focus on practices that ensure salamander microhabitats remain cool and moist in conservation areas. © 2007 Society for the Study of Amphibians and Reptiles.
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1102. **The influence of local habitat and landscape composition on cavity-nesting birds in a forested mosaic.**
Warren, T. L.; Betts, M. G.; Diamond, A. W.; and Forbes, G. J.
Forest Ecology and Management 214(1-3): 331-343. (2005)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2005.04.017.
Descriptors: cavity-nesting birds/ chickadee/ forest management/ landscape composition/ woodpecker/ biodiversity/ composition/ ecosystems/ landforms/ vegetation/ cavity-nesting/ landscapes/ sapsuckers/ woodpeckers/ forestry/ forest management/ habitat structure/ habitat use/ home range/ landscape structure/ nest site/ biodiversity/ birds/ ecosystems/ forestry/ formulations/ plants/ Aves/ Colaptes auratus/ Paridae/ Picoides pubescens/ Picoides villosus/ Sitta canadensis/ Sphyrapicus varius
Abstract: Forest management influences both stand and landscape structure. While research exists on stand-scale habitat relationships for cavity-nesting birds, there are few studies at the landscape scale. In a managed forest, we characterised the influence of local vegetation on the occurrence of cavity-nesting bird species and determined whether landscape scale variables explained any of the remaining variation. We selected three spatial extents for investigation based on the species' natural history: (1) local (100 m radius); (2) meso-scale (300 m radius); (3) macro-landscape (1000 m radius). Variables at the larger scales generally explained little of the species occurrence once we controlled for local factors. The occurrence of boreal chickadees, red-breasted nuthatches, hairy woodpeckers, and yellow-bellied sapsuckers was explained by variables solely at the local scale. Two species most commonly associated with younger stands, northern flicker and downy woodpecker, were influenced by variables at both the meso-scale and macro-landscape scales, although the amount of variance explained by the greater of these extents was small. We speculate that the comparatively strong influence of meso-scale variables may be due to the larger home range size of these two species. Sites that are appropriate at the stand level could remain unoccupied if the area of suitable habitat is not extensive enough to contain an entire home range.
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1103. **Influence of long-term dormant-season burning and fire exclusion on ground-dwelling arthropod populations in longleaf pine flatwoods ecosystems.**
Hanula, J. L. and Wade, D. D.
Forest Ecology and Management 175(1-3): 163-184. (2003)
NAL Call #: SD1.F73; ISSN: 03781127
Descriptors: arthropods/ fire/ insects/ Pinus palustris/ prescribed-burning/ biodiversity/ biomass/ ecosystems/ fires/ Shannon diversity/ forestry/ abundance/ arthropod/ burning/ exclusion experiment/ forest ecosystem/ species diversity/ wildlife management/ biomass/ ecosystems/ forest fires/ forestry/ United States/ Pinus palustris
Abstract: Frequent dormant-season prescribed bums were applied at 1-, 2- and 4-year intervals to longleaf pine stands, Pinus palustris, for over 40 years on the Osceola National Forest in Baker County, Florida. Control plots were unburned for the same period of time. Pitfall traps were operated from November 1994 to October 1999 to measure the short- and long-term effects of prescribed burning frequency on the relative abundance and diversity of ground-dwelling macroarthropods. We also measured dead and live plant biomass to determine how long-term frequent fires affected the structure of the forest floor. The average total dead plus live plant biomass was significantly higher on plots where fire had been excluded. Annual and biennial burning resulted in about the same amount of total plant biomass (dead and live plant material combined) which was significantly less than the quadrennially burned plots. Shannon diversity (H') and evenness of ground-dwelling arthropods were reduced by burning. Annually burned plots had the lowest diversity and evenness while biennially and quadrennially burned plots also were significantly lower than unburned control plots. Dormant-season burning did not increase the number of rare genera regardless of frequency. Percent similarity of arthropod communities was highest for comparisons between plots that had been burned (60-68%) and lowest for the comparison of annually burned plots to unburned controls (37%). Examination of diversity and similarity through time showed that changes were due to short-term effects caused by the application of fire and not long-term changes in the ground-dwelling arthropod community. Burning significantly reduced the numbers of predators regardless of fire frequency and resulted in an increased number of detritivores. A total of 42 genera were reduced by prescribed burning; 32 genera were captured in greater numbers on annually burned plots, and 11 genera had higher numbers in one or both of the intermediate bum frequencies (biennial or quadrennial). Twenty-six genera were captured in equal numbers on quadrennially and annually burned plots, but in significantly lower numbers than on unburned plots, demonstrating that 4 years was insufficient time for their populations to recover from mild dormant-season fires. Arthropod response to burning appeared to be species specific so attempts to generalize how arthropods will respond based on a few species or groups should be avoided. The slow recovery rate of so many species suggests that management oriented toward conservation of biodiversity in longleaf pine flatwoods should include areas of fire exclusion.
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1104. **Influence of precommercial thinning on snowshoe hares.**
Bull, E. L.; Heater, T. W.; Clark, A. A.; Shepherd, J. F.; and Blumton, A. K.
Portland, OR: Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture; Research Paper-PNW 562, 2005. 16 p.
Notes: 05025001 (ISSN).
Descriptors: fuel reduction/ Lepus americanus/ Oregon, northeastern/ snowshoe hare/ thinning/ habitat use/ home range/ lagomorph/ relative abundance/ survival/ thinning/ Lepus/ Lepus americanus/ Pinus contorta
Abstract: Relative abundance, survival, home range, and habitat use of snowshoe hares (Lepus americanus) were evaluated in five precommercial thinning treatments in lodgepole pine (Pinus contorta Dougl. ex Loud.) stands in northeastern Oregon between June 2000 and July 2003. A combination of track surveys, trapping grids, and radiocollared hares was used to evaluate these characteristics. Relative abundance of snowshoe hare tracks was highest in unthinned control stands and lowest in the recently thinned stands. The highest abundance of snowshoe hares in trapping grids occurred in patch cuts

(10-m-wide cuts interspersed with unthinned patches 10 to 30 m wide). Hare home ranges were smallest in the patch cuts. Habitat use changed seasonally, with hares using denser stands during summer and more open stands in winter. In the short term, the patch cut appeared to provide the best hare habitat of the treatments investigated.
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1105. **Influence of prescribed fire on carabid beetle (Carabidae) and spider (Araneae) assemblages in forest litter in southwestern Oregon.**
Niwa, C. G. and Peck, R. W.
Environmental Entomology 31(5): 785-796. (2002)
NAL Call #: QL461.E532; ISSN: 0046225X
Descriptors: Carabidae/ forest litter arthropods/ Oregon/ pitfall traps/ prescribed fire/ spiders/ abundance/ beetle/ forest floor/ litter/ pitfall trap/ prescribed burning/ United States/ Araneae/ Carabidae/ Coleoptera/ Omus cazieri/ Pterostichus herculaneus/ Pterostichus setosus/ Scaphinotus rugiceps/ Zacotus matthewsii
Abstract: The objective of this study was to determine if prescribed fire affects spider (Araneae) and carabid beetle (Carabidae) abundance, and whether the magnitude of this effect varies with time since fire. Within mixed conifer stands, nine understory fuels-reduction burns, ranging from <1 to 15 yr old, were compared with adjacent unburned sites. Pittfall traps were used to compare macroarthropod abundance over 5 too. In total, 3,441 spiders in 24 families and >120 species, and 14,793 carabid beetles from 17 Species, were identifed from the samples. Seven spider families and five species of carabid beetles were abundant enough to be analyzed statistically. Four spider families were more abundant in unburned sites (Antrodiaetidae, Cybaeidae, Thomisidae and Linyphiidae) while three families were more numerous in burned sites (Lycosidae, Gnaphosidae and Dictynidae). Four of five carabid beetle species were more abundant in unburned sites [Pterostichus herculaneus Mannerheim, P. setosus Hatch, Scaphinotus rugiceps rugiceps (Horn) and Zacotus matthewsii LeConte]. There was no difference found for Omus cazieri van den Berghe. No differences in species richness or diversity (Simpson, Shannon-Wiener and Berger-Parker indices) were found for spiders or carabid beetles. Overall, the relationship between abundance and time since burning was weak, with marginal significance found only for Dictynidae and Gnaphosidae. We suggest that changes in foraging substrate, prey availability or microclimatic conditions since fire may have interacted with life history characteristics to influence the abundance of these organisms. Differences in fire intensities among years may have masked patterns in arthropod abundance associated with time since burning.
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1106. **Influence of repeated fertilization on forest ecosystems: Relative habitat use by mule deer and moose.**
Sullivan, T. P.; Sullivan, D. S.; Lindgren, P. M. F.; and Ransome, D. B.
Canadian Journal of Forest Research 36(6): 1395-1406. (2006)
NAL Call #: SD13.C35; ISSN: 00455067.
Notes: doi: 10.1139/X06-033.
Descriptors: mule deer/ moose/ thinning/ forest management/ wildlife habitat/ British Columbia/ Canada
Abstract: This study was designed to test the hypothesis that large-scale precommercial thinning (PCT) and repeated fertilization of young lodgepole pine (Pinus contorta Dougl. ex Loud. var. latifolia Engelm.) stands would enhance relative habitat use by mule deer (Odocoileus hemionus Rafinesque) and moose (Alces alces L.) in summer and winter periods, compared to that in mature and old-growth stands. Replicate study areas were located near Summerland, Kelowna, and Williams Lake in south central British Columbia, Canada. Each study area had a range of PCT densities, with and without fertilization, and mature and old-growth stands. Habitat use in summer and winter was measured by pellet-group counts of deer and moose from 1999 to 2003, 6-10 years after the onset of treatments. During summer months, habitat use by deer was enhanced by PCT with fertilization, and the 1000 stems/ha fertilized stands experienced greater use than the unthinned or mature stands. Winter habitat use by deer was similar in the 1000 stems/ha fertilized stands and old-growth stands. In both summer and winter, moose preferred fertilized to unfertilized stands and low-density to high-density stands. Intensive management of young lodgepole pine forests has considerable potential to develop summer and winter ranges for these ungulates.
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1107. **Influence of repeated fertilization on forest ecosystems: Relative habitat use by snowshoe hares (Lepus americanus).**
Sullivan, T. P.; Sullivan, D. S.; Lindgren, P. M. F.; and Ransome, D. B.
Canadian Journal of Forest Research 36(9): 2080-2089. (2006)
NAL Call #: SD13.C35; ISSN: 00455067.
Notes: doi: 10.1139/X06-093.
http://article.pubs.nrc-cnrc.gc.ca/RPAS/RPViewDoc?_handler_=HandleInitialGet&calyLang=eng&journal=cjfr&volume=36&articleFile=x06-093.pdf
Descriptors: snowshoe hares/ Lepus americanus/ wildlife habitat/ forest management/ thinning/ British Columbia/ Canada
Abstract: This study was designed to test the hypothesis that large-scale precommercial thinning (PCT) and repeated fertilization of lodgepole pine (Pinus contorta Dougl. ex Loud. var. latifolia Engelm.) would enhance relative habitat use by snowshoe hares (Lepus americanus Erxleben) in managed stands. Study areas were located near Summerland, Kelowna, and Williams Lake in south-central British Columbia, Canada. Each study area had nine treatments: four pairs of stands thinned to densities of 250, 500, 1000, and 2000 stems/ha, with one stand of each pair fertilized five times at 2-year intervals, and an unthinned stand. Understory vegetation and relative habitat use by snowshoe hares were measured annually from 1999 to 2003, 6-10 years after the onset of treatments. Mean crown volume index of herbs was significantly higher in fertilized than unfertilized stands, but density had no effect. Shrub volume was not affected by either treatment. Mean crown volume index of trees was significantly greater in the fertilized and high-density stands. Mean total richness of vascular plants was significantly reduced by fertilization. Mean total structural diversity of vegetation was highest in the low-density stands but was not affected by fertilization. Relative habitat use by hares, based on fecal pellet counts,

was highest in the 2000 stems/ha and unthinned stands in summer. This pattern also occurred in winter when hare use was higher in fertilized than unfertilized stands. Overall, fertilized 2000 stems/ha stands provided habitat for hares to a degree comparable with unthinned stands of lodgepole pine. © 2006 NRC.
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1108. **Influence of surrounding vegetation on woodpecker nest tree selection in oak forests of the Upper Midwest, USA.**
Adkins Giese, C. L. and Cuthbert, F. J.
Forest Ecology and Management 179(1-3): 523-534. (2003)
NAL Call #: SD1.F73; ISSN: 03781127
Descriptors: cavity nesting birds/ dead standing trees/ nest trees/ woodpeckers/ forestry/ functions/ harvesting/ mathematical models/ timber/ vegetation/ nesting/ ecology/ Populus tremuloides
Abstract: This study examined the influence of forest context on woodpecker nest tree selection, which has implications for forest managers leaving trees during timber harvest for cavity nesting birds. We surveyed habitat variables in 11.3 m radius subplots centered on 165 active woodpecker nest trees and 144 randomly selected points in oak forests of southeastern Minnesota and western Wisconsin in 1997-1998. Forward stepwise sequential F-tests indicated that the number of potential nest trees and basal area (BA) of dead elms were the most important variables in distinguishing nest sites and random sites. Discriminant function analysis correctly classified 71% of the observations. However, a comparison of nest sites only to those random sites containing a tree likely suitable for nesting showed no differences. This suggests that nest tree has a greater influence in nest site selection than does surrounding vegetation. Yellow-bellied sapsucker nest trees were surrounded by a significantly higher BA of trembling aspen (Populus tremuloides) and density of mast-producing trees than the nest trees of the downy, hairy, red-bellied, red-headed, and pileated woodpeckers, and the northern flicker. However, we found no interspecific differences among downy, hairy, red-bellied, and red-headed woodpeckers. This study is significant because it indicates forest management for cavity nesting birds should focus on providing suitable nest trees within the larger forest context; vegetation immediately surrounding nest trees may have minimal influence on woodpecker nest tree selection.
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1109. **Influence of thinning of Douglas-fir forests on population parameters and diet of northern flying squirrels.**
Gomez, D. M.; Anthony, R. G.; and Hayes, J. P.
Journal of Wildlife Management 69: 1670-1682. (Oct. 2005)
NAL Call #: 410 J827
Descriptors: coniferous forests/ Pseudotsuga menziesii/ forest trees/ forest thinning/ Glaucomys/ squirrels/ forest wildlife relations/ population density/ body size/ mortality/ viability/ wildlife food habits/ fungi/ diet/ population size/ wildlife management/ Oregon/ habitat management for wildlife/ natural resources, environment, general ecology, and wildlife conservation/ animal ecology and behavior/ forestry related/ forestry production artificial regeneration
This citation is from AGRICOLA.

1110. **Influences of hardwood stand area and adjacency on breeding birds in an intensively managed pine landscape.**
Turner, J. Chris; Gerwin, John A.; and Lancia, Richard A.
Forest Science 48(2): 323-330. (2002)
NAL Call #: 99.8 F7632; ISSN: 0015-749X
Descriptors: forestry practices/ habitat alterations/ terrestrial ecology/ forest interior/ hardwood stand area/ intensively managed pine landscape/ mature hardwood stands/ pine matrix/ forests/ ecosystems/ habitat management/ lower coastal plain/ managed pinewoods/ South Carolina/ wildlife-human relationships/ commercial enterprises/ conservation/ wildlife management/ disturbances/ land zones/ Pinus spp.
Abstract: We compared species richness, abundance, and community composition of breeding landbirds among three areal classes of mature hardwood stands within an intensively managed pine (Pinus taeda) landscape in the Lower Coastal Plain of South Carolina. We also compared these community metrics among rotation-age pines ([apprxeq]20 yr old), the pine matrix (regenerated to rotation-age pine stands comprising 50% of the landscape), and all hardwood stands regardless of area. Approximately 220 fixed-radius point counts were conducted in 1995 and 1996. Species richness (21, 23, and 25 species, respectively) within small (n = 19; 1.0-4.4 ha), medium (n = 17; 6.0-34.4 ha), and large (n = 6; 65-560 ha) hardwood islands within the pine matrix was the same, but the trend was for richness to increase with island area. Forest interior, neotropical migrants dominated all hardwood stand areas. Most species were common to all areal classes, with only a few restricted to a particular areal class. Thus, there was little evidence that these hardwood islands, embedded in a managed pine landscape context, harbored unique bird communities. Species richness (40) was greatest within the matrix of pine stands of all ages, intermediate (32) in hardwood stands, and least (27) in rotation-age pine stands. Hardwood stands supported the highest total bird densities as well as the highest densities of neotropical migrants. Pine stands hosted high densities of both resident and early successional neotropical migrants. We concluded that the presence of hardwood stands embedded within a matrix of different age classes of pine likely allowed forest-interior neotropical migrants typical of hardwood stands to "spill over" into adjacent, structurally similar pine stands and vice versa.
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1111. **Influences of herbivory and canopy opening size on forest regeneration in a southern bottomland hardwood forest.**
Castleberry, S. B.; Ford, W. M.; Miller, K. V.; and Smith, W. P.
Forest Ecology and Management 131(1-3): 57-64. (2000)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/S0378-1127(99)00200-5.
Descriptors: bottomland hardwoods/ group selection/ herbivory/ regeneration/ South Carolina/ white-tailed deer/ browsing/ canopy gap/ forest ecosystem/ herbivory/ regeneration/ relative abundance/ species diversity/ Odocoileus virginianus
Abstract: We examined the effects of white-tailed deer (Odocoileus virginianus) browsing and canopy opening size on relative abundance and diversity of woody and herbaceous regeneration in various sized forest openings in

a southern bottomland hardwood forest over three growing seasons (1995-1997). We created 36 canopy openings (gaps), ranging from 7 to 40 m in radius, by group selection timber harvest in December 1994. Fenced exclosures were constructed in the center of each gap and vegetation was sampled monthly from April to September. Plant species richness, diversity, evenness, relative abundance, and a browsing index were calculated for each gap size and for each exclosure type. Herbaceous richness, diversity, or evenness did not differ among exclosure types in any year of the study. Browsing index was higher in the controls in 1996 and 1997. Browsing index for woody species was highest in the controls in 1995 and 1997. Relative abundance of herbaceous species war highest in the 29 m gap size in 1997. Richness and diversity of woody species were lowest in the 29 m gap size in 1995 and 1996. Overall browsing rates on both woody and herbaceous vegetation were low throughout all the 3 years of the study. Low browsing rates reflect seasonal changes in habitat use by deer. Because of the low rates of browsing, vegetative differences among exclosure treatments and gap sizes likely are not attributable to deer herbivory. Other factors, such as soil disturbance, may have influenced the initial vegetative response more than herbivory or gap size.
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1112. **Initial and long-term use of inserts by red-cockaded woodpeckers.**
Saenz, D.; Conner, R. N.; Collins, C. S.; and Rudolph, D. C.
Wildlife Society Bulletin 29(1): 165-170. (2001)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: active cavity/ artificial cavity/ cavity tree/ insert cavity/ Picoides borealis/ red-cockaded woodpecker/ birds/ cavity/ management practices/ United States/ Picoides borealis
Abstract: Artificial cavities have become a standard management technique for red-cockaded woodpeckers (Picoides borealis). Seventy cavity inserts were installed in our study sites on the Angelina National Forest in eastern Texas from 1990 to 1995. Eighty-two percent of the inserts were used for at least one year. It is still too early to make a direct comparison, but it is likely that inserts will remain usable as long as natural cavities do. Inserts installed in 1990 and 1991 were 20.5 cm in height, whereas inserts installed from 1992 to 1995 were 25.5 cm in height. Larger inserts (25.5 cm) appear to remain usable for a longer time than smaller inserts (20.5 cm). Newer unused inserts are more likely to become active for the first time than older unused inserts. Similar to unused inserts, active cavities (naturally excavated and inserts) that have become inactive are less likely to be reactivated the longer they are inactive. Newness and recency of cavity use and red-cockaded woodpecker activity appear to be important factors in the attractiveness of inserts and naturally excavated cavities.
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1113. **Initial cerulean warbler response to experimental silvicultural manipulations, Desha County, Arkansas.**
Hamel, Paul B.; Staten, Mike; and Wishard, Rodney
In: Proceedings of the 13th Biennial Southern Silvicultural Research Conference, General Technical Report-SRS 92/ Connor, Kristina F.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2006. pp. 3-9.
http://www.treesearch.fs.fed.us/pubs/23305
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land zones/ Dendroica cerulea: forestry/ forestry management/ habitat management/ habitat utilization/ forestry management effects/ forest and woodland/ Arkansas/ Desha County/ Aves, Passeriformes, Parulidae/ birds/ chordates/ vertebrates
Abstract: Cerulean warbler (Dendroica cerulea (Wilson) Aves, Parulidae) is a neotropical migratory bird that has become a focus of management attention. Since 1992, we have studied breeding birds on a 54-ha site owned by Anderson-Tully Company, in Desha County, AR. In 2002, we conducted an unreplicated experiment there to assess the species' response to silvicultural manipulation within its habitat. We applied one of two sulvicultural prescriptions to randomly selected halves of the plot. Establishment criteria were that each half-plot be the same size and have had a comparable history of warbler use. Treatments were (1) a standard Anderson-Tully Company prescription designed to establish regeneration, develop existing advance regeneration, and add growth to residual sawtimber trees; and (2) a prescription designed to add growth to residual sawtimber trees and favor development of trees similar to those used by the cerulean warbler. Our initial posttreatment survey identified three cerulean warbler territories on the subplot treated with the cerulean warbler prescription and none on the other portion.
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1114. **Initial response of butterflies to an overstory reduction and slash mulching treatment of a degraded pinon-juniper woodland.**
Kleintjes, P. K.; Jacobs, B. F.; and Fettig, S. M.
Restoration Ecology 12(2): 231-238. (2004)
NAL Call #: QH541.15.R45R515; ISSN: 1061-2971
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Papilionoidea: habitat management/ Degraded pinon juniper/ woodland restoration/ Initial responses to overstory reduction and slash mulching treatment/ evidence for success/ community structure/ environmental indicators/ forest and woodland/ New Mexico/ Bandelier National Monument/ Insecta, Lepidoptera, Glossata, Heteroneura/ arthropods/ insects/ invertebrates/ Lepidopterans
Abstract: Overstory reduction and slash mulching (ORSM) has been shown to be an effective means for increasing herbaceous cover and diversity in degraded pinon (Pinus edulis) and juniper (Juniperus monosperma) woodlands of northcentral New Mexico. Local fire history, tree age-class structure, and grazing records suggest that many areas now occupied by dense pinon-juniper woodlands were formerly more open, with grassy understories that supported well-developed soils and a fire regime. At Bandelier National Monument, studies are evaluating the use of ORSM treatments as a restoration management tool. In 1999 and 2001, we evaluated the effects of an ORSM treatment implemented in 1997 upon butterfly abundance and species richness between a pair of treated and control watersheds. Butterfly abundance and species richness were significantly greater on the treated watershed in both years, and these measures were correlated with significant increases in forb and grass cover in the treated watershed. Five of the 10 most common nectar and larval host plants had significantly greater cover in the treated watershed, including the legume Lotus wrightii. Our results suggest that the increased herbaceous cover resulting from an ORSM treatment of a single watershed induced a positive, initial

response by butterflies. Using butterflies as indicators of site productivity and species richness, our results suggest ORSM is a promising technique for restoring biodiversity in degraded pinon-juniper woodlands.
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1115. **Initiating uneven-aged management in longleaf pine stands: Impacts on red-cockaded woodpecker habitat.**
McConnell, W. V.
Wildlife Society Bulletin 30(4): 1276-1280. (2002)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Picoides borealis/ Piciformes/ Picidae/ longleaf pine/ Pinus palustris/ red-cockaded woodpecker/ Picidae/ forestry/ stand management/ wildlife habitat
Abstract: The United States Forest Service and other land management agencies are introducing the widespread use of group selection, a form of uneven-aged management, into stands of longleaf (Pinus palustris) and other southern pines in the southeastern United States. I compared the results of applying 2 methods of group selection in longleaf stands on the Apalachicola National Forest to the guidelines contained in the United States Fish and Wildlife Service's draft revised red-cockaded woodpecker (Picoides borealis) recovery plan. The application of a group-selection method based on residual basal area and informal area regulation (BAAR) resulted in modified red-cockaded woodpecker habitat markedly superior to the habitat modified by a method based on residual basal area, an upper diameter limit, and a factor (q) used to establish the relationship between adjacent diameter classes (BDq). Restrictions imposed by the BDq method might result in failure to obtain pine regeneration. I recommend that concerned agencies initiate a long-term and broadly based research study to determine the relative merits of the several alternative methods now being used to manage the pine forests of the Southeast.
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1116. **Integrating grouse habitat and forestry: An example using the ruffed grouse Bonasa umbellus in Minnesota.**
Zimmerman, Guthrie S.; Gilmore, Daniel W.; and Gutierrez, R. J.
Wildlife Biology 13(1): 51-58. (2007)
NAL Call #: SK351.W663; ISSN: 0909-6396
Descriptors: Galliformes/ Phasianidae/ Bonasa umbellus/ signals/ auditory sense/ drumming/ forests/ ecosystems/ forestry practices/ habitat alterations/ habitat management/ habitat use/ habitat selection/ Minnesota/ Cloquet Forestry Center/ wildlife-human relationships/ behavior/ commercial enterprises/ communication/ conservation/ wildlife management/ disturbances/ land zones/ Picea spp./ Pinus spp./ Populus ssp.
Abstract: We quantified forest stand attributes at ruffed grouse Bonasa umbellus drumming display sites to develop tree stocking guides as a tool for guiding ruffed grouse management. We estimated tree density and basal area surrounding grouse drumming sites and compared these with unused sites. We used model selection to assess predictions about whether tree density and basal area surrounding drumming sites varied by site classification (primary drumming site, alternate site, unused site) or forest type. We plotted the predicted values from the best model on tree stocking guides, which are tools commonly used by forest managers. Tree density and basal area varied by site classification and by forest type. Our results show that stem density was higher and basal area lower at both primary and alternate drumming sites compared to unused sites in all forest types. We also found that grouse sites in aspen stands had a greater stem density and lower basal area than grouse sites in pine and spruce/fir stands. Incorporating these results into a tree stocking guide suggested that management for grouse in aspen stands should attempt to maintain stands with average stem density and basal area for this species. In contrast, foresters who are managing for conifers and also wish to maintain some grouse habitat should favour wider spacing of trees in stands. Wider spacing will encourage the development of dense understory vegetation favoured by grouse as well as enhance the growth of quality saw-logs. Our study describes a method for incorporating habitat data on ruffed grouse and other wildlife into tree stocking charts, which are commonly used to facilitate management of forest stands.
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1117. **Is a "hands-off" approach appropriate for red-cockaded woodpecker conservation in twenty-first-century landscapes?**
Saenz, D.; Conner, R. N.; Rudolph, D. C.; and Engstrom, R. T.
Wildlife Society Bulletin 29(3): 956-966. (2001)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: fire-maintained ecosystems/ Picoides borealis/ red-cockaded woodpecker/ wilderness/ conservation management/ endangered species/ forest management/ population ecology/ prescribed burning/ United States/ Picoides borealis
Abstract: The endangered red-cockaded woodpecker (Picoides borealis) is well adapted to fire-maintained pine ecosystems of the southeastern United States. Management practices vary greatly among land ownerships. In some wilderness areas and state parks, a "no management" policy has eliminated use of prescribed fire, artificial cavities, and woodpecker translocation, tools that have proved effective elsewhere in recovering woodpecker populations. We compared forests with essentially "no management" to actively managed forests of similar tree ages and similar red-cockaded woodpecker population demographics. We also compared sites that had received no management in the past to the same sites after management. In every case, populations in forests that did not use state-of-the-art management for woodpeckers declined severely compared to those in managed forests. Because managed forests typically used all available management techniques concurrently, it was not possible to separate and rank effectiveness of specific management activities. One exception was the Wade Tract in Georgia, where prescribed fire was the primary activity for herbaceous layer and hardwood management in a high-density, stable woodpecker population. Wilderness areas, which are intended to be pristine places that preserve biodiversity, are losing red-cockaded woodpeckers, a keystone species in the ecosystem, at an alarming rate. Collectively, 9 groups of red-cockaded woodpeckers were present in 4 wilderness areas in Texas national forests in 1983. At the close of the millennium, only one woodpecker group remained and its continued existence is unlikely without management. The very fragmented features of

present-day landscapes and intervention by humans impair the effectiveness of natural disturbance processes, primarily growing-season fire, that historically produced and maintained open pine savannas with grass-forb herbaceous layers in the pre-Columbian forests of the southeastern U.S.; therefore, active management must be used if the red-cockaded woodpecker is to persist.
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1118. **Is forest close to lakes ecologically unique? Analysis of vegetation, small mammals, amphibians, and songbirds.**
Ellen Macdonald, S.; Eaton, B.; Machtans, C. S.; Paszkowski, C.; Hannon, S.; and Boutin, S.
Forest Ecology and Management 223(1-3): 1-17. (2006)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2005.06.017.
Descriptors: amphibians/ biodiversity/ boreal/ community composition/ forest/ forest structure/ lake/ riparian/ small mammals/ songbirds/ understory vegetation
Abstract: We compared vegetation structure, flora, and fauna in forest stands at varying distances from small lakes in the boreal mixedwood zone of Alta., Canada, with that in the surrounding upland landscape. We tested the hypothesis that lakeside riparian forest is more structurally diverse, hosts different biotic communities, and has greater floral diversity and greater abundance and richness of other biota, as compared with similar forest in areas far from open water. Lakeside forest was characterized by greater canopy cover, and aspen height and diameter (breast height) than upland forest, but absolute differences were quite small and there was no evidence of greater structural diversity. Contrary to expectations, herb richness and diversity were lower in lakeside forests and the understory community there could not be differentiated from that of upland forests. Two species of anuran amphibians [wood frog (Rana sylvatica) and boreal toad (Bufo boreas boreas)] were more abundant in forest up to 100 m from lakes than in upland areas 400-1200 m away from open water. However, differences in abundance between trapping sites in the non-forested riparian zone and sites up to 100 m into the lakeside forest were small. Use of upland habitats by amphibians (juvenile wood frog in particular) was substantial during the latter part of their active season, possibly because they used upland areas for dispersal and overwintering. The two most abundant species of small mammal [red-backed vole (Clethrionomys gapperi) and deer mouse (Peromyscus maniculatus)] were trapped less often in the non-forested riparian zone, while the meadow vole (Microtus pennsylvanicus), meadow jumping mouse (Zapus hudsonicus), and shrews (Sorex spp.) were more abundant in those areas. Abundance did not differ significantly among trap lines located in forest from 50 m to >600 m from open water. Songbird abundance and richness were higher near lakes, possibly because of the additional niches available at the forest/lake interface and increased food supply for insectivorous birds. Overall, our results did not strongly support our hypotheses concerning the ecological attributes of lakeside riparian forest. If any part of these lakeside riparian areas can be considered ecologically unique or species-rich it appears to be the non-forested riparian zone and, for birds, the natural lakeshore ecotone (~50 m into the forest). We encourage those responsible for forest management to re-think prescriptive placement of fixed-width forested buffers around all lakes, and instead consider a landscape-scale planning approach that determines the appropriate placement of uncut forest on the landscape to meet broad conservation objectives.
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1119. **Landbird community composition varies among seasons in a heterogeneous ponderosa pine forest.**
Wightman, C. S.; Germaine, S. S.; and Beier, P.
Journal of Field Ornithology 78(2): 184-194. (2007)
NAL Call #: 413.8 B534; ISSN: 02738570.
Notes: doi: 10.1111/j.1557-9263.2007.00102.x.
Descriptors: interseasonal variation/ landbird communities/ migration ecology/ Pinus ponderosa/ ponderosa pine/ species richness
Abstract: There is growing recognition of the need to conserve areas used by birds during migration, including forest and upland habitats. Because extensive thinning and burning treatments are planned for ponderosa pine (Pinus ponderosa) forests in the southwestern United States, information on the use of these forests by landbirds during migration is needed for conservation planning. We compared species richness among spring, breeding, and fall seasons at 69 points in a ponderosa pine forest to assess changes in landbird communities and the role of different ponderosa pine cover types in habitat selection among seasons. We detected a total of 64 bird species. Bird community similarity was lowest between the breeding and fall seasons and highest between the spring and breeding seasons. Twenty percent of the species detected were present exclusively in the fall and, of these, over half were Neotropical migrants. Only two species (3%) were detected exclusively during the spring. Although we found little difference in bird species similarity among vegetative cover types during the breeding season, forests that contained a deciduous component exhibited higher bird species similarity with each other than with habitats that did not include a deciduous component in spring and fall. In addition, foliage foragers dominated the community in spring and fall, and all Neotropical migrants detected exclusively in fall were found in ponderosa pine forests with a deciduous component. Our results indicate that ponderosa pine forests may be important to migrating or dispersing landbirds in autumn, especially if there is a deciduous component. © 2007 Association of Field Ornithologists.
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1120. **Landscape characteristics of northern spotted owl nest sites in managed forests of northwestern California.**
Folliard, Lee B.; Reese, Kerry P.; and Diller, Lowell V.
Journal of Raptor Research 34(2): 75-84. (2000)
NAL Call #: QL696.F3J682; ISSN: 0892-1016
Descriptors: Neotoma fuscipes/ Strix occidentalis/ strigidae/ strigiformes/ birds/ coastal habitat/ Douglas fir/ ecosystems/ endangered-threatened species/ foods-feeding/ forestry practices/ forests, coniferous/ forests, deciduous/ habitat management/ mammals/ nesting sites/ nests-nesting/ predation/ redwood/ succession/ wildlife-habitat relationships/ spotted owl/ habitat/ ecosystem/ ecological requirements/ nest/ habitat: description/ reproduction: nest structure, nest site/ success/ northern spotted owl/ dusky-footed woodrat/
California: Humboldt County

Abstract: The authors investigated vegetative and topographic characteristics of forest landscapes surrounding northern spotted owl (Strix occidentalis caurina) nest sites on managed timberlands in northwestern California. Nest sites occurred primarily in young (31-60-year old) forests of redwood (Sequoia sempervirens) and Douglas-fir (Pseudotsuga menziesii). They compared 60 northern spotted owl nest landscapes (0.8-km radius circle centered on the nest site) with 60 randomly selected landscapes. Vegetative type and age class were used to classify forest stands within the landscape. Landscape features differed between nest sites and random sites (Wilks' F = 6.073, p < 0.001) suggesting that nest-site selection was correlated with landscape level features. Nest landscapes had greater amounts of forest in the 31-45 and 46-60 year old age classes, and a greater amount of total edge. In addition, nest sites were located lower on slopes. In the study area, dusky-footed woodrats (Neotoma fuscipes) were the major prey species. Edges may provide opportunities for owls to prey on woodrats that are abundant in early seral habitats. The coastal forests of the redwood zone have unique characteristics that contribute to rapid development of northern spotted owl habitat. These include coppice growth (i.e., vegetative reproduction) of redwoods and several hardwood species, favorable growing conditions, and the occurrence of major prey species in young seral habitats. Despite differences in habitat types and age classes, northern spotted owl nestsite selection in these young, managed forests showed some consistent patterns with other portions of the owls' range.
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1121. **Landscape connectivity and biological corridors.**
Laurance, Susan G.
In: Agroforestry and biodiversity conservation in tropical landscapes/ Schroth, G. Fonseca G. A. da Harvey C. A. Gascon C. Vasconcelos H. L. Izac A. M., 2004.
Notes: 1559633565 (ISBN).
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ comprehensive zoology: forestry/ biological corridors creation to counteract habitat fragmentation/ agroforestry role/ overview/ habitat management/ forest and woodland
© Thomson Reuters Scientific

1122. **Landscape effects on breeding songbird abundance in managed forests.**
Lichstein, Jeremy W.; Simons, Theodore R.; and Franzreb, Kathleen E.
Ecological Applications 12(3): 836-857. (2002)
NAL Call #: QH540.E23 ; ISSN: 1051-0761
Descriptors: Passeriformes/ Aves/ terrestrial ecology/ partial-regression analysis/ breeding ecology/ clearcuts/ conservation biology/ habitat fragmentation/ habitat management/ land cover/ landscape composition/ landscape effects/ landscape patterns/ managed forests/ distribution/ forests/ ecosystems/ North Carolina/ Pisgah National Forest/ status/ Tennessee/ communities/ habitat use/ land zones/ birds/ abundance/ dispersion/ forest/ landscape/ habitat
Abstract: We examined the relationship between songbird relative abundance and local and landscape-scale habitat variables in two predominately mid- to late-successional managed National Forests in the southern Appalachian Mountains, USA. We used partial-regression analysis to remove correlations between habitat variables measured at different spatial scales (local habitat and square landscape regions with sides of 0.5, 1, and 2 km) and between landscape composition (proportion of different land cover types) and pattern (spatial arrangement of land cover) variables. To account for spatial autocorrelation, we used autoregressive models that incorporated information on bird abundance in the spatial neighborhood surrounding each sample point. Most species, especially Neotropical migrants, were significantly correlated with at least one landscape variable. These correlations included both composition and pattern variables at 0.5-2 km scales. However, landscape effects explained only a small amount of the variation in bird abundance that could not be explained by local habitat. Our results are consistent with other studies of songbird abundance in large managed forests that have found weak or moderate landscape effects. These studies suggest that songbird abundance in forested landscapes will primarily reflect the quantity of different habitats in the landscape rather than the spatial arrangement of those habitats. Although some studies have suggested consolidating clearcuts in large managed forests to reduce edge and landscape heterogeneity, much of the current evidence does not support this management recommendation. An important future challenge in avian conservation is to better understand how the importance of landscape effects varies in relation to (1) the amount of suitable habitat in the landscape, and (2) land use patterns at broader spatial scales.
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1123. **Landscape-level effects of forest management on bird species in the Ozarks of southeastern Missouri.**
Clawson, Richard L.; Faaborg, John; Gram, Wendy K.; and Porneluzi, Paul A.
In: Proceedings of the Second Missouri Ozark Forest Ecosystem Project Symposium: Post-treatment Results of the Landscape Experiment, General Technical Report-NC 227/ Shifely, S. R. and Kabrick, J. M.; St. Paul, MN: North Central Forest Experiment Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 147-160.
Notes: 0363-616X (ISSN).
Descriptors: conservation measures/ reproduction/ ecology/ population dynamics/ terrestrial habitat/ land zones/ habitat management/ forest mangement/ population density/ reproductive success/ reproductive productivity/ Missouri/ Ozarks/ Aves/ birds/ chordates/ vertebrates
Abstract: This study was designed as an experiment to test how bird populations in an extensively forested landscape respond to small (group and single-tree selection) and large (clearcut) openings. Our objectives are to test the landscape-level effects of even-aged and uneven-aged forest management relative to no-harvest management on population density and reproductive success for forest-interior and early-successional bird species. Pre-treatment data were gathered during the period 1991 through 1995, treatments were applied in 1996 and early 1997, and post-treatment data have been collected from 1997 through the present. Immediately following treatment, populations of forest-interior species declined on all study sites. Post-treatment, forest-interior species responded both positively and negatively to the even-aged and uneven-aged treatments. For early successional species, changes in density were positive in response to both even-aged and

uneven-aged treatment types. Neither nest predation rates nor nest parasitism rates increased following treatment. From a landscape-level perspective, our findings indicate that the short- term effects of even-aged management are mixed, positive , and negative, for forest-interior species and that the response by early-successional species is greater for even-aged than for uneven-aged management.
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1124. **A landscape perspective of bird nest predation in a managed boreal black spruce forest.**
Boulet, M.; Darveau, M.; and Belanger, L.
Ecoscience 7(3): 281-289. (2000)
NAL Call #: QH540.E366; ISSN: 1195-6860
Descriptors: Tamiasciurus hudsonicus/ Corvidae/ Passeriformes/ Perisoreus canadensis/ Aves/ behavior/ birds/ black spruce/ ecosystems/ forestry practices/ forests, boreal/ habitat alterations/ habitat management/ mammals/ nest predation/ nests-nesting/ predators/ wildlife-habitat relationships/ nestbox/ predation/ silviculture/ gray jay/ red squirrel/ cover/ Picea mariana
Abstract: Several landscape level studies have reported that bird nest predation increases as forest cover decreases. These studies have mainly been conducted in agricultural or urban regions. However, few studies have explored relationships between forest cover and nest predation in boreal forests managed for timber harvesting. In 1997 and 1998, the authors evaluated bird nest predation in a mosaic of clearcuts and forest remnants dominated by black spruce (Picea mariana [Mill.] B.S.P.) and located north of Lake Saint-Jean, Quebec. They used a 7 km x 9 km grid of sampling points to determine nest predation at four landscape scales (local vegetation, and 250 m, 500 m, and 1000 m radii around sampling points). Artificial nests (ground and arboreal) containing a common quail (Coturnix coturnix L.) egg and a plasticine egg were used to calculate predation pressure and to identify nest predators. Nest predation was high over the entire study area. Dominant predators were the gray jay (Perisoreus canadensis L.) and the red squirrel (Tamiasciurus hudsonicus Erxleben). Depredation by squirrels was influenced by local variables in 1997 and by landscape variables in 1998. In the latter case, depredation by squirrels increased as spruce cover increased. Depredation by gray jays was positively related to water body area and jack pine (Pinus banksiana Lamb.) cover. Squirrels preyed more on ground nests than on arboreal nests, while gray jays preyed almost exclusively on arboreal nests. The authors conclude that these predators probably impose different threats to different songbird species in boreal black spruce forests. Their results show that, in the short term, timber harvesting did not seem to increase predation in a boreal black spruce forest.
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1125. **Landscape-scale disturbances and changes in bird communities of boreal mixed-wood forests.**
Drapeau, Pierre; Leduc, Alain; Giroux, Jean-Franois; Savard, Jean-Pierre; Bergeron, Yves; Vickery, William L.; and Savard J. P.
Ecological Monographs 70(3): 423-444. (2000)
NAL Call #: 410 Ec72; ISSN: 0012-9615
Descriptors: Aves/ agricultural practices/ birds/ communities/ ecosystems/ forestry practices/ forests, boreal/ forests, mixed/ habitat alterations/ habitat management/ succession/ wildlife-habitat relationships/ biocenosis/ habitat change/ landscape/ silviculture/ agriculture/ settlement/ Canada/ Quebec
Abstract: Bird community response to both landscape-scale and local (forest types) changes in forest cover was studied in three boreal mixed-wood forest landscapes modified by different types of disturbances: (1) a pre-industrial landscape where human settlement, agriculture, and logging activities date back to the early 1930s, (2) an industrial timber managed forest, and (3) a forest dominated by natural disturbances. Birds were sampled at 459 sampling stations distributed among the three landscapes. Local habitat and landscape characteristics of the context surrounding each sampling station (500-m and 1-km radius) were also computed. Bird communities were influenced by landscape-scale changes in forest cover. The higher proportion of early-successional habitats in both human-disturbed landscapes resulted in significantly higher abundances of early-successional bird species and generalists. The mean number of mature forest bird species was significantly lower in the industrial and pre-industrial landscapes than in the natural landscape. Landscape-scale conversion of mature forests from mixed-wood to deciduous cover in human-disturbed landscapes was the main cause of changes in mature forest bird communities. In these landscapes, the abundance of species associated with mixed and coniferous forest cover was lower, whereas species that preferred a deciduous cover were more abundant. Variation in bird community composition determined by the landscape context was as important as local habitat conditions, suggesting that predictions on the regional impact of forest management on songbirds with models solely based on local scale factors could be misleading. Patterns of bird species composition were related to several landscape composition variables (proportions of forest types), but not to configuration variables (e.g., interior habitat, amount of edge). Overall, the authors' results indicated that the large-scale conversion of the southern portion of the boreal forest from a mixed to a deciduous cover may be one of the most important threats to the integrity of bird communities in these forest mosaics. Negative effects of changes in bird communities could be attenuated if current forestry practices are modified toward maintaining forest types (deciduous, mixed-wood, and coniferous) at levels similar to those observed under natural disturbances.
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1126. **Landscape-scale forest habitat relationships to tassel-eared squirrel populations: Implications for ponderosa pine forest restoration.**
Dodd, N. L.; Schweinsburg, R. E.; and Boe, S.
Restoration Ecology 14(4): 537-547. (2006)
NAL Call #: QH541.15.R45R515; ISSN: 10612971.
Notes: doi: 10.1111/j.1526-100X.2006.00165.x.
Descriptors: Arizona/ forest restoration/ habitat relationships/ landscape/ Pinus ponderosa/ ponderosa pine/ population dynamics/ Sciurus aberti/ tassel-eared squirrels/ thresholds
Abstract: Pinus ponderosa (ponderosa pine) forest ecosystem restoration is a growing emphasis in the southwestern United States to address over 120 years of forest structure change, decreased forest health, and increased potential for disease and wildfire. Restoration treatments replicating pre-settlement conditions may

reduce tree density by 98%, are detrimental to canopy-dependent wildlife such as tassel-eared squirrel (Sciurus aberti), particularly at the patch scale, and are of concern when applied at the landscape scale. We examined S. aberti population dynamics in north-central Arizona, U.S.A., from 1999 to 2002 at nine 280-ha sites oriented along a landscape gradient of varying proportions (4.6-99.2%) of unlogged, high-quality (HQ) habitats within a matrix of intensively thinned low-quality habitat. Our objectives were to estimate S. aberti density, juvenile recruitment, and survival across this gradient; quantify patch- and landscape-scale habitat relationships to populations; evaluate possible habitat thresholds in squirrel population response; and develop forest management recommendations. In regression models, both patch-scale and landscape-scale parameters influenced squirrel populations. At the patch scale, number of interlocking canopy trees was added most frequently, whereas the proportion of HQ habitat was the landscape-scale variable added in five of seven models. Recruitment and survival at dense, HQ plots were inversely related to number of small, sapling-sized trees. Nonlinear thresholds in density and recruitment occurred when the proportion of HQ habitat at study sites was between 24 and 42%. Our study points to the importance of maintaining HQ habitat in mesoreserves on the landscape at or above this threshold range, as well as pursing a mix of forest management prescriptions in the matrix surrounding mesoreserves to achieve wildlife, forest restoration, and fire risk reduction objectives. © 2006 Society for Ecological Restoration International.
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1127. **Large-scale management experiments in the moist maritime forests of the Pacific Northwest.**
Monserud, Robert A.
Landscape and Urban Planning 59(3): 159-180. (2002)
NAL Call #: QH75.A1L32; ISSN: 0169-2046
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ land and freshwater zones/ comprehensive zoology: forestry/ silviculture/ conservation measures/ biodiversity preservation/ habitat management/ wildlife habitat enhancement/ forest and woodland/ moist maritime forests/ conservation tools/ United States/ Pacific Northwest/ large scale forest management
Abstract: Several large, integrated forest management experiments have been initiated in the Pacific Northwest this past decade, partially in response to contentious resource management debates. Their goal is to use alternative silviculture treatments to enhance wildlife habitat, biodiversity, or the conservation of aquatic resources in a manner that is socially acceptable. Seven of these large-scale multi-resource silvicultural experiments are examined and evaluated, in light of previous experience with large-scale experiments. All seven employ randomized block designs with replicated treatment units large and practical enough to be commercially operational (most treatment units are 13-20 ha). Because the large-scale context is designed into these experiments, results can be directly interpreted at the scale of management that produced the manipulation, eliminating a change-of-scale bias common in smaller management experiments. The considerable advantages of large, operational treatments are accompanied by their own problems, however. Because of the great expense (≃US$ 106/block) and size (50-200 ha) of the experimental blocks, sample size is small (n<7 blocks) on all but one experiment. This means that statistical power (the probability of correctly rejecting the null hypothesis) will be weak across blocks. With few replicates and high variability both within and among these large-scale treatments, investigators face the possibility that differences might only be detectable at untraditionally high significance levels. A second problem with large-scale experiments is pseudoreplication (lack of independence across replicates), which results in the strength of the experimental evidence being overstated. This is a concern for three of the experiments because their blocks are located in relatively small geographic areas. Meta-analysis (a joint hypothesis test across experiments) is proposed as an effective way to increase sample size-and, therefore, power-while accounting for the different degrees of variation across studies. Looking for commonality, all seven studies are examining the effect of alternative silvicultural on both wildlife habitat and biodiversity. A test of a common hypothesis about ecosystem management would greatly increase not only the power of the test but the return on investment from these rather expensive experiments. In addition to small sample sizes, large variability, and pseudoreplication, other problems common to large-scale experiments are evident. Forest growth experiments are inherently long-term because they are dominated by slow processes with strong transient dynamics. Investigators are faced with institutional and academic demands for short-term results that not only are publishable but also can justify the large investments. The realities of the timber-sale process delayed or eliminated several blocks on at least three of the experiments. Randomization becomes a serious concern for the forest manager, because a clearcut or heavy removal treatment could be assigned to a highly visible location that might be socially unacceptable.
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1128. **Leaf-litter decomposition and macroinvertebrate communities in boreal forest streams linked to upland logging disturbance.**
Kreutzweiser, David P.; Good, Kevin P.; Capell, Scott S.; and Holmes, Stephen B.
Journal of the North American Benthological Society 27(1): 1-15. (Mar. 2008)
NAL Call #: QL141.F7
Descriptors: macroinvertebrates/ leaf litter/ forests/ forestry practices
Abstract: Leaf-litter decomposition and associated macroinvertebrate communities were compared in standardized leaf packs across forest streams in recently clearcut (n = 9) and reference (n = 12) low-order catchments on the Boreal Shield in northeastern Ontario, Canada. Logging was conducted under best management practices that included application of 30- to 100-m-wide no-harvest buffer zones on both sides of each stream. No significant differences were detected between sites in logged and reference streams for any reach- or catchment-level characteristics (except % area logged) or water-quality variables. Coarse-mesh leaf-pack mass loss was significantly lower (t-test, p = 0.003), and the ratio of fine-mesh to coarse-mesh leaf-pack mass loss was significantly higher (t-test, p = 0.008) in logged than in reference streams, but no difference in fine-mesh leaf-pack mass loss was detected between logged and reference streams. A stepwise multiple regression model of coarse-mesh leaf-pack mass loss on 15 reach- and catchment-level characteristics indicated that only logging presence/absence (r = -0.524) and average reach velocity (r = 0.397) were significantly and independently associated

with leaf-litter decomposition. Macroinvertebrate communities on leaf packs in logged streams were different from those in reference streams. Taxonomic richness was significantly lower in logged than in reference streams. A multivariate ordination and analysis of similarity separated logged from reference streams, and abundances of the 3 most discriminating taxa were significantly lower in logged than in reference streams. A multivariate BVSTEP routine indicated that macroinvertebrate community structure was most strongly associated with logging presence/absence among the suite of site characteristics. Leaf-litter decomposition and aquatic macroinvertebrate community structure were successful bioindicators of catchment logging impacts, even when logging was conducted under best management practices. Effects on litter decomposition and leaf-pack macroinvertebrate communities seem to have been caused by upland logging disturbances because riparian areas were undisturbed in logged catchments.
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1129. **Legacy retention versus thinning: Influences on small mammals.**
Wilson, Suzanne M. and Carey, Andrew B.
Northwest Science 74(2): 131-145. (2000)
NAL Call #: 470 N81; ISSN: 0029-344X
Descriptors: Clethrionomys gapperi/ Microtus oregoni/ Neurotrichus gibbsii/ Peromyscus maniculatus/ Peromyscus oreas/ Sorex monticolus/ Sorex trowbridgii/ Sorex vagrans/ communities/ ecosystems/ forestry practices/ forests, coniferous/ forests, old-growth/ habitat alterations/ habitat management/ mammals/ management/ snags/ species diversity/ succession/ wildlife/ creeping vole/ montane shrew/ Trowbridge's shrew/ southern red-backed vole/ deer mouse/ meadow mouse/ American shrew mole/ Columbian mouse/ Washington
Abstract: Management strategies for promoting late-seral attributes in second-growth forest need evaluation for their efficacy in maintaining biodiversity, including complete forest-floor, small-mammal communities. Two common strategies in the Pacific Northwest are (1) management with thinnings to promote large trees with developed understories and (2) retention of legacies, defined as live trees, logs, and snags from the preceding forest, at harvest, followed by protection but not thinnings of the new stand. The authors compared small-mammal communities resulting from >65 years of application of these strategies in the Puget Trough, Washington. They also compared these communities with the small-mammal communities found in old-growth, naturally young, and extensively managed forests elsewhere in western Washington. Forests managed with thinnings had 1.5 times the individual mammals and 1.7 times the mammal biomass of forests managed with legacies of coarse woody debris and snags - differences similar to those between old-growth and naturally young forest (1.2 times more individuals in old-growth) and old-growth and extensively managed forest (1.6 times more in old-growth). Management strategy had a profound impact on community structure, with the Columbian mouse (Peromyscus oreas), the small mammal most associated with old growth, much reduced in Puget Trough forests (absent from most stands) and the creeping vole (Microtus oregoni) (a species commonly associated with early seral stages, but found in all seral stages in Washington) third-ranked in thinned stands but seventh ranked in legacy stands. The montane shrew (Sorex monticolus) was second-ranked, after Trowbridge's shrew (S. trowbridgii), in marked contrast to codominance by the southern red-backed vole (Clethrionomys gapperi), S. monticolus, and P. oreas in old growth. Thus, neither strategy produced communities typical of late-seral forests.
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1130. **Linking shade coffee certification to biodiversity conservation: Butterflies and birds in Chiapas, Mexico.**
Mas, A. H. and Dietsch, T. V.
Ecological Applications 14(3): 642-654. (2004)
NAL Call #: QH540.E23; ISSN: 10510761
Descriptors: biodiversity/ certification/ Chiapas, Mexico/ coffee agroecosystems/ forest birds/ fruit-feeding butterflies/ intensity gradient/ market-based conservation/ shade coffee/ agricultural ecosystem/ agricultural practices/ biodiversity/ certification/ coffee/ conservation management/ ecolabeling/ ecological economics/ North America/ Aves/ Papilionoidea
Abstract: Shade coffee certification programs have emerged over the past six years to verify that coffee marketed as "shade grown" is actually grown on farms that provide higher quality habitat for biodiversity. In spite of good intentions and an increasing market, little consensus exists on whether current criteria can successfully identify coffee farms of conservation significance. This paper provides the first ecological evaluation and comparison of shade-grown coffee criteria used by major certification programs. Using vegetative data, we evaluated criteria developed by the Rainforest Alliance, the Smithsonian Migratory Bird Center (SMBC), and the Specialty Coffee Association of America across a range of coffee agroecosystems in Chiapas, Mexico, to determine which management practices each program would certify. Fruit-feeding butterflies and forest bird species found in these coffee agroecosystems were compared with nearby forest reserves as indicators of biodiversity and conservation potential. These agroecosystems fall into three categories: rustic, commercial polyculture, and shaded monoculture. The rustic system contained significantly higher fruit-feeding butterfly diversity and an avifauna more similar to that found in forest reserves than the other systems. This was also the only agroecosystem that met the criteria for all certification programs, while the shaded monoculture fell short of all sets of criteria. This suggests that certification programs are succeeding in discriminating between the extremes of shade coffee production. Certification programs differed, however, in their treatment of the intermediate, commercial polyculture systems, reflecting different philosophies for conservation in managed ecosystems. Programs promoted by SMBC use high standards that would exclude all but the most diverse commercial polyculture or rustic systems to certify only those systems that support high levels of biodiversity. The program supported by the Rainforest Alliance only excludes the shaded monoculture while engaging the others in the move toward greater sustainability. The merits of each approach should be put to rigorous debate, and their ability to contribute to biodiversity conservation should be reflected in product marketing. This study suggests that further research can provide a stronger scientific basis and independent verification for the certification of green products that claim to enhance biodiversity conservation in tropical agroecosystems.
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1131. **A literature review of management practices to support increased biodiversity in intensively managed Douglas-fir plantations.**
Zobrist, Kevin W. and Hinckley, Thomas M.
Pullman, WA: Rural Technology Initiative, 2005.
Notes: See related document at http://www.ncseonline.org/NCSSF/cms.cfm?id=683; Literature review; Final Technical Report to the National Commission on Science for Sustainable Forestry (NCSSF). http://www.ncseonline.org/ewebeditpro/items/O62F7175.pdf
Descriptors: Pseudotsuga menziesii/ Douglas fir/ biodiversity/ forest management/ management practices/ wildlife

1132. **A literature review of management practices to support increased biodiversity in intensively managed loblolly pine plantations.**
Zobrist, Kevin W.; Hinckley, Thomas M.; and Andreu, Michael G.
Pullman, WA: Rural Technology Initiative, 2005.
Notes: See related document at http://www.ncseonline.org/NCSSF/cms.cfm?id=683; Literature review; Final Technical Report to the National Commission on Science for Sustainable Forestry (NCSSF). http://www.ruraltech.org/pubs/working/ncssf/tech_c/index.asp
Descriptors: Pinus taeda/ loblolly pine/ biodiversity/ forest management/ management practices/ wildlife

1133. **Litter invertebrate responses to variable density thinning in western Washington forest.**
Schowalter, T. D.; Zhang, Y. L.; and Rykken, J. J.
Ecological Applications 13(5): 1204-1211. (2003)
NAL Call #: QH540.E23 ; ISSN: 1051-0761
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Invertebrata: habitat management/ variable density thinning/ forest/ effects on litter fauna/ community structure/ forest litter/ effects of forest thinning/ forest and woodland/ Douglas fir forest/ variable density thinning effects on litter fauna/ Litter habitat/ Washington/ Ft Lewis Military Reservation/ forest thinning effects on litter fauna/ invertebrates
Abstract: We evaluated the response of forest floor invertebrates to variable density thinning (VDT) of the Douglas-fir (Pseudotsuga menziesii (Mirb.) Franco) forest overstory at Ft. Lewis, Washington, during 2000 and 2001 (7-8 years. post-thinning). We placed pitfall traps at 8-12 random grid points in each of four thinned units and four control (unthinned) units in each of two sites (blocks) representing different management histories. Most taxa showed significant seasonal trends, with peak abundances during summer. ANOVA indicated strongly significant effects of site for 9 of 39 species and combined taxa, probably reflecting factors associated with management history; only two taxa showed significant responses to the thinning treatment or to blockxtreatment interactions. Indicator analysis revealed three spider species as potential indicators of thinning treatment. Detrended correspondence analysis (DCA) and cluster analysis for 85 species indicated that the thinning treatments altered the invertebrate assemblage in different ways, depending on initial structure. Multiresponse permutation procedure (MRPP) confirmed that species assemblages, but not combined taxa or functional groups, in treated units differed significantly from those in control units and from each other. Therefore, VDT affected forest floor invertebrates in the short term, but the effect was strongly modified by site (block) factors, especially management history. These results indicated that previous management history is an important determinant of treatment effect and that compensatory shifts in relative importance among species within functional groups may maintain ecological function during environmental changes.
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1134. **Little trees, big benefits.**
DeWitt, Bob
Missouri Conservationist 64(8)(2003); ISSN: 0026-6515
Descriptors: wildlife/ succession/ mammals/ habitat management/ forests/ forestry practices/ forest/ wildlife relationships/ food supply/ ecosystems/ ecosystem management/ birds/ Missouri
Abstract: Trees follow the same cycle of birth, growth, reproduction, and death that governs all living things. These changes during its lifetime are referred to as succession. The ability of trees to provide wildlife habitat varies throughout their life cycle. When mature trees are removed, sun reaches the soil surface and stimulates new vegetation. This new growth is made up of several types including woody plants that sprout from shoots and roots of removed trees. The period of regrowth of a forest is called regeneration, which can last up to 20 years. The regeneration stage provides many things to different species of animals. Its abundant foliage provides browse for mammals and insects. Its insects form high-protein food source for many bird species. The fruits and seeds of plants provide food for birds during fall and winter. Species that prefer areas of forest regeneration include quail, turkey, deer, and numerous songbirds. Maintaining an adequate amount of forests in the regenerative condition requires harvesting timber. Several projects are implemented to create suitable habitat for wildlife. The River Hills Forest Habitat Project, was formed to create sufficient successional habitat to increase the numbers of ruffed grouse in east central Missouri. The forest management standard is to preserve 10 percent of forest cover in regeneration condition. Woodland improvement and woody edge enhancement are the practices that can be implemented to provide young forest habitat. During woodland improvement undesirable tree species are removed. The process of woody edge enhancement creates small openings in large blocks of mature forest to stimulate forest regeneration.
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1135. **Long-term effects of even-aged management on bird communities in central Pennsylvania.**
Yahner, R. H.
Wildlife Society Bulletin 28(4): 1102-1110. (2000)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: bird community/ clearcutting/ even-aged management/ forest/ nest predation/ nesting success/ Pennsylvania/ avifauna/ brood parasitism/ community composition/ community structure/ deciduous forest/ nesting success/ predation/ wildlife management/ United States/ Pipilio erythophthalmus/ Poecile atricapillus/ Seiurus aurocapillus

Abstract: Long-term studies are a prerequisite for understanding the impacts of even-aged management on bird communities of the eastern deciduous forest. In this paper, I synthesize the results obtained from a series of studies dealing with the structure and composition of wintering and breeding bird communities and the impacts of predation and brood parasitism on avian nesting success over a 22-year period (1974-1995) on a study area affected by even-aged management in central Pennsylvania. Fourteen wintering species were noted on the study area; 8 (57%) were present on treated (managed) and reference (uncut) sectors. Species richness of wintering birds remained relatively constant over time, but trunk-bark foraging species, e.g., black-capped chickadee (Poecile atricapillus), predominated on the study area. Forty-seven breeding species were recorded on the study area; 37 (79%) occupied both sectors. Unlike in winter, species richness fluctuated widely over time, perhaps due to chance or short-term response to habitat changes created by even-aged management. Early successional species, e.g., eastern towhee (Pipilio erythrophthalmus), tended to be most common on the study area; however, as plant succession progressed, forest-interior species, e.g., ovenbird (Seiurus aurocapillus), became abundant. Nest predation declined over time, in part because of probable reductions in abundance of avian nest predators. Incidences of brood parasitism remained relatively low throughout the study period. A comprehensive, long-term study on a localized area, such as this study in central Pennsylvania, provides important insight into the effects of small-scale, even-aged management on bird communities in a managed forested landscape.
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1136. **Long-term impacts of even-aged timber management on abundance and body condition of terrestrial amphibians in northwestern California.**
Karraker, N. E. and Welsh, H. H.
Biological Conservation 131(1): 132-140. (2006)
NAL Call #: S900.B5; ISSN: 0006-3207
Descriptors: commercial activities/ conservation measures/ whole animal physiology/ ecology/ population dynamics/ terrestrial habitat/ land zones/ Amphibia: forestry/ even aged timber management/ long term impact on abundance and body condition/ habitat management/ even aged silvicultural systems/ physiological condition/ body condition/ long term impact of even aged timber management/ population size/ abundance/ forest and woodland/ abundance and body condition/ California/ Amphibia/ amphibians/ chordates/ vertebrates
Abstract: Conservation needs for amphibians in managed timberlands may differ based upon the species present and the timber harvesting methods employed. Clearcuts have been documented to be detrimental to amphibians but the impacts of associated silvicultural edges and alternative harvesting treatments are not well understood. The primary objective of this study was to determine if amphibian abundances and body condition differed in thinned forests and intact forests, and in clearcuts and associated silvicultural edges. We also examined which environmental attributes were important in explaining observed differences. We sampled clearcuts, silvicultural edges, and adjacent late-seral forests at 10 sites in northwestern California from October 1999 to July 2002. Clearcuts at these sites ranged in age from 6 to 25 years. Five of these forest stands were intact and five had been commercially thinned at least 10 years prior to our study. Amphibian abundances were similar in thinned and unthinned forests, but body condition of the most common species was lower in thinned forests. Abundances of amphibians were nearly twice as high in forests and at silvicultural edges than in clearcuts. Clearcutting at these sites appears to have affected amphibian numbers up to 25 years post-harvest, however, silvicultural edges were suitable habitats for amphibians. While commercial thinning did not reduce amphibian numbers, it is an intermediate treatment followed by clearcutting. Where conservation of amphibians is a concern, even-aged silvicultural systems may not provide the most appropriate method for maintaining viable populations on managed forestlands in the northwestern US.
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1137. **Long-term prescribed burning regime has little effect on springtails in pine stands of southern Arkansas.**
Renschin, Michele L.; Thompson, Lynne C.; and Shelton, Michael G.
In: Proceedings of the 12th Biennial Southern Silvicultural Research Conference, General Technical Report-SRS 71/ Connor, Kristina F.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2004. pp. 79-81.
http://www.treesearch.fs.fed.us/pubs/6304
Descriptors: commercial activities/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Collembola: forestry/ prescribed burning/ community structure/ prescribed burning effects/ forest and woodland/ pine forest habitat/ fire/ Arkansas/ Ashley County/ Crossett Experimental Forest/ Insecta/ arthropods/ insects/ invertebrates
Abstract: Concerns regarding the impacts of prescribed fires on faunal communities in pine stands have led to numerous studies. One soil/litter insect that may be influenced by fire is springtails, an important member of the forest floor community. A study was conducted in burned and unburned loblolly/shortleaf pine stands in southeastern Arkansas to examine whether springtail abundance, composition, and diversity were different between areas burned every 2 to 3 years over the past 20 years and areas not burned at all. Litterbags were used to collect springtails periodically over a 10-month period. Comparisons of springtail populations for the two treatments were analyzed by abundance, diversity, and similarity. A total of 5,528 individuals were collected, but only 92 percent could be identified to family; identified specimens represented 24 genera and 10 families. The prescribed fires significantly affected only one genus, Orchesella, which occurred in burned areas more frequently than in unburned areas. Springtail diversity was not affected by burning. Dendrograms based on Jaccard and Sorenson (Bray-Curtis) similarity indices showed no distinct grouping of the treatments. These results indicate that springtail populations on the sites are influenced more by other environmental factors than by prescribed fire.
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1138. **Long-term responses of ecosystem components to stand thinning in young lodgepole pine forest, Part I: Population dynamics of northern flying squirrels and red squirrels.**
Ransome, D. B.; Lindgren, P. M.; Sullivan, D. S.; and Sullivan, T. P.
Forest Ecology and Management 202(1-3): 355-367. (2004)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2004.08.002.
Descriptors: Glaucomys sabrinus/ lodgepole pine/ old-growth attributes/ population dynamics/ pre-commercial thinning/ Tamiasciurus hudsonicus/ ecosystems/ growth kinetics/ population statistics/ sampling/ late-seral forests/ population dynamics/ pre-commercial thinning/ forestry/ forest management/ old-growth forest/ population dynamics/ rodent/ thinning/ ecosystems/ forestry/ Pinus/ Sampling/ Glaucomys/ Glaucomys sabrinus/ Pinus contorta/ Sciuridae/ Tamiasciurus hudsonicus
Abstract: A new paradigm in forest management is managing second-growth forests to accelerate development of structural characteristics associated with late-seral forests. A key uncertainty is whether those wildlife species associated with these structural characteristics will respond positively to their development in thinned young seral forests. This study was designed to test the hypothesis that population dynamics (abundance, breeding condition, and survival) of northern flying squirrels (Glaucomys sabrinus) and red squirrels (Tamiasciurus hudsonicus) would be maintained at levels recorded in old-growth forests by large-scale pre-commercial thinning of young (17-27 years old) lodgepole pine (Pinus contorta) forests. Replicated study areas were located near Penticton, Kamloops, and Prince George in south-central British Columbia, Canada. Each study area had three young pine stands thinned to densities of ~500 (low), ~1000 (medium), and ~2000 (high) stems/ha, with unthinned (4300-7600 stems/ha) and old-growth stands for comparison. Populations of G. sabrinus and T. hudsonicus were sampled intensively from 2000 to 2002 corresponding to 12-14 years after thinning. Abundance of G. sabrinus was significantly higher in the high-density stand and lowest in the low-density and unthinned stands. Intermediate densities were found in the medium-density and old-growth stands. Adult male body mass was significantly greater in old-growth than high-density stands. We failed to detect significant differences among treatments for recruitment, movement, and survival for G. sabrinus and all parameters measured for T. hudsonicus. Survival increased significantly in 2002 from previous years for G. sabrinus, while survival decreased significantly for T. hudsonicus during this period. Our results support the hypothesis that population dynamics of G. sabrinus and T. hudsonicus would be maintained at levels recorded in old-growth forests by large-scale pre-commercial thinning of young lodgepole pine forests. Abundance of G. sabrinus in high-density stands exceeded levels recorded in old-growth stands.
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1139. **Long-term responses of ecosystem components to stand thinning in young lodgepole pine forest, Part II: Diversity and population dynamics of forest floor small mammals.**
Sullivan, T. P.; Sullivan, D. S.; Lindgren, P. M.; and Ransome, D. B.
Forest Ecology and Management 205(1-3): 1-14 . (2005)
NAL Call #: SD1.F73; ISSN: 03781127
Descriptors: abundance/ Clethrionomys gapperi/ forest-floor small mammals/ lodgepole pine/ population dynamics/ pre-commercial thinning/ species diversity
Abstract: A variety of silvicultural practices may be used to diversify second-growth forests that have regenerated from clearcut harvesting. These young stands are structurally simple and amenable to practices such as variable-density and conventional thinnings to accelerate ecosystem development. This study was designed to test the hypotheses that (i) abundance and diversity of forest floor small mammals, and (ii) population dynamics (reproduction, recruitment, and survival) of the southern red-backed vole (Clethrionomys gapperi) would be maintained at levels recorded in old-growth forest, by large-scale thinning to various densities in young lodgepole pine (Pinus contorta) forest. Replicate study areas were located near Penticton, Kamloops, and Prince George in south-central British Columbia, Canada. Each study area had three stands thinned to densities of ~500 (low), ~1000 (medium), and ~2000 (high) stems/ha, with an unthinned young pine and old-growth pine stand for comparison. Forest floor small mammal communities were sampled intensively in 2000, 2001, and 2002 at 12-14-years after the pre-commercial thinning treatment. Mean total abundance of small mammals was similar among stands with the highest overall numbers recorded in 2002. Mean species richness and diversity of small mammals were similar among stands. Mean abundance of C. gapperi was similar among stands and increased significantly with time. This pattern of abundance of C. gapperi will likely be consistent except perhaps in years of high numbers when productivity of this species may be highest in old-growth forest. Reproduction, recruitment, and early juvenile survival of C. gapperi was similar among stands; Jolly-Seber summer survival was higher in the thinned than unthinned stands with no difference in winter survival among stands. Our results supported hypotheses (i) and (ii) that abundance and diversity of forest floor small mammals and the demographic attributes of C. gapperi populations would be maintained in young managed lodgepole pine stands (thinned or unthinned) at levels recorded in old-growth forest.
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1140. **Long-term responses of ecosystem components to stand thinning in young lodgepole pine forest, Part IV: Relative habitat use by mammalian herbivores.**
Sullivan, T. P.; Sullivan, D. S.; Lindgren, P. M. F.; and Ransome, D. B.
Forest Ecology and Management 240(1-3): 32-41. (2007)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2006.11.020.
Descriptors: Alces alces/ Lepus americanus/ lodgepole pine/ Odocoileus hemionus/ pre-commercial thinning/ relative habitat use

Abstract: Pre-commercial thinning (PCT) is a silvicultural practice that can provide diverse understory and overstory vegetation conditions. We tested the hypothesis that relative habitat use by snowshoe hare (Lepus americanus), mule deer (Odocoileus hemionus), and moose (Alces alces) would increase in response to enhanced abundance of herbs and shrubs, and species diversity and structural diversity of conifers, in heavily thinned (<=1000 stems/ha) stands, at 12-15 years post-thinning. Replicate study areas were located near Penticton, Kamloops, and Prince George in south-central British Columbia, Canada. Each study area had three young pine stands thinned to densities of ~500 stems/ha (low), ~1000 stems/ha (medium), and ~2000 stems/ha (high), with an unthinned young pine and old-growth pine stand for comparison. Relative habitat use, based on counts of fecal pellets and pellet-groups, was similar among the five treatment stands for hares (P = 0.24), deer (P = 0.23), and moose (P = 0.16). However, low-density stands (~500 stems/ha) had ca. 3-20 times as many deer pellet-groups, and ca. 2-4 times as many moose pellet-groups, than other stands. Low-density stands had significantly greater canopy openness, volume of shrubs <2 m, and horizontal hiding cover <1.6 m than other treatments. Relative habitat use by deer and moose was positively related to understory characteristics such as enhanced abundance of forage and security cover. These results support our hypothesis that deer and moose responded positively to enhanced volume of herbs and shrubs as well as to species diversity and structural diversity of conifers and overall vegetation in heavily thinned (<=1000 stems/ha) stands at 12-15 years post-thinning. Our results suggest that ungulate management would be enhanced if greater emphasis was placed on forage enhancement throughout the year, which differs from current management recommendations which tend to focus on winter range and snow-interception cover.
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1141. **Longleaf pine restoration: Implications for landscape-level effects on bird communities in the Lower Gulf Coastal Plain.**
Tucker, J. W.; Hill, G. E.; and Holler, N. R.
Southern Journal of Applied Forestry 27: 107-121. (May 2003)
NAL Call #: SD1.S63
Descriptors: Pinus palustris/ ecological restoration/ analysis of variance/ forest habitats/ wildlife habitats/ forest ecosystems/ ecosystem management/ wild birds/ statistical analysis/ prescribed burning/ forest plantations/ coastal forests/ Gulf of Mexico region/ Florida/ Eglin Air Force Base/ neotropical migrants/ resident birds/ migratory birds/ sandhills/ natural resources, environment, general ecology, and wildlife conservation/ forestry related
This citation is from AGRICOLA.

1142. **Managed forest landscape structure and avian species richness in the southeastern US.**
Loehle, C.; Wigley, T. B.; Rutzmoser, S.; Gerwin, J. A.; Keyser, P. D.; Lancia, R. A.; Reynolds, C. J.; Thill, R. E.; Weih, R.; White, D.; and Wood, P. B.
Forest Ecology and Management 214(1-3): 279-293. (2005)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2005.04.018.
Descriptors: avian diversity/ forest management/ landscape heterogeneity/ species accumulation curves/ biodiversity/ biomarkers/ biomass/ data acquisition/ distance measurement/ landforms/ spatial variables measurement/ watersheds/ landscapes/ species composition/ stem density/ sustainable forest programs/ forestry/ avifauna/ breeding population/ species richness/ stand structure/ biodiversity/ biomass/ birds/ forest products/ forests/ indicators/ sustainable forest management/ watersheds/ Arkansas/ Aves
Abstract: Forest structural features at the stand scale (e.g., snags, stem density, species composition) and habitat attributes at larger spatial scales (e.g., landscape pattern, road density) can influence biological diversity and have been proposed as indicators in sustainable forestry programs. This study investigated relationships between such factors and total richness of breeding birds based on data from four studies within highly forested landscapes in the southeastern United States (Arkansas, South Carolina, and West Virginia) that were managed for commercial forest products. Habitat attributes were developed from forest inventory data and other information at the stand level and in circular buffers with radii of 250, 500 m, and 1 km around each sample point. Species accumulation curves for all study sites indicated greater richness in the youngest stands, with greater landscape age heterogeneity, and with proximity of sample points to roads. However, bird richness was not related to distance to nearest water or stream density at any scale. Pine forests had the most species at two of three sites where pine forests occurred. Stand biomass and basal area were generally not predictive of avian richness. Watersheds within the Arkansas site under more intensive management showed greater bird diversity. Overall, forest management appeared to have a positive effect on total bird richness.
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1143. **Managed forests and migratory bird populations: Evaluating spatial configurations through simulation.**
Goldstein, M. I.; Corson, M. S.; Lacher, T. E.; and Grant, W. E.
Ecological Modelling 162(1-2): 155-175. (2003)
NAL Call #: QH541.15.M3E25; ISSN: 03043800
Descriptors: connectivity/ habitat fragmentation/ Industrial forestry/ neotropical migrant birds/ spatially explicit simulation/ avifauna/ ecological modeling/ forest management/ habitat fragmentation/ migratory species/ simulation/ species richness/ succession/ Pinus echinata/ Pinus taeda
Abstract: We developed a simulation model of forest succession in managed loblolly pine (Pinus taeda) short-leaf pine (Pinus echinata) plantations to explore factors that influence temporal variability in avian richness. We simulated 16 unique landscapes through a full harvest rotation (i.e. 25 years from planting to harvest). In the model, Neotropical migrant birds colonized tree stands based on habitat parameters such as vegetation type, stand size and configuration, and amount of edge. The model predicted species richness and abundance for each stand and across the landscape. Results demonstrated how stand size, stand configuration, and habitat fragmentation may play a substantial role in landscape suitability concerns for Neotropical migrant birds. An intermediate level of landscape fragmentation appeared to

decrease variation in total bird abundance and to provide greater overall species richness, the latter an important consideration when the concern lies with optimizing multiple species management.
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1144. **Managing changing landscapes on the northern prairies: Using functional groups and guilds.**
Radenbaugh, T. A.
Prairie Forum 30(1): 157-170. (2005); ISSN: 03176282
Descriptors: ecosystem function/ ecosystem management/ guild/ landscape change/ prairie/ Canada/ North America/ Aves
Abstract: This article reviews how the northern prairie landscapes have changed since European agricultural settlement at the broad ecosystem level. Society has developed a broad-scale relationship with this landscape that is complex, causal, and non-linear, and investigating human-environment interactions needs to be addressed in terms of ecological functions and hierarchies. Ecosystem functions are examined in terms of changes in both landscape level vegetation and breeding bird guilds. Human land use has increasingly sculptured the landscape to the point where society now influences all ecological levels of the region, altering not only species assemblages but also how the entire ecosystem functions. Thus, we must also look at our management of the system at the ecosystem level. Using this approach, some general strategies are outlined to manage northern prairie ecosystems, with an emphasis on using changes in biotic guilds as an overall indication of ecosystem health.
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1145. **Managing firebreak fuels to promote habitat of an imperiled moth (Massachusetts).**
Haggerty, Sarah A. and Sievert, Paul R.
Ecological Restoration 23(1): 67-68. (2005); ISSN: 1522-4740
Descriptors: conservation measures/ terrestrial habitat/ land zones/ Hemileuca maia: habitat management/ firebreak management/ Conservation implications/ woodland and scrub/ forest and woodland/ Pitch pine/ scrub oak barrens/ scrub/ Massachusetts/ Martha's Vineyard/ Insecta, Lepidoptera, Glossata, Heteroneura, Bombycoidea, Saturniidae/ arthropods/ insects/ invertebrates/ Lepidopterans
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1146. **Managing for wildlife habitat in Westside production forests.**
Harrington, Timothy B. and Nicholas, Gretchen E.
Portland, OR: Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture; General Technical Report-PNW 695, 2007. 135 p.
Notes: Meeting paper: Managing for wildlife habitat in Westside production forests, October 18, 2006, held in Vancouver, WA.
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ land zones/ comprehensive zoology: forestry/ wildlife habitat management in production forests/ managing for wildlife habitat in westside production forests/ habitat management/ forest management strategies/ forest and woodland/ production forests/ wildlife habitat management/ Pacific Northwest/ Washington/ Vancouver
Abstract: The purpose of the workshop was to provide prescriptions and guidelines for people who manage Westside forests (those west of the Cascade Mountains' crest) primarily for wood production, but because of mandate or personal preference, want to integrate wildlife values. The audience included over 150 professionals from forest industry, consulting firms, and public and tribal forest and wildlife management agencies. This proceedings includes ten papers based on oral presentations at the workshop plus a synthesis paper summarizing workshop themes, discussions, and related information. Topics include a history of wildlife management research in the Pacific Northwest, elements of habitat and how to manage for them, the challenges of appropriately implementing ecosystem management, and economic implications to private forestland owners.
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1147. **Managing forestlands for wildlife.**
Yahner, Richard H.; Mahan, Carolyn G.; and Rodewald, Amanda D.
In: Techniques for wildlife investigations and management/ Braun, C.; 6th.
Bethesda, MD: Wildlife Society, 2005; pp. 898-919.
Notes: ISBN: 0933564155.
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ comprehensive zoology: forestry/ forest management for wildlife/ habitat management/ forest and woodland/ habitat management for wildlife
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1148. **Managing forests for wildlife.**
Dickson, J. G. and Wigley, T. B.
In: Wildlife of southern forests habitat and management. Blaine, WA: Hancock House Publ., 2001; pp. 83-94.
http://www.srs.fs.usda.gov/pubs/ja/ja_dickson003.pdf
Descriptors: forest habitat/ habitat management/ riparian habitat/ edge habitat/ herbicides/ Alabama/ Arkansas/ Florida/ Georgia/ Kentucky/ Louisiana/ Mississippi/ North Carolina/ Texas/ South Carolina/ Oklahoma/ Tennessee
Abstract: In this chapter we present some information about habitat relationships and management options at a scale broader than the stand level, such as discussion of edge and streamside zones. But we treat wildlife habitat relationships primarily at the stand level, which is the basic management unit. We approach this by treating suitability of stand structure and composition for wildlife communities and present information about how common management practices affect that suitability as wildlife habitat for wildlife communities. Each species has different habitat requirements, SO conditions or manipulations that favor some species likely will be negative for others. Forest and stand suitability for wildlife should be considered in regard to alternative land uses and also how they fit into the broader landscape context. In recent years pine plantations have increased in extent in the South, there is much interest in pine plantations as wildlife habitat, and much of this chapter focuses on those relationships.
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1149. **Managing forests for wildlife and nontimber products.**
McEvoy, Thom
In: Positive Impact Forestry: A Sustainable Approach to Managing Woodlands/ McEvoy, Thom.
Washington, DC: Island Press, 2004; pp. 171-191.
NAL Call #: SD387.S87 M389 2004
Descriptors: wildlife/ forest management/ silvicultural practices/ habitat management

1150. **Managing forests with prescribed fire: implications for a cavity-dwelling bat species.**
Boyles, Justin G. and Aubrey, Doug P.
Forest Ecology and Management 222(1-3): 108-115. (2006)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: Chiroptera/ Vespertilionidae/ Nycticeius humeralis/ Microchiroptera/ environmental factors/ habits-behavior/ behavior/ canopy light penetration/ cavity-dwelling bat species/ deciduous forest management/ habitat use/ fires-burns/ forests/ ecosystems/ land zones/ Missouri/ North America/ prescribed forest burns/ radiotelemetry/ roosts/ roosting/ roosting preference/ roosting site selection/ site selection/ Taney County, Drury Conservation Area/ terrestrial ecology/ microchiroptera/ tree hole/ sleeping place/ habitat/ forest/ landscape management/ fire
Abstract: Prescribed burning is used as a restoration and management technique in many deciduous forests of eastern North America. The effects of fire have been studied on habitat selection of many vertebrate species, but no studies have reported the effect of fire on bat roosting habitat. Fire initially leads to an influx of dead and dying trees, an increase of light availability, and a decrease of canopy and sub-canopy tree density. These characteristics are beneficial to many forest-dwelling vertebrates including cavity-roosting bats. We evaluated evening bat (Nycticeius humeralis) roost-site selection at the stand-scale in order to determine roosting preferences as they relate to prescribed burning. Standard radiotelemetry techniques were used to locate evening bat roost trees. Canopy light penetration and overstory tree density were measured in both burned and unburned forests. Sixty-three trees used as roosts by both male and female evening bats were located during both the summer and winter and all 63 roosts were located in the burned portion of the study area. Canopy light penetration was higher and canopy tree density was lower in the burned forest than unburned forest. An increase in light availability may release bats from one of the constraints suggested for many forest-dwelling bat species in roost tree selection-sun-exposure. This should increase the abundance of trees with characteristics suitable for roosting and may allow bats to roost throughout the interior of the forest as opposed to only on forest edges, thereby allowing bats to roost closer to foraging grounds and possibly lessening predation rates. Lower tree density may allow for ease of flight within the forest as well as more efficient locating of roost trees. In addition, there were a significantly higher proportion of dead trees, which evening bats commonly use as roost trees, in burned forests compared to unburned forests. Prescribed burning appears to initially lead to creation or restoration of favorable cavity-dwelling bat habitat and its continual implementation perpetuates an open sub-canopy. Therefore, we suggest that prescribed rning may be a suitable tool for management of roosting habitat for cavity-roosting bats. © 2005 Elsevier B.V. All rights reserved.
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1151. **Managing habitat for dispersing northern spotted owls: Are the current management strategies adequate?**
Buchanan, J. B.
Wildlife Society Bulletin 32(4): 1333-1345. (2004)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: Section: "In My Opinion"; doi: 10.2193/0091-7648(2004)032[1333:IMOMHF]2.0.CO;2.
Descriptors: habitat management/ management practices/ raptors/ Strigiformes/ Strix occidentalis caurina
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1152. **Managing pines for wild turkeys.**
Burhans, B.
Forest Landowner 62(2): 58-59. (2003)
NAL Call #: SD144.A15F67; ISSN: 10879110
Descriptors: biodiversity/ ecosystems/ hardwoods/ harvesting/ herbicides/ timber/ prescribed fire/ understory/ forestry/ birds/ forestry/ forests/ hardwoods/ harvesting/ Pinus/ plantations/ prescribed burning/ thinning/ wildlife
Abstract: The practices used for the management of pine forests to provide a natural habitat for wild turkeys are discussed. Prescribed fire can be used as an effective tool to manage the forest understory, as thick understories are unattractive to wild turkeys. Selective herbicides can also effectively kill hardwoods and keep the understory in a pine stand open and turkey friendly. The need to maintain the forest in at least 10% openings, especially in pine dominated landscapes is also elaborated.
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1153. **Managing young upland forests in southeast Alaska for wood products, wildlife, aquatic resources, and fishes: Problem analysis and study plan.**
Wipfli, M. S.; Deal, R. L.; Hennon, P. E.; Johnson, A. C.; De Santo, T. L.; Hanley, T. A.; Schultz, M. E.; Bryant, M. D.; Edwards, R. T.; Orlikowska, E. H.; and Gomi, T.
Portland, OR: Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture; General Technical Report-PNW 558, 2002. 46 p.
Notes: 08874840 (ISSN).
http://www.fs.fed.us/pnw/pubs/gtr558.pdf
Descriptors: fish/ invertebrates/ red alder/ vegetation/ wildlife/ young-growth management/ ecosystem management/ forest management/ nitrogen fixation/ riparian forest/ trophic interaction/ United States/ Alnus/ Alnus rubra/ Aves/ Betulaceae/ Coniferophyta/ Invertebrata/ Pisces/ Riparia
Abstract: Red alder (Alnus rubra Bong.) appears to influence the productivity of young-growth conifer forests and affect the major resources (timber, wildlife, and fisheries) of forested ecosystems in southeast Alaska. We propose an integrated approach to understanding how alder influences trophic links and processes in young-growth ecosystems. The presence of red alder is expected to increase understory biomass, and aquatic, riparian, and terrestrial invertebrate abundance, providing more food for herbivores, fish, and birds. We predict that most red alder trees will die standing, and woody debris will be small and

mobile in streams. Nitrogen fixation by red alder in mixed stands may result in larger, more commercially valuable conifers. Inclusion of red alder in the regenerating stand may therefore mitigate some negative impacts of clearcutting, and may increase total wood production from the landscape.
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1154. **Measuring edge effects on nest predation in forest fragments: Do finch and quail eggs tell different stories?**
Niehaus, A. C.; Heard, S. B.; Hendrix, S. D.; and Hillis, S. L.
American Midland Naturalist 149(2): 335-343. (Apr. 2003)
NAL Call #: 410 M58
Descriptors: edge effect/ habitat fragmentation/ nest predation/ passerines/ predation risk/ Coturnix/ Poephila guttata
Abstract: Experiments assessing rates of avian nest predation often find that nests near forest edges are at high risk of predation, suggesting the importance of forest fragmentation in recent population declines of ground-nesting passerines. However, the use of quail (Coturnix spp.) eggs in nest predation experiments may confound conclusions about edge effects because only large-mouthed predators are able to consume these relatively large eggs, but both large and small-mouthed predators consume smaller passerine eggs. We directly compared predation rates on artificial nests baited with quail eggs or with zebra finch (Poephila guttata) eggs; the latter are similar in size to the eggs of many neotropical passerines. In 1998 and 1999 we placed 392 artificial ground nests at edge and interior locations in two east-central Iowa forest fragments. Predation on these nests varied with egg type (quail or finch) and location (edge or interior) and there was a significant interaction between egg type and location: predation on quail eggs was greater at edges than in the interior, whereas finch egg predation was high in both edge and interior locations. Based on tooth imprints in clay eggs, we determined that large-mouthed predators were six times more active at edges, whereas activity of small-mouthed nest predators was evenly distributed between edge and interior locations. We suggest that the use of only quail eggs can exaggerate edge effects and that finch eggs or clay eggs used in conjunction with quail eggs in artificial nests can be used to estimate relative predation rates by large- and small-mouthed predators.
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1155. **Mesocosm experiments on habitat choice by an endemic lizard: Implications for timber management.**
Tiebout, Harry M. and Anderson, Roger A.
Journal of Herpetology 35(2): 173-185. (2001)
NAL Call #: QL640.J6; ISSN: 0022-1511
Descriptors: Sceloporus woodi/ amphibians and reptiles/ behavior/ habitat use/ wildlife-habitat relationships/ habitat alterations/ forestry practices/ social behavior/ intraspecies relationships/ endemic/ habitat management
Abstract: The authors investigated the impacts of various logging practices on habitat choice by the endemic Florida scrub lizard (Sceloporus woodi) in the Florida scrub of Ocala National Forest (ONF). They used large outdoor mesocosms as a novel means to evaluate lizard preferences for habitats with different structural features produced by standard forestry practices. Captive lizards were offered a choice between two adjoining habitats (= sides of a mesocosm) created using one of two substratum treatments [SAND = 75% open. sand; WOOD = 75% coarse woody debris (CWD)] coupled with one of two insolation treatments (LIGHT = ambient sunlight; DARK = 45% ambient sunlight). The mesocosms proved to be an effective technique for evaluating lizard habitat preferences. Lizards were easily observed and remained active and healthy throughout the experiment. Sighting frequencies differed significantly among the four mesocosm sides, yielding an overall preference ranking of DARK SAND > LIGHT SAND > DARK WOOD > or = LIGHT WOOD. Analysis of sighting frequencies by treatment factors (substratum and isolation) and of dissimilarity matrices both indicated that habitat choice was based primarily on substratum composition and only weakly determined by insolation level. In addition, size- and gender-specific preferences suggest that social interactions may help shape patterns of habitat used in conjunction with individual preferences. The authors conclude that the least favored mesocosm side (LIGHT WOOD) represents a habitat type that could potentially serve as a population sink for scrub lizards and recommend several methods to reduce the accumulation of CWD or to ameliorate its potential thermal stress on lizards. In addition, the most favored mesocosm side (DARK SAND) represents a shaded sandy habitat type not currently found in ONF timber stands. They present several alternative harvesting and site preparation methods that could produce such habitats and recommend further research on their potential value for enhancing populations of scrub lizards and other open-habitat scrub endemics.
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1156. **A method for landscape analysis of forestry guidelines using bird habitat models and the Habplan harvest scheduler.**
Loehle, C.; Van Deusen, P.; Wigley, T. B.; Mitchell, M. S.; Rutzmoser, S. H.; Aggett, J.; Beebe, J. A.; and Smith, M. L.
Forest Ecology and Management 232(1-3): 56-67. (2006)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2006.05.040.
Descriptors: avian richness/ biodiversity/ extended rotations/ forest management/ habitat model/ Habplan/ harvest scheduler/ riparian zone/ sustainable forestry initiative
Abstract: Wildlife-habitat relationship models have sometimes been linked with forest simulators to aid in evaluating outcomes of forest management alternatives. However, linking wildlife-habitat models with harvest scheduling software would provide a more direct method for assessing economic and ecological implications of alternative harvest schedules in commercial forest operations. We demonstrate an approach for frontier analyses of wildlife benefits using the Habplan harvest scheduler and spatially explicit wildlife response models in the context of operational forest planning. We used the Habplan harvest scheduler to plan commercial forest management over a 40-year horizon at a landscape scale under five scenarios: unmanaged, an unlimited block-size option both with and without riparian buffers, three cases with different block-size restrictions, and a set-asides scenario in which older stands were withheld from cutting. The potential benefit to wildlife was projected based on spatial models of bird guild richness and species probability of detection. Harvested wood volume provided a measure of scenario costs, which provides an indication of

management feasibility. Of nine species and guilds, none appeared to benefit from 50 m riparian buffers, response to an unmanaged scenario was mixed and expensive, and block-size restrictions (maximum harvest unit size) provided no apparent benefit and in some cases were possibly detrimental to bird richness. A set-aside regime, however, appeared to provide significant benefits to all species and groups, probably through increased landscape heterogeneity and increased availability of older forest. Our approach shows promise for evaluating costs and benefits of forest management guidelines in commercial forest enterprises and improves upon the state of the art by utilizing an optimizing harvest scheduler as in commercial forest management, multiple measures of biodiversity (models for multiple species and guilds), and spatially explicit wildlife response models.
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1157. **Microhabitat associations of northern flying squirrels in burned and thinned forest stands of the Sierra Nevada.**
Meyer, Marc D.; Kelt, Douglas A.; and North, Malcolm P.
American Midland Naturalist 157(1): 202-211. (2007)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: Rodentia/ Sciuridae/ Glaucomys sabrinus/ California/ forest and woodland/ forestry/ habitat utilization/ Sierra Nevada, south/ commercial activities/ ecology/ land zones/ terrestrial habitat/ biogeography/ geographical range/ microhabitat association/ burned forest stand/ thinned forest stand/ control
Abstract: Prescribed burning and mechanical thinning are used to manage fuels within many western North American forest ecosystems, but few studies have examined the relative impacts of these treatments on forest wildlife. We sampled northern flying squirrels (Glaucomys sabrinus) and microhabitat variables in burned, thinned and control stands of mixed-conifer forest of the southern Sierra Nevada at the Teakettle Experimental Forest. We used this information to determine the effects of burning and thinning on the microhabitat associations of flying squirrels. Across pretreatment stands, the probability of flying squirrel capture increased with decreasing distance to a perennial creek and increasing litter depth. The probability of flying squirrel capture also was greater with increased canopy cover in thinned stands and increased litter depth in burned stands. Greater canopy cover may provide protection from predators, thicker litter layers may harbor a greater abundance of truffles, a primary food of northern flying squirrels, and creeks may provide squirrels with food sources, drinking water and nest trees. Results from this study underscore the need for more information on the effects of forest management on northern flying squirrels near the southern extent of the species' geographic range.
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1158. **Modeling habitat occupancy of orange-crowned warblers in managed forests of Oregon and Washington, USA.**
Kroll, Andrew J.; Duke, Steven D.; Runde, Douglas E.; Arnett, Edward B.; and Austin, Kelly A.
Journal of Wildlife Management 71(4): 1089-1097. (2007)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Parulidae/ Passeriformes/ Vermivora celata/ study methods/ techniques/ forests/ ecosystems/ habitat management/ habitat occupancy model/ habitat use/ Oregon/ Washington/ conservation/ wildlife management/ land zones
Abstract: As part of a habitat management planning process for commercially managed forests, we developed and evaluated habitat occupancy models for the orange-crowned warbler (Vemivora celata), a conservation priority species in Oregon and Washington, USA. We used repeated surveys to classify a random sample of managed conifer stands at the McKenzie, PeEll, and Tolt study sites in western Oregon and Washington as either occupied or unoccupied during 1994-1995. We modeled occupancy and detection probabilities as a function of stand-level habitat characteristics subject to manipulation by management activities. The best-fitting model indicated that orange-crowned warblers were 2 times (95% CI: 0.99-5.1) and 3.8 times (95% CI: 1.5-6.1) as likely to occupy a stand for every 5% increase in evergreen shrub cover and 5-m decrease in canopy lift (lit to lowest live branch), respectively. Management actions that maintain evergreen shrub cover >10% and permit development of low canopy lifts (4-10 m) should promote habitat occupancy by the orange-crowned warbler in commercial forests in western Oregon and Washington.
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1159. **Modeling potential outcomes of fire and fuel management scenarios on the structure of forested habitats in northeast Oregon, USA.**
Wales, B. C.; Suring, L. H.; and Hemstrom, M. A.
Landscape and Urban Planning 80(3): 223-236. (2007)
NAL Call #: QH75.A1L32; ISSN: 01692046
Descriptors: forest restoration/ fuels management/ habitat modeling/ Interior Northwest landscape Analysis System (INLAS)/ Lynx canadensis/ wildlife habitat
Abstract: Thinning and prescribed fire are being used extensively across the interior western United States to reduce the risk of large, severe wildfires. However, the full ecological consequences of implementing these management practices on the landscape have not been completely evaluated. We projected future vegetation trends resulting from four management scenarios and compared vegetation trends against the natural range of variability (NRV) using a state and transition model that included natural disturbances (e.g., wildfires, insect outbreaks) on a study area in northeast Oregon. We tracked the area of forests with large trees to assess potential trends of habitat for wildlife species closely associated with these forest structures and evaluated land allocations that restricted management practices on national forests (i.e., riparian and old-growth forests). We also specifically analyzed habitat available for Canada lynx (Lynx canadensis), a species listed as threatened under the USA Endangered Species Act. This included an evaluation of implementing and not implementing current management practices designed to protect Canada lynx habitat. We found that the area of forests in large-diameter (≥ 52.5 cm) trees is currently well below the estimated NRV, and that it might take >100 years to return to more natural levels regardless of the management scenario implemented. In addition, fuels management activities (i.e., thinning, prescribed fire) resulted in total area of closed-canopy large- and medium-diameter (≥ 40 cm) forests well below that predicted under a natural disturbance regime, particularly in cool-moist and cold forests.
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1160. **Modeling the influence of dynamic zoning of forest harvesting on ecological succession in a northern hardwoods landscape.**
Zollner, P. A.; Gustafson, E. J.; He, H. S.; Radeloff, V. C.; and Mladenoff, D. J.
Environmental Management 35(4): 410-425. (2005)
NAL Call #: HC79.E5E5; ISSN: 0364152X.
Notes: doi: 10.1007/s00267-003-0217-9.
Descriptors: American marten/ dynamic zoning/ LANDIS/ landscape pattern/ ruffed grouse/ simulation model/ succession/ biodiversity/ computer simulation/ ecology/ hardwoods/ harvesting/ mathematical models/ zoning/ forest harvesting/ landscape/ forestry/ ecological impact/ ecological modeling/ forest management/ succession/ timber harvesting/ ecosystem/ biodiversity/ ecology/ forest management/ hardwoods/ lumber/ mathematical models/ wildlife/ Chequamegon National Forest/ Wisconsin/ Bonasa umbellus/ Martes americana/ Populus sp.
Abstract: Dynamic zoning (systematic alteration in the spatial and temporal allocation of even-aged forest management practices) has been proposed as a means to change the spatial pattern of timber harvest across a landscape to maximize forest interior habitat while holding timber harvest levels constant. Simulation studies have established that dynamic zoning strategies produce larger tracts of interior, closed canopy forest, thus increasing the value of these landscapes for interior-dependent wildlife. We used the simulation model LANDIS to examine how the implementation of a dynamic zoning strategy would change trajectories of ecological succession in the Great Divide Ranger District of the Chequamegon-Nicolet National Forest in northern Wisconsin over 500 years. The components of dynamic zoning strategies (number of zones in a scenario and the length of the hiatus between successive entries into zones) and their interaction had highly significant impacts on patterns of forest succession. Dynamic zoning scenarios with more zones and shorter hiatus lengths increased the average amount of the forest dominated by early successional aspen (Populus sp.). Dynamic zoning scenarios with two zones produced more late successional mature northern hardwoods than scenarios with four zones. Dynamic zoning scenarios with very short (30 years) or very long (120 years) hiatus lengths resulted in more late successional mature northern hardwoods than scenarios with intermediate hiatus lengths (60 and 90 years). However, none of the dynamic scenarios produced as much late successional mature northern hardwoods as the static alternative. Furthermore, the amounts of all habitat types in all dynamic zoning scenarios fluctuated greatly in time and space relative to static alternatives, which could negatively impact wildlife species that require a stable amount of habitat above some minimum critical threshold. Indeed, implementing dynamic zoning scenarios of different designs would have both positive and negative effects on wildlife speciesand for other objectives of forest management. © 2005 Springer Science+Business Media, Inc.
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1161. **Monitoring for adaptive management in coniferous forests of the northern Rockies.**
Young, Jock S.; Hoffland, John R.; and Hutto, Richard L.
In: Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference, General Technical Report-PSW 191/ Ralph, C. J. and Rich, T. D.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2005. pp. 405-411.
Notes: 0196-2094 (ISSN).
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Aves: habitat management/ monitoring adaptive management in coniferous forest/ community structure/ population dynamics/ habitat utilization/ forest and woodland/ Coniferous forest/ monitoring adaptive management/ North America/ northern Rockies/ Aves/ birds/ chordates/ vertebrates
Abstract: Monitoring can and should be much more than the effort to track population trends; it can be a proactive effort to understand the effects of human activities on bird populations. It should be an integral part of the adaptive management process. With this in mind, the Northern Region Landbird Monitoring Program has a dual focus: (1) to monitor long-term bird population trends, and (2) to study bird-habitat relationships and management effects. By conducting permanent, longterm monitoring transects every other year, we are free to use the intervening years to study the effects of specific management activities. The coordination and funding is in place to achieve an impressive degree of replication in such studies. These alternate-year monitoring efforts have great potential to get management-orientated results into the hands of managers in the short term, so planning can be improved before long-term trends might reveal a problem. We have conducted several such projects, including the effects of partial-cut logging in coniferous forests, and the effects of grazing on willow-riparian bird communities. We discuss here another such project that we initiated in 2001, on bird responses to dry-forest restoration in the northern Rockies. Ponderosa pine (Pinus ponderosa) stands have been greatly altered from historical conditions due to logging and fire suppression. Active treatment of ponderosa pine forests to reverse historical trends is a recent management direction involving well-financed, regionally coordinated restoration efforts. The widespread distribution and abundance of planned treatments provided a unique opportunity for a controlled research design (with high replication), including pre- and post-treatment surveys. We present some preliminary results and discuss their relevance to adaptive management.
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1162. **Moth diversity in a fragmented habitat: Importance of functional groups and landscape scale in the boreal forest.**
Schmidt, B. C. and Roland, J.
Annals of the Entomological Society of America: 1110-1120. (Nov. 2006)
Descriptors: Lepidoptera/ moths/ insect communities/ species diversity/ community structure/ phytophagous insects/ ecological function/ host plants/ Malacosoma disstria/ parasitoids/ forest habitats/ boreal forests/ habitat fragmentation/ spatial variation/ forest fragmentation/ spatial scale/ landscape structure/ pests of plants insects/ forestry related/ animal ecology and behavior/ entomology related

Abstract: One of the leading concerns for both conservation biology and forestry has been how forest fragmentation affects biodiversity, and how forestry practices can be altered to mitigate diversity losses. However, the effects of habitat fragmentation on ecological functional groups within diverse taxa such as Lepidoptera are poorly known, particularly in boreal forests. We assessed landscape-level changes in moth species richness and abundance in relation to forest fragmentation, measured at multiple scales. We assessed fragmentation effects on three functional tree- and shrub-feeding species, grass- and forb-feeding species, and species that act as hosts for parasitoids of an important forest defoliator, Malacosoma disstria Hubner (Lepidoptera: Lasiocampidae). Total species richness showed a significant decline as a function of fragmentation at all measured spatial scales; both polynomial and threshold models tended to explain more variation than linear models, suggesting that there is little to no change in overall moth diversity between low and moderately fragmented stands. However, changes in diversity patterns within functional groups showed that total diversity measures may mask changes in community structure. Changes in overall diversity were driven largely by a decrease in species richness of tree- and shrub-feeding moths, although forb- and grass-feeding moths also showed marginally lower species richness at high fragmentation levels. Most species of the parasitoid host group decreased in abundance with increasing fragmentation. These findings show that overall diversity measures can mask important community changes, and that the optimal landscape scale at which these changes are measured is taxon dependent. Finally, the decrease in host availability to M. disstria parasitoids in fragmented forests may exacerbate population outbreaks of M. disstria. This citation is from AGRICOLA.

1163. **Movement patterns and relative abundance of coastal tailed frogs in clearcuts and mature forest stands.**

Matsuda, Brent M. and Richardson, John S.

Canadian Journal of Forest Research 35(5): 1131-1138. (2005)
NAL Call #: SD13.C35; ISSN: 0045-5067
Descriptors: Anura/ Leiopelmatidae/ Lissamphibia/ Ascaphus truei/ tailed frogs/ clearcutting/ forest management/ habitat management/ riparian habitat/ forestry practices

Abstract: Age-specific movements, abundance, and capture rates of coastal tailed frogs (Ascaphus truei Stejneger) were compared between clearcuts and mature forests in southwestern British Columbia, Canada, during 1998 and 1999 using pitfall traps and drift-fence arrays. Total frog abundance was similar in both habitat types. More adults were caught in mature stands than in clearcuts, but there was no significant difference for immatures. Analysis of numbers of frogs captured indicated that the direction of movement did not differ between habitat types for any age-class. Frogs were captured at similar frequencies across distance from stream in both habitats. These findings suggest that there are age-specific differences in tailed frog abundance in clearcuts along streams without riparian reserves relative to mature forests. Variation among sites had a greater influence than habitat type on the number of immatures. Low proportions of adults in clearcuts suggested that immatures may be transient or that they incurred high rates of mortality. Age-specific differences in habitat use by tailed frogs indicated that total numbers alone are insufficient to determine the effect of forest management on habitat suitability for tailed frogs.
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1164. **Movements, foraging habits, and habitat use strategies of northern woodland caribou during winter: Implications for forest practices in British Columbia.**

Johnson, Chris J.; Parker, Katherine L.; Heard, Douglas C.; and Seip, Dale R.

British Columbia Journal of Ecosystems and Management 5(1): 23-35. (2004)
NAL Call #: SD146.B7 B34; ISSN: 1488-4674.
http://www.forrex.org/JEM/ISS25/vol5_no1_art4.pdf
Descriptors: commercial activities/ conservation measures/ nutrition/ feeding behavior/ ecology/ terrestrial habitat/ land zones/ North America/ Canada/ Rangifer tarandus/ caribou: forestry/ forestry practices/ habitat management/ forest management practices/ foraging/ foraging habits/ distribution within habitat/ movements/ habitat utilization/ forest and woodland/ tundra/ British Columbia/ foraging habits and habitat use/ forestry practice implications/ forest and tundra/ Mammalia, Artiodactyla, Cervidae/ chordates/ mammals/ ungulates/ vertebrates

Abstract: Land managers face increasing challenges as they try to balance timber harvesting with the habitat requirements of wildlife, including those of woodland caribou in north-central British Columbia. With the aim of conserving caribou by improving forest practices, we employed a hierarchical, scale-explicit approach to study the processes governing movement and distribution of the northern woodland caribou ecotype. Investigations of foraging sites north of Prince George, British Columbia revealed that caribou in forested and alpine areas cratered at locations with relatively low snow depths and relatively large amounts of terrestrial lichens. When snow depth, snow hardness, and snow density increased, caribou fed more frequently at trees supporting abundant arboreal lichens. Feeding activities of caribou in forested foraging patches were positively related to the biomass of several terrestrial lichen species and to decreasing snow depth; the number of arboreal feeding sites increased as snow depth and hardness increased. We identified three scales of habitat selection based on movement rates of caribou fitted with GPS collars. For all scales, caribou selected pine-lichen woodland and windswept rocky slopes. Predation risk was greatest for caribou travelling between habitat patches, was lowest for caribou in alpine habitats, and had no apparent influence on intra-patch movements. Land use plans should address the needs of northern woodland caribou by ensuring that large patches of widely distributed pine-lichen woodland are maintained on the landscape, recognize the limiting effects of deep snow (i.e., > 50-]80 cm), and encourage silvicultural strategies that minimize the creation of early seral-stage forests adjacent to caribou movement routes.
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1165. **Movements of Allegheny woodrats in relation to timber harvesting.**
Castleberry, Steven B.; Ford, W. Mark; Wood, Petra Bohall; Castleberry, Nikole L.; and Mengak, Michael T.
Journal of Wildlife Management 65(1): 148-156. (2001)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Neotoma magister/ habits-behavior/ distribution/ food supply/ foods-feeding/ forestry practices/ habitat alterations/ land use/ mammals/ mast/ techniques/ telemetry/ wildlife-habitat relationships/ cutting/ distance/ forest practices/ habitat management for wildlife/ home range/ mast yield/ movements/ rats, wood/ statistics/ timber/ Allegheny woodrat
Abstract: The Allegheny woodrat (Neotoma magister) occurs in the Appalachian Mountains, forming colonies in rock outcrops, cliffs, and caves. Populations on the northern and western peripheries of the range have experienced drastic declines in the past 20-30 years. Dependence upon rock outcrops makes Allegheny woodrats vulnerable to land-use practices that alter habitats surrounding colonies. To examine the impacts of timber harvesting on Allegheny woodrat behavior, we radiotracked 37 adults during summer 1998 and 1999 in clearcut, diameter-limit, and intact forest stands in the central Appalachians of West Virginia. Home range size and foraging movements generally were greatest at diameter-limit sites and smallest in intact forests in 1998, following a poor mast crop. We detected no differences among harvest methods in 1999 when mast was abundant. We believe that when hard mast was scarce, woodrats increased foraging movements and home range size to locate mast or sufficient alternative foods. Additionally, woodrats used clearcut and adjacent forested areas in proportion to availability. Our results suggested that clearcutting has minimal impact on woodrat movements, home range and habitat use if sufficient intact forest is retained adjacent to colonies. Harvesting methods that selectively remove important mast-producing species may represent the greatest disturbance to Allegheny woodrats from forest management.
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1166. **Movements of female white-tailed deer (Odocoileus virginianus) in relation to timber harvests in the central Appalachians.**
Campbell, Tyler A.; Laseter, Benjamin R.; Ford, W. Mark; and Miller, Karl V.
Forest Ecology and Management 199(2-3): 371-378. (2004)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: Cervidae/ Artiodactyla/ Odocoileus virginianus/ biogeography/ clearcut habitat/ deer movement/ timber harvest/ distribution/ forests/ ecosystems/ forestry practices/ habitat alterations/ habitat management/ Randolph County/ West Virginia/ wildlife-human relationships/ commercial enterprises/ conservation/ wildlife management/ disturbances/ habitat use/ land zones
Abstract: Deer movements in relation to timber harvests have not been studied within nonmigratory white-tailed deer (Odocoileus virginianus) populations. We compared home range and core area size and overlap, deer movements during timber harvests, and habitat use before and after harvests for deer associated and not associated with clearcuts. We radio-monitored 83 adult female deer pre- (3 months prior to), during, and post- (3 months after) timber harvest. Change in home range and core area size and overlap did not differ between control deer (home ranges comprised entirely of mature forest during all time periods) and treatment deer (≥ 1 telemetry location within a harvested stand during any time period). During timber harvests, treatment deer were located outside their pre-harvest home ranges more often than control deer and generally were located closer to clearcuts than in other time periods. During both the pre- and post-timber harvest time periods, deer used clearcut habitats (stands ≤ 5 years-old) in greater proportion than availability. Lack of significant changes in white-tailed deer movements before, during, and after timber harvest suggests habitat management aimed at attracting deer away from problem areas (e.g., areas with low regeneration success) or toward browse supplies during severe winters would likely be unsuccessful in the central Appalachians of West Virginia.
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1167. **Moving towards a new paradigm for woody detritus managment.**
Harmon, Mark E.
Ecological Bulletins 49: 269-278. (2001); ISSN: 0346-6868
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ comprehensive zoology: forestry/ habitat management/ woody detritus in boreal forests/ ecological function considerations and new management paradigm/ ecology/ Importance and ecological functions of woody detritus in boreal forests/ management implications/ forest and woodland/ boreal forests/ management of woody detritus/ ecological function considerations and new approach
Abstract: Woody detritus has become an important focus of many scientific and management questions in forests. Perspectives of the role of this part of the ecosystem have greatly changed over time. Today forest managers are moving away from a “blanket” removal of all the woody detritus possible to retaining and even enhancing the amounts in forests. To understand how much woody detritus is required to sustain ecosystem functions, we need to develop a dynamic and specific objective-oriented approach. This can be based on existing data on tree mortality and decomposition, but these will have to be coupled with process and species responses to coarse wood quantities as well as a landscape perspective.
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1168. **Natural landscape features, human-related attractants, and conflict hotspots: A spatial analysis of human-grizzly bear conflicts.**
Wilson, S. M.; Madel, M. J.; Mattson, D. J.; Graham, J. M.; Burchfield, J. A.; and Belsky, J. M.
Ursus 16(1): 117-129. (2005)
NAL Call #: QL737.C27 I573; ISSN: 15376176
Descriptors: attractants/ beehives/ grizzly bear/ livestock/ management practices/ Montana/ private landowners/ ranches/ Ursus arctos
Abstract: There is a long history of conflict in the western United States between humans and grizzly bears (Ursus arctos) involving agricultural attractants. However, little is known about the spatial dimensions of this conflict and the relative importance of different attractants. This study was undertaken to better understand the spatial and functional components of conflict between humans and grizzly bears on privately owned agricultural lands in Montana. Our

investigations focused on spatial associations of rivers and creeks, livestock pastures, boneyards (livestock carcass dump sites), beehives, and grizzly bear habitat with reported human-grizzly bear conflicts during 1986-2001. We based our analysis on a survey of 61 of 64 livestock producers in our study in the Rocky Mountain East Front, Montana. With the assistance of livestock and honey producers, we mapped the locations of cattle and sheep pastures, boneyards, and beehives. We used density surface mapping to identify seasonal clusters of conflicts that we term conflict hotspots. Hotspots accounted for 75% of all conflicts and encompassed approximately 8% of the study area. We also differentiated chronic (4 or more years of conflicts) from non-chronic hotspots (fewer than 4 years of conflict). The 10 chronic hotpots accounted for 58% of all conflicts. Based on Monte Carlo simulations, we found that conflict locations were most strongly associated with rivers and creeks followed by sheep lambing areas and fall sheep pastures. Conflicts also were associated with cattle calving areas, spring cow-calf pastures, summer and fall cattle pastures, and boneyards. The Monte Carlo simulations indicated associations between conflict locations and unprotected beehives at specific analysis scales. Protected (fenced) beehives were less likely to experience conflicts than unprotected beehives. Conflicts occurred at a greater rate in riparian and wetland vegetation than would be expected. The majority of conflicts occurred in a small portion of the study area, where concentrations of attractants existed that overlapped with bear habitat. These hotspots should be the target of management and conservation efforts that focus on removing or protecting attractants using non-lethal techniques.
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1169. **Nest box use and productivity of great crested flycatchers in prescribed-burned longleaf pine forests.**
White, Donald H. and Seginak, John T.
Journal of Field Ornithology 71(1): 147-152. (2000)
NAL Call #: 413.8 B534; ISSN: 0273-8570
Descriptors: Passeriformes/ Tyrannidae/ Myiarchus crinitus/ habits-behavior/ birds/ ecosystems/ fires-burns/ habitat alterations/ habitat management/ longleaf pine/ management/ nest boxes/ nest predation/ nests-nesting/ productivity/ snags/ wildlife/ great crested flycatcher/ South Carolina/ Carolina Sandhills National Wildlife Refuge
Abstract: Managing for the endangered red-cockaded woodpecker (Picoides borealis) on federal lands requires burning large tracts of mature pine forests every three-to-five years. Many cavity trees that serve as potential nest sites for primary and secondary hole-nesting birds are destroyed by fire. The authors assessed the efficacy of a nest box program for the great crested flycatcher (Myiarchus crinitus) at Carolina Sandhills National Wildlife Refuge, an area intensively managed for red-cockaded woodpeckers. During 1996-1998, the authors installed and monitored 330 (30 in each of 11 sites) nest boxes in mature (>60 yr) longleaf pine (Pinus palustris) tracts that were burned either in April-June (warm season) or December-March (cool season). Prescribed-burned sites were nearly devoid of snags; it was estimated only 0.8/ ha in cool-season burns and 1.7 /ha in warm-season burns. Great crested flycatchers built nests in 20% of the boxes available to them. Clutch sizes were larger in warm-season burns than in cool-season burns, but fledging success (fledglings/nest hatching >or=1 egg) was lower. Twenty-two of 59 great crested flycatcher nests were depredated and the proportions in each burn class were similar. The authors recommend the installation of nest boxes for great crested flycatchers in prescribed-burned pine forests, but additional research is needed in these habitats on nest depredation rates and causes.
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1170. **Nest predation in riparian buffer strips in a balsam fir forest in western Newfoundland (Coturnix japonica, Xexcalfactoria chinensis, Perisoreus canadensis, Tamiasciurus hudsonicus).**
Lewis, Keith Peter. Memorial University of Newfoundland (Canada), 2000.
Notes: Advisor: Montevecchi, William A.
Descriptors: forestry/ wildlife/ Abies falsamea/ Abies spp./ Aves/ forests/ trees/ conservation/ habitat alteration/ buffer strips/ nest predation/ Newfoundland
Abstract: Logging pressures on boreal forests have increased in recent decades and carry with them increased concerns for wildlife and habitat conservation. Buffer strips mitigate some of the negative impacts of logging on riparian habitat and associated wildlife. Given the widespread use of buffer strips, the subsequent increase of clear-cut/forest edge, and the decline of many forest birds, I investigated how buffer strips and habitat edges influence avian nesting success. Nest predation is the most common cause of nest failure among song birds. Therefore, artificial nests are a useful research tool for investigating the influences of habitat alteration on nest predation. Japanese Quail (Coturnix japonica) eggs are often used in artificial nest studies, although these eggs may be too large to detect predation by small mammals. My primary objectives were to determine (1) if nest predation differs between intact riparian forest and (a) buffer strips and (b) clear-cut forest edges, and (2) if Japanese Quail eggs are appropriate to use in artificial nest studies in western Newfoundland.
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1171. **Nest survival of forest birds in the Mississippi Alluvial Valley.**
Twedt, D. J.; Wilson, R. R.; Henne-Kerr, J. L.; and Hamilton, R. B.
Journal of Wildlife Management 65(3): 450-460. (2001)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: nests/ survival/ riparian environments/ forests/ breeding success/ wildlife management/ ecological effects/ birds/ nesting/ riparian land/ Aves/ birds/ Mississippi Alluvial Valley
Abstract: In the Mississippi Alluvial Valley, flood control has led to a drastic reduction in the area of forest habitat and altered the patchwork of forest cover types. Silvicultural management of the remaining fragmented forests has changed to reflect the altered hydrology of the forests, current economic conditions of the area, and demand for forest products. Because forest type and silvicultural management impact forest birds, differences in avian productivity within these forests directly impact bird conservation. To assist in conservation planning, we evaluated daily nest survival, nest predation rates, and brood parasitism rates of forest birds in relation to different forest cover types and silvicultural management strategies within this floodplain. Within bottomland hardwood forests, nest success of blue-gray gnatcatcher (Polioptila caerulea, 13%), eastern towhee (Pipilo erythrophthalmus, 28%),

indigo bunting (Passerina cyanea, 18%), northern cardinal (Cardinalis cardinalis, 22%), and yellow-billed cuckoo (Coccyzus americanus, 18%) did not differ from that within intensively managed cottonwood plantations. However, average daily survival of 542 open-cup nests of 19 bird species in bottomland hardwoods (0.9516 ± 0.0028, similar to 27% nest success) was greater than that of 543 nests of 18 species in cottonwood plantations (0.9298 ± 0.0035, similar to 15% nest success). Differences in daily nest survival rates likely resulted from a combination of differences in the predator community - particularly fire ants (Solenopsis invicta) - and a marked difference in species composition of birds breeding within these 2 forest types. At least 39% of nests in bottomland hardwood forests and 65% of nests in cottonwood plantations were depredated. Rates of parasitism by brown-headed cowbirds (Molothrus ater) were greater in managed cottonwoods (24%) than in bottomland hardwoods (9%). Nest success in planted cottonwood plantations for 18 species combined (similar to 14%), and for yellow-breasted chat (Icteria virens, 7%), eastern towhee (14%), indigo bunting (14%), and northern cardinal (17%) did not differ from nest success in cottonwood plantations that were coppiced from root sprouts following pulpwood harvest. Within bottomland hardwood forests, uneven-aged group-selection timber harvest reduced the combined daily nest survival of all species from 0.958 to 0.938, which reduced nest success by about 14%. Specifically, timber harvest reduced nest success of species that nest in the forest midstory and canopy, such as Acadian flycatcher (Empidonax virescens) - from 32% before harvest to 14% after harvest. Conversely, those species that nest primarily in the shrubby understory - such as northern cardinal - were not affected by timber harvest and maintained an overall nest success of about 33%. Thus, birds nesting in the understory of bottomland hardwood forests are not adversely impacted by selective timber harvest, but there is a short-term reduction in nest success for birds that nest in the canopy and midstory.
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1172. **Nest usurpation is an 'edge effect' for Carolina chickadees Poecile carolinensis.**
Doherty, P. F. and Grubb, T. C.
Journal of Avian Biology 33(1): 77-82. (2002);
ISSN: 09088857.
Notes: doi: 10.1034/j.1600-048X.2002.330112.x.
Descriptors: edge effect/ fragmentation/ nest site/ nesting success/ passerines/ United States/ Carolinensis/ Paridae/ Parus carolinensis/ Passeriformes/ Poecile/ Poecile carolinensis/ Troglodytes aedon/ Troglodytes troglodytes/ Troglodytinae
Abstract: During 1995-1997, we monitored Carolina chickadee Poecile carolinensis nests in a fragmented forest landscape in northcentral Ohio, USA. Nest success was positively correlated with woodlot area and most nest loss was due to nest destruction by house wrens Troglodytes aedon. During 1998 and 1999, we conducted an experiment in both large (> 6.8 ha) and small (< 6.8 ha) woodlots in which we gave chickadees a choice of nesting on edges of woodlots (preferred wren habitat) or in the center of woodlots. We found no difference in nest success between large and small Woodlots, but regardless of woodlot size, nest success was lower on edges than in the center. In the experiment, 100% of nest loss was due to nest destruction by house wrens. Given a choice, Carolina chickadees preferred to nest centrally more often than on edges. These results suggest that in fragmented landscapes where house wrens are common, nest destruction by house wrens is a major cause of nest failure in the Carolina chickadee. Such edge-dependent interspecific nest-site usurpation has not been previously recognized as a potentially important selective factor in nest site selection.
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1173. **Nesting habitat of eastern wild turkeys (Meleagris gallopavo sylvestris) in east Texas.**
Eichler, B. G. and Whiting, R. M.
Texas Journal of Science 56(4): 405-414. (2004)
NAL Call #: 470 T31; ISSN: 00404403
Descriptors: meleagris gallopavo/ poaceae/ Texas/ meleagris gallopavo sylvestris/ turkeys/ nest site selection
Abstract: Eastern wild turkeys (Meleagris gallopavo sylvestris) captured in Iowa and Georgia were relocated to the Pineywoods of east Texas where they were radio-marked and released. During the 1995 and 1996 nesting seasons, nest sites of radio-marked hens were located and characteristics of the habitat surrounding the sites and of randomly selected sites in the same vegetation type were evaluated using paired t-tests. Of 24 nest located, 6 were successful. Most nests were in mature pine-hardwood stands or pine regeneration areas. Nest sites had higher densities of living and dead grasses and higher screening cover values than did random sites (P < 0.05). Other habitat characteristics did not differ between nest and random sites (P > 0.05). These results suggest that herbaceous ground cover is the most important habitat variable which hens use when selecting nest sites. Habitat characteristics surrounding nests located in this study were similar to those documented in other studies in the southeast. Although nesting habitat probably is adequate in east Texas, land managers could increase such habitat by mowing utility rights-of-way on a two to three-year schedule, implementing a three to five-year prescribed burning regime, thinning pine stands at or before canopy closure, retaining slash after logging operation, and delaying site preparation in regeneration areas until after the nesting season.
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1174. **Nesting success of Acadian flycatchers (Empidonax virescens) in floodplain forest corridors.**
Chapa-Vargas, Leonardo and Robinson, Scott K.
Auk 124(4): 1267-1280. (Oct. 2007)
NAL Call #: 413.8 AU4
Descriptors: habitat fragmentation/ wildlife/ wildlife corridors/ Acadian flycatchers/ Illinois
Abstract: Reconnecting forest patches, including those of floodplain forest, often involves the creation of long, narrow corridors that have the potential to act as ecological traps for wildlife. We examined the effect of forest width and habitat composition of the landscapes immediately around nest patches on survival and parasitism of 359 Acadian Flycatcher (Empidonax virescens) nests in the Cache River Bioreserve in southern Illinois. Nests were distributed among 19 floodplain forest corridors along a small river system that is being restored and reconnected along its original floodplain. The corridors spanned a range of widths (80-3,170 m) and varied with the presence or absence of

natural water-related habitats (beaver ponds, backwater swamps, and creeks). Although nest success varied slightly between stages of the breeding cycle, confidence intervals overlapped, which suggests constant nest success throughout the breeding cycle. Nest survival was relatively high by regional standards but did not vary significantly with any of the landscape variables measured. Contrary to predictions, probabilities of brood parasitism decreased with increasing proportions of anthropogenic habitats surrounding nests. Probabilities of brood parasitism also decreased, but only slightly, as the breeding season progressed. Finally, Acadian Flycatcher nests were located significantly more often near natural (forest-water interface) edges than expected at random. Narrow corridors such as those along floodplain restoration projects do not necessarily create ecological traps for all forest species. Acadian Flycathcers, however, are one of the only forest-nesting Neotropical migrants that nest in narrow corridors and, therefore, may be less vulnerable to negative effects of fragmentation.
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1175. **Nesting success of birds in different silvicultural treatments in southeastern U.S. pine forests.**
Barber, David R.; Martin, Thomas E.; Melchiors, M. Anthony; Thill, Ronald E.; and Wigley, T. Bently
Conservation Biology 15(1): 196-207. (2001)
NAL Call #: QH75.A1C5 ; ISSN: 0888-8892.
Notes: doi: 10.1046/j.1523-1739.2001.97294.x.
Descriptors: nesting success/ silviculture/ Corvidae/ Fringillidae/ Passeriformes/ Vireonidae/ Corvus brachyrhynchos/ Cyanocitta cristata/ Icteria virens/ Molothrus ater/ Spizella pusilla/ Vireo griseus/ United States
Abstract: We examined nesting success and levels of nest predation and cowbird parasitism among five different silvicultural treatments: regenerating (three-six years old), mid-rotation (12-15 years old), and thinned (17-23 years old) pine plantations, single-tree selection, and late-rotation pine-hardwood stands in the Ouachita Mountains of Arkansas from 1993 to 1995. We monitored 1674 nests. Differences in daily mortality and daily predation rate among two or more treatments were found for four and three of 12 species, respectively. These differences were lost following Bonferroni adjustments, but thinned stands had higher levels of predation than single-tree selection stands when predation levels were averaged across species. Daily predation rates were positively correlated with the relative abundance of birds, suggesting that nest predators respond to prey availability (i.e., nests) in a density-dependent manner. The relative abundance of cowbirds differed among treatments, with the highest densities in regenerating, thinned, and single-tree selection stands. Field sparrows (Spizella pusilla) and yellow-breasted chats (Icteria virens) experienced higher levels of parasitism in thinned than regenerating plantations, whereas white-eyed vireos (Vireo griseus) experienced higher parasitism in regenerating plantations than in mid-rotation or thinned plantations. Several shrub-nesting and one ground-nesting species had lower nesting success in thinned and regenerating plantations than has been reported in previously published studies. Thus, some seral stages of even-aged management may provide low-quality nesting habitat for several early-successional bird species. In contrast, many species nesting in mid-rotation and single-tree selection stands had nesting success similar to or greater than that found in previous studies, suggesting that some silvicultural treatments, when embedded in a largely forested landscapes, may provide suitable habitat for forest land birds without affecting their reproductive success.
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1176. **New hope for western bluebirds? Effect of forest restoration being studied.**
Germaine, Heather L. and Germaine, Stephen S.
Bluebird 23(1): 13-15. (2001)
Descriptors: Sialia mexicana/ video tapes/ study methods/ restoration/ productivity/ population ecology/ ponderosa pine/ nests-nesting/ nestlings/ nesting sites/ monitoring/ habitat use/ habitat management/ habitat alterations/ forests, coniferous/ food supply/ fires-burns/ ecosystem management/ conservation/ birds/ behavior/ western bluebird/ Arizona, Northwestern
Abstract: The authors studied the effects of forest restoration and conservation on western bluebirds in the ponderosa pine forests of northwestern Arizona. Historically these birds were confined to open forest areas but due to the removal of large degenerating trees and increased competition for nest sites decline of western bluebirds has been noted in many parts of their range. Also, these open forests have become dense forests dominated by young trees containing few nest cavities and containing a low number of insects. Efforts to restore southwestern forests are gaining momentum due to poor nutrient cycling, increased potential for high-intensity, stand-replacing fires, and a reduced ability of pine forests to support wildlife species. Restoration of 4000 acres of forest in northwestern Arizona have been cooperatively being done by scientists from Northern Arizona University's (NAU) Ecological Restoration Institute and the Arizona Strip District of the Bureau of Land Management (BLM). Treatments included mechanical thinning of trees, slash manipulation, and burning and reseeding of native grasses and plants. A study was conducted to compare western bluebird reproductive success between dense forests and restoration-treated open forests. The authors monitored the number of nestlings that survived to fledge, nest predation rates, nestling parasitism, and parental provisioning rates. Sixty-four active western bluebird nests were monitored during the summers of 1998, 1999, and 2000. Nest success has been higher in restoration treated forests than dense forests. This data suggests that bluebird populations will increase only if their young survive and, therefore, it is important to study their survival rates in treated forest areas.
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1177. **North American grassland birds: An unfolding conservation crisis?**
Brennan, L. A. and Kuvlesky, W. P.
Journal of Wildlife Management 69(1): 1-13. (2005)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2005)069<0001:NAGBAU>2.0.CO;2.
Descriptors: Breeding Bird Survey/ grass-shrub birds/ grassland birds/ North American Bird Conservation Initiative/ North American Waterfowl Management Plan/ Partners in Flight/ prairie grouse/ quail/ afforestation/ avifauna/ conservation management/ fragmentation/

grassland/ population decline/ species conservation/ North America/ Anas/ Anatidae/ Anser/ Aves/ Phasianidae
Abstract: The widespread and ongoing declines of North American bird populations that have affinities for grassland and grass-shrub habitats (hereafter referred to as grassland birds) are on track to become a prominent wildlife conservation crisis of the 21st century. There is no single cause responsible for the declines of grassland birds. Rather, a cumulative set of factors such as afforestation in the eastern United States, fragmentation and replacement of prairie vegetation with a modern agricultural landscape, and large-scale deterioration of western U.S. rangelands are the major causes for these declines. The North American Bird Conservation Initiative (NABCI) is a set of comprehensive and coordinated strategic actions modeled on the Joint Venture initiatives that were used to successfully implement the North American Waterfowl Management Plan. The NABCI is emerging as a potential broad-scale solution for conserving populations of grassland birds. Coordinating grassland bird conservation efforts with initiatives to stabilize and increase upland game birds that have strong affinities for grassland habitats - such as quail and prairie grouse - presents additional opportunities to leverage funding and resources that will positively impact virtually all species of North American grassland birds.
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1178. **Northern bobwhite population and habitat response to pine-grassland restoration.**
Cram, D. S.; Masters, R. E.; Guthery, F. S.; Engle, D. M.; and Montague, W. G.
Journal of Wildlife Management 66(4): 1031-1039. (2002)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: Arkansas/ Colinus virginianus/ disc of vulnerability/ forest management/ northern bobwhite/ Picoides borealis/ pine-grassland restoration/ prescribed fire/ red-cockaded woodpecker/ usable space/ abundance/ grassland/ habitat restoration/ mixed forest/ United States/ Colinus virginianus/ Picoides borealis/ Pinus echinata
Abstract: We compared northern bobwhite (Colinus virginianus) abundance and habitat characteristics in unmanaged mixed shortleaf pine (Pinus echinata)-hardwood stands and restored pine-grassland stands managed for the red-cockaded woodpecker (Picoides borealis) on the Ouachita National Forest, Arkansas, USA. To determine northern bobwhite (hereafter, bobwhite) population response in untreated control, thinned, and thinned and burned stands either 1, 2, or 3 growing seasons (Mar to mid-Oct) post-burn, we used whistling-male counts and covey-call counts as indices of population abundance. We estimated woody stem density, understory and overstory canopy cover, conifer and hardwood basal area, and the disc of vulnerability to characterize habitat response. Relative abundance of whistling males in the spring was greatest in thinned stands 3 growing seasons post-burn and in thinned but unburned stands. These stands had the smallest disc of vulnerability and the greatest understory shrub cover <2 m in height compared with other treatments. A threshold-like increase in bobwhite abundance was observed as a function of woody structure <2 m. Pine-grassland restoration provided suitable structure for bobwhites in spring, summer, and fall, but may not be adequate in winter. Further, data suggested that bobwhite density within a stand also was related to the amount of suitable habitat surrounding the stand. Bobwhite management efforts in similar shortleaf pine forests should include thinning to reduce midstory and overstory cover and frequent fire to maintain open woodland conditions - i.e., low basal area stands with limited midstory.
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1179. **Northern hawk owls and recent burns: Does burn age matter?**
Hannah, Kevin C. and Hoyt, Jeff S.
Condor 106(2): 420-423. (2004)
NAL Call #: QL671.C6; ISSN: 0010-5422
Descriptors: Surnia ulula/ Strigiformes/ Strigidae/ wildlife management/ burned forest habitat/ conifer-dominated boreal forest/ Alberta/ burned and unburned conifer dominated boreal forest/ fires-burns/ forests/ ecosystems/ habitat management/ Mariana Lake region/ status/ environmental factors/ Canada/ communities/ conservation/ wildlife management/ habitat use/ land zones/ burned forest/ clearcut logging/ fire/ northern hawk owl/ Surnia ulula/ breeding/ habitat/ forest/ silviculture/ abundance/ dispersion/ ecological requirements
Abstract: The Northern Hawk Owl (Surnia ulula) remains one of the least-studied birds in North America. Although hawk owls use burned forest, reports of this association have been primarily anecdotal and outside the breeding season. We present the first comparison of hawk owl relative abundance between burned and unburned conifer-dominated boreal forest in North America. Hawk owls were detected only in postfire forest and were not detected in nearby unburned coniferous forest. There was a significant negative exponential relationship between hawk owl abundance and bum age, suggesting that bums were only suitable up to 8 years postfire. A conservative estimate of a peak in breeding density was three nests per 100 km^2 for a 2-year-postfire forest. Wildfire and newly burned forests may be an important feature for hawk owls in the Nearctic boreal forest. This raises the question whether management of this species through improved forestry techniques is a sufficient conservation measure.
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1180. **Northwest Forest Plan: The first 10 years (1994-2003) - Synthesis of monitoring and research results.**
Haynes, Richard W.; Bormann, Bernard T.; Lee, Danny C.; and Martin, Jon R.
Portland, OR: Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture; General Technical Report-PNW 651, 2006. 292 p.
Notes: 0363-6224 (ISSN).
Descriptors: conservation measures/ terrestrial habitat/ land zones/ comprehensive zoology: habitat management/ old growth forest management plan/ synthesis of monitoring and research results/ forest and woodland/ old growth forest/ management plan/ Pacific Northwest/ United States
Abstract: It has been 10 years since the Northwest Forest Plan (the Plan) came into being at the direction of President Clinton. This report synthesizes the status and trends of five major elements of the Plan: older forests, species, aquatic systems, socioeconomics, and adaptive management and monitoring. It synthesizes new science that has resulted from a decade of research. The report also contains key management implications for federal agencies. This report is a step in the adaptive management approach adopted by the Plan, and there is the expectation

that its findings will lead to changes in the next decade of Plan implementation. Although most of the monitoring has been underway for less than a decade and many of the Plan's outcomes are expected to evolve over decades, the monitoring is already producing a wealth of data about the status and trends in abundance, extent, diversity, and ecological functions of older forests, the species that depend on them, and how humans relate to them. Conditions did change over the decade. Watershed conditions improved, increase in acreage of late-successional old growth exceeded expectations, new species now pose threats, and there is greater appreciation of the need to share habitat protection among land ownerships. The Plan anticipated greater timber harvests and more treatments to reduce fuel in fire-prone stands than have actually occurred. Monitoring showed human communities are highly variable, and it is difficult to disentangle overall growth in regional economies from the impacts of reduced timber harvests on federal land.
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1181. **Oak regeneration using the shelterwood-burn technique: Management options and implications for songbird conservation in the southeastern United States.**
Lanham, J. Drew; Keyser, Patrick D.; Brose, Patrick H.; and Van Lear, David H.
Forest Ecology and Management 155(1-3): 143-152. (2002)
NAL Call #: SD1.F73; ISSN: 0378-1127.
Notes: Special issue: Forest ecology in the next millennium: Putting the long view into practice / edited by A.C. Dibble. Paper presented at a workshop held June 27-30, 1999, Orono, Maine. Includes references.
Descriptors: commercial activities/ conservation measures/ land zones/ North America/ Passeriformes: forestry/ shelterwood/ burn techniques/ oak regeneration/ habitat management/ United States, southeastern region/ Aves/ birds/ chordates/ vertebrates
Abstract: Shelterwood silviculture is commonly used to regenerate oaks in upland stands. However, competition from other species such as tulip-poplar (Liriodendron tulipifera) may deter oak regeneration when these traditional shelterwood techniques are used. The shelterwood-burn technique is a relatively new tool for regenerating oak-dominated stands on some upland sites while simultaneously minimizing undesirable hardwood intrusion with prescribed fire. Once successful oak regeneration has been achieved, three options are available which will result in different vegetative structure and composition within a stand and subsequently different habitats for songbirds. These options are: complete or partial canopy retention, post-harvest prescribed burning and complete canopy removal. Canopy retention, burning and removal treatments will create, respectively, two-age stands that are likely to harbor a diverse mixture of mature forest and early successional species; park-like woodlands with open woodland species; or early-successional habitats with shrubland species. We suggest that shelterwood-burn systems and the management options associated with them offer viable alternatives for managing both songbird and timber resources where oak-dominated stands are the desired goal in upland southeastern sites.
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1182. **Observations of bat activity during prescribed burning in West Virginia.**
Rodrigue, Jane L.; Schuler, Thomas M.; and Menzel, Michael A.
Bat Research News 42(2): 48-49. (2001)
NAL Call #: QL737.C5 B328; ISSN: 0005-6227
Descriptors: Myotis/ Lasiurus borealis/ mammals/ behavior/ habitat use/ habitat alterations/ fires-burns/ habitat management/ movements/ ecosystems/ forests, deciduous/ oak/ little brown bat/ red bat/ Acacia spp./ Acer rubrum/ Acer spp./ West Virginia: Tucker County
Abstract: During the week of 30 April 2001, the USDA Forest Service conducted a series of prescribed burns on the Monongahela National Forest, Tucker County, West Virginia, in conjunction with an ongoing study of regeneration of oak (Quercus spp.). Burn units were located in the Allegheny Mountain and Plateau physiographic province, at elevations ranging from 615 to 800 m. The forest primarily consisted of chestnut oak (Q. prinus), hickory (Carya spp.), red maple (Acer rubrum), and black locust (Robinia pseudo-acacia) in the overstory, with striped maple (Acer pennsylvanicum) and mountain laurel (Kalmia latifolia) in the shrub layer. On 30 April, at ca. 1210 h, a myotid bat (Myotis sp.) flew from a snag that had ignited at its base, as the fire rapidly moved up the slope. The bat flew ca. 7-10 m to a live serviceberry (Amelanchier arborea), where it clung to the uppermost, leafed-out branches. The bat remained in the serviceberry for ca. 30 seconds, before it flew straight to unburned forest across the cleared fireline. Similar behavior was observed on 1 May 2001 on another burn unit in the same general area. At ca. 1330 h, as the prescribed fire moved up a slope, two red bats (Lasiurus borealis) flew rapidly out of the burning unit, across a wildlife opening, and into an unburned area of forest. The short and long-term negative and positive impacts of prescribed burning on bats in forested landscapes of the East are poorly known. Red bats that readily roost in leaf litter on the forest floor or in tree foliage are subjected to heat and dense smoke (Saugey et all, 1998, J. Arkansas Acad. Sci., 52:92-98; Moorman et al., 1999, Bat Research News, 40:74-75), and other bats roosting in snags consumed by fire undoubtedly are displaced in the short-term. Nonetheless, because most prescribed fires in these Allegheny forests are short in duration and relatively cool, few snags probably are consumed and fire-related mortality of subcanopy, suppressed trees could result in a net gain of potential bat roosts (Menzel et al., in press, Forest Ecology and Management)
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1183. **Observations on amphibians and reptiles in burned and unburned forests on the upper coastal plain of Virginia.**
Mitchell, Joseph C.
Virginia Journal of Science 51(3): 199-203. (2000); ISSN: 0042-658X
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ abiotic factors/ land and freshwater zones/ Amphibia/ Reptilia: forestry/ habitat management/ forest and woodland/ fire/ prescribed burning/ forest fauna/ Virginia/ Caroline County/ Fort A.P. Hill/ Amphibia/ amphibians/ chordates/ reptiles/ vertebrates
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1184. **Observations on the use of stubs by wild birds: A 10 year update.**
Harris, Brian
British Columbia Journal of Ecosystems and Management 1(1): 1-5. (2001)
NAL Call #: SD146.B7 B34.
http://www.forrex.org/jem/ISS1/vol1_no1_art3.pdf
Descriptors: commercial activities/ conservation measures/ reproductive behavior/ terrestrial habitat/ land zones/ Canada/ Aves: forestry/ logging/ lodgepole pines/ stub use patterns/ long-term research projects/ habitat management/ wildlife-tree management/ breeding sites/ nesting sites/ habitat utilization/ mixed forest/ British Columbia/ Kelowna/ Rendell Creek Valley/ birds/ chordates/ vertebrates
Abstract: In British Columbia, many species of wildlife depend on dead or dying trees; however, current Workers' Compensation Board regulations require that such trees be felled. In 1990, in an effort to resolve workers' safety with wildlife habitat needs, Pope and Talbot Limited proposed the creation of a number of tall stumps (3-5 m tall) in their logging operations. In the study cutblock, approximately 170 lodgepole pine stumps ("stubs") were cut. Since their establishment, the stubs were monitored for bird nesting each spring. A total of 86 active nests have been counted in 10 years. Ninety-five percent of this nesting occurred in stubs in the clearcut portion of the block, versus 5% in the selectively logged portion. Approximately 16% of the stubs were used for nesting at least once during the 10 years of observations. In general, the greater the diameter of the stub, the greater likelihood that it would be used for nesting. All nesting occurred in reworked holes; no new nest holes were drilled in these stubs. Stub creation should continue to be a part of the wildlife tree management strategy in any logging operation, irrespective of the species of tree being harvested. The average density should be at least one stub per hectare, but preferably much higher to ensure that suitable nest stubs are retained. Stubs that are not used for nesting may provide perching or feeding sites, and contribute to the area's coarse woody debris when they fall. Stub creation involves little extra cost and little volume is lost. Therefore, all forest companies should be encouraged to create stubs as part of responsible forest stewardship.
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1185. **Occurrence and nest survival of four thrush species on a managed central Appalachian forest.**
Dellinger, Rachel L.; Bohall Wood, Petra.; and Keyser, Patrick D.
Forest Ecology and Management 243(2-3): 248-258. (2007)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ conservation measures/ reproduction/ reproductive behavior/ ecology/ terrestrial habitat/ land zones/ Catharus fuscescens/ Catharus guttatus/ Hylocichla mustelina/ Turdus migratorius: forestry/ forest management/ Effect on habitat utilization and nest site selection/ habitat management/ breeding site/ nest site selection/ forest management effects/ habitat utilization/ forest and woodland/ management effects on habitat utilization and nest site selection/ West Virginia/ Randolph County/ forestry management effects on habitat utilization and nest site selection/ Aves, Passeriformes, Turdidae/ birds/ chordates/ vertebrates
Abstract: The wood thrush (Hylocichla mustelina Gmelin) is a species of concern in the central Appalachians, and is sympatric there with three related species, the American robin (Turdus migratorius Linnaeus), hermit thrush (Catharus guttatus Pallas), and veery (Catharus fuscescens Stephens). Our objectives were to quantify use of mature forests and areas subjected to even-aged harvesting and partial harvesting by these four species by measuring their frequency of occurrence, nest survival, and nest site characteristics. We also compared microhabitat characteristics among the landcover types. During 2001-2003 we conducted point count surveys, monitored nests, and collected nest habitat data on a managed forest in West Virginia. Land cover was digitized into five categories: deciduous and mixed mature forest, deciduous and mixed partial harvest, and even-aged regeneration harvest. Chi-square goodness-of-fit analysis with Bonferroni 95% confidence intervals indicated that deciduous partial harvests were more likely to be inhabited by wood thrushes. The other three species were less likely to occur in deciduous partial harvests, and veery had lower nest survival in partial harvests than in mature forest. Contrary to many published descriptions that suggest thrushes will not nest in even-aged harvests, a small number of all species but hermit thrushes did nest in this cover type, often near a residual canopy tree. Hermit thrushes were less likely to inhabit mature deciduous forest, even-aged harvests, and harvested edges but chose nesting areas in mature mixed forest that was disturbed by road building and the seeding of landings and skid trails >10 years ago. Microhabitat characteristics of landcovers did not differ overall. Our results suggest a relationship with partial harvesting that is positive for wood thrush but negative for the other three species. © 2007 Elsevier B.V. All rights reserved.
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1186. **One hundred fifty years of change in forest bird breeding habitat: Estimates of species distributions.**
Schulte, L. A.; Pidgeon, A. M.; and Mladenoff, D. J.
Conservation Biology 19(6): 1944-1956. (2005)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1111/j.1523-1739.2005.00254.x.
Descriptors: avian ecology/ conservation planning/ habitat suitability modeling/ historical range of variability/ landscape ecology/ pre-Euro-American settlement/ Wisconsin
Abstract: Evaluating bird population trends requires baseline data. In North America the earliest population data available are those from the late 1960s. Forest conditions in the northern Great Lake states (U.S.A.), however, have undergone succession since the region was originally cut over around the turn of the twentieth century, and it is expected that bird populations have undergone concomitant change. We propose pre-Euro-American settlement as an alternative baseline for assessing changes in bird populations. We evaluated the amount, quality, and distribution of breeding bird habitat during the mid-1800s and early 1990s for three forest birds: the Pine Warbler (Dendroica pinus), Blackburnian Warbler (D. fusca), and Black-throated Green Warbler (D. virens). We constructed models of bird and habitat relationships based on literature review and regional data sets of bird abundance and applied these models to widely available vegetation data. Original public-land survey records represented historical habitat conditions, and a combination of forest inventory and national land-cover data represented current conditions. We assessed model robustness by comparing current habitat distribution to actual breeding bird locations from the Wisconsin Breeding Bird Atlas. The model showed

little change in the overall amount of Pine Warbler habitat, whereas both the Blackburnian Warber and the Black-throated Green Warbler have experienced substantial habitat losses. For the species we examined, habitat quality has degraded since presettlement and the spatial distribution of habitat shifted among ecoregions, with range expansion accompanying forest incursion into previously open habitats or the replacement of native forests with pine plantations. Sources of habitat loss and degradation include loss of conifers and loss of large trees. Using widely available data sources in a habitat suitability model framework, our method provides a long-term analysis of change in bird habitat and a presettlement baseline for assessing current conservation priority. ©2005 Society for Conservation Biology.
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1187. **Options for managing early-successional forest and shrubland bird habitats in the northeastern United States.**
DeGraaf, R. M. and Yamasaki, M.
Forest Ecology and Management 185(1-2): 179-191. (2003)
NAL Call #: SD1.F73; ISSN: 03781127
Descriptors: disturbance-dependent species/ early-successional habitats/ even-age management/ opening size/ silvicultural systems/ agriculture/ biodiversity/ floods/ regenerators/ wind/ shrubland/ forestry/ avifauna/ conservation management/ disturbance/ forest management/ shrubland/ silviculture/ succession/ United States/ Castor canadensis
Abstract: Historically, forests in the northeastern United States were disturbed by fire, wind, Native American agriculture, flooding, and beavers (Castor canadensis). Of these, wind and beavers are now the only sources of natural disturbance. Most disturbance-dependent species, especially birds, are declining throughout the region whereas species affiliated with mature forests are generally increasing or maintaining populations. Disturbance must be simulated for conservation of early-successional species, many of which are habitat specialists compared to those associated with mature forests. Both the maintenance of old fields and forest regeneration are needed to conserve brushland species. Regenerating forest habitats are more ephemeral than other woody early-successional habitats. The types and amounts of early-successional habitats created depend on the silvicultural system used, patch size selected, time between regeneration cuts, and rotation age. We recommend that group selection and patch cuts should be at least 0.8 ha, and patches should be generated approximately every 10-15 years depending on site quality. Regeneration of intolerant and mid-tolerant tree species should be increased or maintained in managed stands. Also, frost pockets, unstocked, or poorly-stocked stands can provide opportunities to increase the proportion of early-successional habitats in managed forests.
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1188. **Pairing season habitat selection by Montezuma quail in southeastern Arizona.**
Bristow, K. D. and Ockenfels, R. A.
Journal of Range Management 57(5): 532-538. (2004)
NAL Call #: 60.18 J82 ; ISSN: 0022409X
Descriptors: Arizona/ Cyrtonyx montezumae/ grazing/ habitat selection/ livestock/ Madrean evergreen woodland/ Montezuma quail/ gamebird/ grazing/ habitat availability/ habitat quality/ habitat selection/ livestock/ Cyrtonyx montezumae/ Quercus
Abstract: Montezuma quail (Cyrtonyx montezumae Vigors) are closely associated with oak woodlands (Quercus spp.). Livestock grazing and cover availability are considered important factors affecting Montezuma quail distribution and density. While habitat conditions during pairing season (April-June) are thought to be important to Montezuma quail survival and reproduction, information on habitat selection during that time is limited. We investigated habitat selection by Montezuma quail in grazed and ungrazed areas within the Huachuca and Santa Rita mountain foothills in southeastern Arizona. We used pointing dogs to locate quail during the pairing seasons of 1998 and 1999, and measured habitat characteristics at 60 flush sites and 60 associated random plots (within 100 m of flush sites). We recorded information on landform, substrate, vegetation, and cover. Montezuma quail selected (P < 0.10) areas with higher grass canopy cover and more trees than randomly available. Short (< 50 cm tall) visual obstruction (cover), usually associated with bunch grass, was greater (P < 0.10) at use sites than at random plots. Land management practices that reduce grass and tree cover may affect Montezuma quail habitat quality and availability in southeastern Arizona. Based on habitat selection patterns of Montezuma quail, we recommend that oak woodland habitats should contain a minimum tree canopy of 26%, and 51-75% grass canopy cover at the 20-cm height to provide optimum cover availability.
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1189. **Partial cutting of woodlots in an agriculture-dominated landscape: Effects on forest bird communities.**
Holmes, S. B.; Burke, D. M.; Elliott, K. A.; Cadman, M. D.; and Friesen, L.
Canadian Journal of Forest Research 34(12): 2467-2476. (2004)
NAL Call #: SD13.C35; ISSN: 00455067.
Notes: doi: 10.1139/X04-130.
Descriptors: agriculture/ biodiversity/ harvesting/ bird community/ landscapes/ maple forests/ silviculture guidelines/ wood/ avifauna/ community dynamics/ community structure/ forest management/ logging (timber)/ Acer/ agriculture/ basal area/ biodiversity/ birds/ harvesting/ silviculture/ Canada/ North America/ Ontario/ Acer/ Aves/ Certhia americana/ Dendroica pensylvanica/ Indigofera/ Molothrus ater/ Myiarchus crinitus/ Passerina cyanea/ Setophaga ruticilla
Abstract: We studied the short-term effects of partial cutting on the forest bird communities of mixed maple forests in an agriculture-dominated landscape in southwestern Ontario. Blocks that had been recently harvested were grouped according to provincial silvicultural guidelines (standard and heavy cuts) and compared with blocks that had been uncut for at least 24 years (old cuts). We found significant differences in forest bird community structure between standard and heavy cuts and between heavy and old cuts, but not between standard and old cuts. Heavy cuts had more species and more individuals than old cuts, the result primarily of greater numbers of early-successional species. Brown creeper (Certhia americana Bonap.) was the only species to show a significant negative response to harvesting and was the best indicator of old cuts, while indigo bunting (Passerina cyanea L.), brown-

headed cowbird (Molothrus ater Bodd.), chestnut-sided warbler (Dendroica pensylvanica L.), American redstart (Setophaga ruticilla L.), and great crested flycatcher (Myiarchus crinitus L.) were all significant indicators of heavy cuts. Our research suggests that it is possible to protect native bird communities in southwestern Ontario by using the single-tree selection system to meet the minimum basal area targets and harvest intensities recommended in provincial silvicultural guidelines. © 2004 NRC Canada.
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1190. **Pinyon-juniper woodland restoration studies: A watershed scale, multi-disciplinary approach.**
Jacobs, Brian E.; Gatewood, Richard G.; Hastings, Brian K.; Julius, Christian; Kleintjes, Paula K.; Fettig, Stephen M.; and Allen, Craig D.
Ecological Society of America Annual Meeting, Proceedings 87 (2002)
NAL Call #: QH540.E365.
Notes: Conference: 87th Annual Meeting of the Ecological Society of America and the 14th Annual International Conference of the Society for Ecological Restoration, Tucson, Arizona, USA; August 04-09, 2002.
Descriptors: biodiversity/ conservation/ terrestrial ecology: ecology, environmental sciences/ mechanical restoration treatment/ applied and field techniques/ mechanical thinning/ applied and field techniques/ slash mulching/ applied and field techniques/ age class/ biological diversity/ biomass/ canopy cover/ drought/ fire history/ grazing/ historical record/ multi disciplinary approach/ pinyon juniper woodland restoration/ plant cover/ ponderosa pine savanna displacement/ sediment loss/ soil exposure/ soil microtopography/ soil moisture/ species abundance/ species richness/ summer monsoon/ tree age/ understory vegetation suppression/ watershed scale/ woodland density
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1191. **Planning for bats on forest industry lands in North America.**
Wigley, T. Bently; Miller, Darren A.; and Yarrow, Greg K.
In: Bats in Forests: Conservation and Management/ Lacki, M. J.; Hayes, J. P.; and Allen Kurta, A.
Baltimore, MD: Johns Hopkins University Press, 2007; pp. 293-318 .
Notes: Literature review; ISBN: 9780801884993 or 0801884993.
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ land zones/ Chiroptera: forestry/ habitat management/ harvested forest management/ forest and woodland/ forest industry lands/ North America/ Mammalia/ Bats/ chordates/ mammals/ vertebrates
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1192. **Planning open spaces for wildlife, I: Selecting focal species using a Delphi survey approach.**
Hess, George R. and King, Terri J.
Landscape and Urban Planning 58(1): 25-40. (2002)
NAL Call #: QH75.A1L32; ISSN: 0169-2046
Descriptors: Mammalia/ barred owl/ broad-winged hawk/ eastern box turtle/ loggerhead shrike/ northern bobwhite/ pileated woodpecker/ Aves/ wildlife management/ Delphi survey approach/ suburban development/ habitat management/ habitat use/ North Carolina/ suburban wildlife space planning/ Triangle region/ urban habitat/ ecosystems/ conservation/ wildlife management/ land zones/ artificial structures/ open space planning/ green space planning/ umbrella species/ focal species/ keystone species/ wildlife conservation/ wildlife habitat/ delphi survey/ amphibians/ birds/ ecological requirements/ forest/ habitat change/ indicator/ landscape/ mammals/ reptiles/ road/ settlement
Abstract: In a world being transformed by human population growth, conservation biology has emerged as one discipline focused on preventing, mitigating, and reversing the loss of species, ecosystems, and landscapes. Because of the need to act quickly with incomplete information, conservation biologists have developed shortcuts that rely on identifying key species to be focused on during planning efforts. We describe a process that can be used to select those species, using a suburbanizing region in the United States as an example. The Triangle region of North Carolina, USA - Raleigh-Durham-Chapel Hill and surroundings - is undergoing rapid suburbanization, resulting in land-use changes that will alter wildlife communities and might result in the loss of some species. We are developing a wildlife conservation plan for the region based on a combination of landscape and focal species approaches. The objective of the research described in this paper was to identify focal species to be used for conservation planning in the region; our effort focused on amphibians, birds, mammals, and reptiles. In theory, habitat conserved by planning for a few carefully chosen focal species is expected to encompass habitat for many other species with similar requirements. To identify focal species, we used a three-part Delphi survey, administered to a panel of experts. The panel identified six landscape types and nine associated focal species: extensive undisturbed habitat (bobcat, eastern box turtle); riparian and bottomland forest (barred owl, beaver); upland forest (ovenbird, broad-winged hawk); mature forest (pileated woodpecker); pastures and grassy fields (loggerhead shrike); and open and early successional forest (northern bobwhite). The panelists generally agreed that a combined landscape[-]focal species approach was reasonable, but noted a number of problems to be expected during the planning phase. The most critical of these problems are that the approach has not been well tested, required data are often unavailable, and implementation will be difficult in the face of extreme economic pressures to develop land. Administering the Delphi survey was more labor-intensive, and took longer, than we anticipated; it might have been more effective had it been completed more quickly. Nevertheless, we believe this process can be applied to a broad range of conservation problems, which are often characterized by a high degree of uncertainty and the need to act quickly.
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1193. **Planning open spaces for wildlife, II: Modeling and verifying focal species habitat.**
Rubino, Matthew J. and Hess, George R.
Landscape and Urban Planning 64(1-2): 89-104. (2003)
NAL Call #: QH75.A1L32; ISSN: 0169-2046
Descriptors: Castoridae/ Rodentia/ Felidae/ Carnivora/ Chelonia/ wildlife habitat/ modeling/ North Carolina
Abstract: In the face of human population growth that is transforming the Earth, scientists, land managers, and planners are working to prevent, mitigate, and reverse the consequent loss of species, ecosystems, and landscapes. Because of the need to act quickly with incomplete data, a number of shortcuts have been developed that rely on

identifying key species for planning efforts. By developing conservation plans for a small set of carefully selected focal species, planners hope to create a protective umbrella for a wider array of species and functional landscapes. In an earlier paper, we described an approach for selecting a set of focal species. In this paper, we report a process for the rapid identification and verification of potential habitat for a focal species. Using the barred owl as an example, we present the process for a suburbanizing region of North Carolina, USA. The barred owl was selected to represent bottomland hardwood and forested wetland landscapes in the region. Using a geographic information system (GIS), we assembled data layers from readily available remotely sensed, conventional survey, and physiographic data to create a model of barred owl habitat. Barred owls occupy bottomland hardwood forests, which we identified using land cover, soils, and wetlands data. We eliminated from consideration bottomland forest habitat within 100 m of a road and within 60 m of open vegetative cover. Patches of the remaining bottomland forest larger than 86 ha in size were considered large enough to meet all barred owl habitat needs. Simple presence/absence surveys detected barred owls in approximately 65% of patches identified by our model as suitable habitat. We tested the barred owl's suitability as an umbrella for bottomland forest species using an existing database of rare and outstanding elements of natural diversity. Umbrella coverage for barred owl habitat (bottomland forest patches ≥ 86 ha) varied with taxa from 0% for invertebrate species to 75% for vertebrate species. However, umbrella coverage for all bottomland forest, including patches < 86 ha, was at or near 100% for all taxa. The relatively simple modeling and verification processes we used can be carried out with a minimal amount of data and time, making it an attractive tool in situations where time and resources are in short supply.
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1194. **Ponderosa pine restoration and turkey roost site use in northern Arizona.**
Martin, S. L.; Theimer, T. C.; and Fule, P. Z.
Wildlife Society Bulletin 33(3): 859-864. (2005)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2005)33[859:PPRATR]2.0.CO;2.
Descriptors: Meleagris gallopavo/ Pinus ponderosa/ restoration/ roost site/ adaptive management/ gamebird/ habitat restoration/ habitat use/ roost site/ Arizona/ Meleagris gallopavo/ Meleagris gallopavo merriami/
Abstract: Ecological restoration of ponderosa pine (Pinus ponderosa) forests in the southwestern United States is a relatively new, adaptive management practice that potentially alters wildlife habitat during and immediately after restoration treatments. To determine whether restoration treatments affected Merriam's wild turkey (Meleagris gallopavo merriami) use of roost sites, we relocated 91 of 120 turkey roost sites that originally had been mapped in 1985 in the Uinkaret Mountains of northern Arizona. We compared current turkey use of historical roost sites in stands that had been thinned and burned between 1995 and 2002 to adjacent (<800 m away) and distant (>800 m) stands. In 2002, 23 historical roosts were still in use, and in 2003, 13 were still in use, 5 of which had not been used in 2002. The number of historical roost sites still in use among treated, adjacent, and distant stands did not differ from that expected based on the total number of historical roosts in each stand type. We also searched for new roosts while traveling between historical roost sites and found 2.2 new roosts per hour searched in treated stands, 1.5 in adjacent stands, and 1.0 in distant stands. As expected, active roost sites in treated stands had significantly lower basal area, fewer stems, and less canopy cover compared to roost sites in untreated areas. However, roost trees in treated and untreated stands did not differ in diameter at breast height, height, or distance to the lower limb, indicating that treatment did not affect these characteristics. Several factors unique to our study site may have influenced our results: treated areas represented only 5% of total habitat available, treatments occurred primarily on flat areas and not on ridges or slopes, and treatments were implemented over several years.
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1195. **Ponderosa pine snag dynamics and cavity excavation following wildfire in northern Arizona.**
Chambers, C. L. and Mast, J. N.
Forest Ecology and Management 216(1-3): 227-240. (2005)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2005.05.033.
Descriptors: cavities/ cavity-nesting birds/ ponderosa pine/ snags/ standing dead trees/ wildfire/ wildlife/ biodiversity/ fires/ probability/ forestry/ coniferous forest/ forest fire/ nest site/ treehole/ wildfire/ birds/ holes/ Pinus ponderosa/ Arizona/ Animalia/ Aves
Abstract: Snags are important components of wildlife habitat, providing nesting and feeding sites for over 75 species of animals in the southwestern United States. Wildfires can increase or decrease the availability of snags to wildlife by killing live trees or incinerating snags. Our objectives were to describe dynamics and spatial patterns of fire-killed snags in ponderosa pine (Pinus ponderosa) forests of northern Arizona and predict the probability of snag use by cavity nesters. We established six 1-ha plots following two recent fires that occurred in northern Arizona (Hochderffer fire of 1996 [H96] and Pumpkin fire of 2000 [P00]) to determine ponderosa pine snag availability and use by wildlife as evidenced by presence of excavated cavities. For comparison, six paired 1-ha plots in nearby unburned areas were sampled with burned plots. For the twelve 1 ha plots, field methods included mapping and measuring 15 characteristics for 668 snags (630 in burned and 38 in unburned plots) 4 years post-fire on the H96 fire, and 1010 snags (996 in burned and 14 in unburned plots) 1 year post-fire on the P00 fire. We remeasured characteristics of all snags in 2003. Most burned snags were standing 3 years after fire, but 7 years after fire, 41% had fallen. Snags in burned plots were clumped when initially measured and remeasured. After 7 years, snags in burned plots that were still standing were straight, large diameter trees in denser clumps. Density of excavated cavities was similar between burned (3.0 ha-1) and unburned (2.2 ha-1) plots, even though burned areas produced much higher densities of snags. Snags (both burned and unburned) that were most likely to contain excavated cavities were large diameter with broken tops. This evidence of cavity nester use indicates that in ponderosa pine forests in the southwest, retaining large diameter snags is important to cavity nesters regardless of snag origin. If salvage logging is to occur in severely

burned ponderosa pine in the southwest, retaining straight, large diameter snags in clumps will help maintain snags for cavity-excavating species.
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1196. **Population increase in Kirtland's warbler and summer range expansion to Wisconsin and Michigan's Upper Peninsula, USA.**
Probst, J. R.; Donner, D. M.; Bocetti, C. I.; and Sjogren, S.
ORYX 37(3): 365-373. (2003); ISSN: 00306053.
Notes: doi: 10.1017/S0030605303000632.
Descriptors: carrying capacity/ colonization/ Dendroica kirtlandii/ dispersal/ jack pine/ Michigan/ population expansion/ Wisconsin/ endangered species/ habitat management/ passerines/ population growth/ range expansion/ Aves/ Dendroica kirtlandii/ Pinus banksiana
Abstract: The threatened Kirtland's warbler Dendroica kirtlandii breeds in stands of young jack pine Pinus banksiana growing on well-drained soils in Michigan, USA. We summarize information documenting the range expansion of Kirtland's warbler due to increased habitat management in the core breeding range in the Lower Peninsula of Michigan during 1990-2000. We collected records and conducted searches for the species in Michigan's Upper Peninsula and Wisconsin over 1978-2000. During that time 25 males were found in Wisconsin and 90 males in the Upper Peninsula. We documented colonization of Michigan's Upper Peninsula by six ringed males from the Lower Peninsula of Michigan. Four ringed birds also moved back to the core breeding range, including two males that made two-way movements between the core breeding range and the Upper Peninsula. Thirty-seven females were observed with males from 1995 to 2000, all in Michigan. Nesting activities were noted for 25 pairs and at least nine nests fledged young. One male ringed as a fledgling returned to breed in two subsequent years. After a 19-year period of population stability, the Kirtland's warbler population increased four-fold during 1990-2000, most likely in response to a tripling in habitat area. This increase in sightings and documented breeding may be related to habitat availability in Michigan's Upper Peninsula and to saturation of habitat in the main breeding range. The increase in extra-limital records during 1995-1999 corresponds to the time when the population went from the minimum to the maximum projected population densities, and a decline in natural wildfire habitat was just offset by new managed habitat for the Kirtland's warbler. © 2003 FFI.
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1197. **Potential effects of groundcover restoration on breeding bird communities in longleaf pine stands.**
Rutledge, B. T. and Conner, L. M.
Wildlife Society Bulletin 30(2): 354-360. (2002)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: avian community/ Conservation Reserve Program/ CRP/ ecosystem management/ Georgia/ longleaf pine/ native groundcover/ Pinus palustris/ restoration/ species diversity/ avifauna/ breeding population/ forest ecosystem/ ground cover/ restoration ecology/ United States/ Aimophila aestivalis/ Contopus virens/ Dendroica pinus/ Dumetella carolinensis/ Molothrus ater/ Passerina cyanea/ Pinus palustris
Abstract: The longleaf pine (Pinus palustris) ecosystem is one of the most endangered ecosystems in the United States. Recent incentives have led to increased interest in longleaf pine restoration. These restoration efforts often emphasize reestablishing native groundcovers, yet there have been no studies that address the role of native groundcover on breeding bird communities within longleaf pine forests. Therefore, we studied breeding bird communities in mature longleaf pine stands with either native or disturbed groundcovers to determine the likely effects of groundcover reestablishment associated with longleaf pine reforestation. Avian species richness and diversity did not differ (P=0.823, P=0.571, respectively), and avian community similarity was high (Morisita's index=0.98) between native and disturbed groundcover. However, pine warblers (Dendroica pinus), gray catbirds (Dumetella carolinensis), eastern wood-pewees (Contopus virens), brown-headed cowbirds (Molothrus ater), and Bachman's sparrows (Aimophila aestivalis) were more abundant (P≤0.10) in areas with native groundcover, whereas indigo buntings (Passerina cyanea) were more abundant (P=0.058) in areas with disturbed groundcover. Although groundcover restoration may benefit some avian populations, overall avian species richness, diversity, and community composition may be unaffected. Restoration of native groundcover may be best justified for aesthetic values and as a tool to facilitate long-term stand management using prescribed fire.
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1198. **Potential indicators of the impacts of forest management on wildlife habitat in northeastern Ontario: A multivariate application of wildlife habitat suitability matrices.**
Malcolm, Jay R.; Campbell, Brian D.; Kuttner, Ben G.; and Sugar, Alissa
Forestry Chronicle 80(1): 91-106. (2004)
NAL Call #: 99.8 F7623; ISSN: 0015-7546
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land zones/ North America/ Canada/ Amphibia/ Aves/ Mammalia/ Reptilia: forestry/ forest management/ Impacts on wildlife habitat/ potential indicators/ habitat management/ environmental indicators/ forest management impacts on wildlife habitat/ forest and woodland/ boreal forests/ Ontario/ Amphibia/ amphibians/ birds/ chordates/ mammals/ reptiles/ vertebrates
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1199. **Precommercial thinning reduces snowshoe hare abundance in the short term.**
Griffin, Paul C. and Mills, L. Scott
Journal of Wildlife Management 71(2): 559-564. (2007)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Carnivora/ Felidae/ Lagomorpha/ Leporidae/ Lepus americanus/ Lynx canadensis/ food supply/ forests/ ecosystems/ forestry practices/ habitat alterations/ forestry thinning techniques/ habitat management/ habitat use/ Lepus americanus/ Lynx canadensis/ predators/ mammals/ foods-feeding/ mammalian prey abundance/ Montana/ precommercial thinning/ young montane and subalpine forests/ wildlife-human relationships/ commercial enterprises/ conservation/ wildlife management/ diets/ disturbances/ land zones/ nutrition/ predation
Abstract: Management of young forests is not often considered in conservation plans, but young forests provide habitat for some species of conservation concern. Snowshoe hares (Lepus americanus), critical prey of forest carnivores including the United States federally threatened

Canada lynx (Lynx canadensis), can be abundant in young montane and subalpine forests with densely spaced saplings and shrub cover. Precommercial thinning (PCT) is a silvicultural technique that reduces sapling and shrub density on young forest stands. We tested for effects of PCT on snowshoe hare abundance for 2 years after experimental treatment at 3 replicate study areas. We also tested the effectiveness of a precommercial thinning with reserves (PCT-R) prescription, where 20% of the total stand was retained in uncut quarter-hectare patches. All stands were in montane-subalpine coniferous forests of western Montana, USA, where there is a persistent population of Canada lynx. Posttreatment changes in abundance were strongly negative on stands treated with standard PCT prescriptions (100% of the stand was treated), relative to both controls and stands treated with PCT-R. Trapping, snowtrack, and winter fecal-pellet indices indicated that snowshoe hares used the quarter-ha retention patches more than thinned portions of the PCT-R-treated stands in winter. We suggest that managing forest landscapes for high snowshoe hare abundance will require adoption of silvicultural techniques like PCT-R for stands that will be thinned, in addition to conservation of structurally valuable early and late-successional forest stands.
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1200. **Predicting the impacts of forest management on woodland caribou habitat suitability in black spruce boreal forest.**
Brown, G. S.; Rettie, W. J.; Brooks, R. J.; and Mallory, F. F.
Forest Ecology and Management 245(1-3): 137-147. (June 2007)
NAL Call #: SD1.F73
Descriptors: forest habitats/ wildlife habitats/ Rangifer tarandus/ habitat preferences/ boreal forests/ forest management/ optimization/ timber management/ timber supply/ logging/ simulation models/ spatial data/ anthropogenic activities/ wildlife management/ Ontario/ resource selection function/ natural resources, environment, general ecology, and wildlife conservation/ animal ecology and behavior/ forestry production harvesting and engineering/ computer and library sciences/ forestry production general
This citation is from AGRICOLA.

1201. **The preliminary effects of wildlife stand improvements and low intensity prescribed burns on bat populations on the Buffalo Ranger District, Ozark National Forest, Arkansas.**
Jackson, Jeremy L.; Wilhide, J. D.; and Prescott, Shane
Bat Research News 42(4): 162. (2001)
NAL Call #: QL737.C5 B328; ISSN: 0005-6227
Descriptors: habitat management/ prescribed burns/ forest management/ bats/ Ozark National Forest/ Arkansas
Abstract: The effects of forest management on bat populations is a concern in many of our National Forests. Wildlife stand improvements (WSI) and low intensity prescribed burns can alter the age and condition of the forest, and this can affect the abundance and diversity of bat species. These management practices were investigated on the Buffalo Ranger District, Ozark National Forest in northwestern Arkansas. The habitat consists primarily of deciduous hardwoods with small compartments of conifers scattered throughout the district. The district is approximately 241,000 acres of which 30,000 acres are designated wilderness areas. For this investigation on the effects of these management practices on the bat population, observations were made in areas where WSI's and low intensity prescribed burns will be conducted in the fall of 2001 and spring of 2002, respectively. Two controls were chosen in areas where WSI's and low intensity prescribed burns have been conducted in the past.
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1202. **Prescribed burning effects on summer elk forage availability in the subalpine zone, Banff National Park, Canada.**
Sachro, L. L.; Strong, W. L.; and Gates, C. C.
Journal of Environmental Management 77(3): 183-193. (2005)
NAL Call #: HC75.E5J6 ; ISSN: 0301-4797
Descriptors: conservation measures/ nutrition/ terrestrial habitat/ land zones/ North America/ Canada/ Cervus elaphus: habitat management/ prescribed burning/ food availability/ summer forage availability/ effects of prescribed burning habitat management/ forest and woodland/ Coniferous forest/ Alberta/ Banff National Park/ Mammalia, Artiodactyla, Cervidae/ chordates/ mammals/ ungulates/ vertebrates
Abstract: The effects of prescribed burning on forage abundance and suitability for elk (Cervus elaphus) during the snow-free season was evaluated in east-central Banff National Park, Canada. Six coniferous forest and mixed shrub-herb plant communities (n = 144 plots), and 5223 ha of burned (n = 13 1) vegetation 12 years old were sampled using a stratified semi-random design. Sampling units represented various combinations of vegetation, terrain conditions, and stand ages that were derived from digital biophysical data, with plant communities the basic unit of analysis. Burning coniferous forest stands reduced woody biomass. and increased herbaceous forage from 146 to 790 kg/ha. Increases commonly occurred in the percent cover of hairy wild rye (Leymus innovatus (Beal) Pigler) and fireweed (Chamerion angustifolium (L.) Holub.). The herbaceous components of mixed shrub-herb communities increased from 336747 kg/ha to 517-1104 kg/ha in response to burning (P 0.025, Mann-Whitney U-test). Browse biomass (mostly Salix spp. and Betula nana L.) increased >=220% (P = 0.003, Mann-Whitney U-test) from 653 kg/ha in deciduous shrub types. Elk preferences for unburned and burned vegetation-types were assessed as low and moderate, respectively. Potential summer carrying capacity, based on forage availability, increased from eight to 28 elk/100 km^2 within burned areas, whereas spring grazing potential rose from 13 to 45 elk/100 km^2. Most of the increase (73%) was attributable to changes within burned Engelmann Spruce stands, which composed 58% of the burned area. © 2005 Elsevier Ltd. All rights reserved.
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1203. **Prescribed burning to restore mixed-oak communities in southern Ohio: Effects on breeding-bird populations.**
Artman, Vanessa L.; Sutherland, Elaine K.; and Downhower, Jerry F.
Conservation Biology 15(5): 1423-1434. (2001)
NAL Call #: QH75.A1C5; ISSN: 0888-8892
Descriptors: birds/ ecosystems/ forests, deciduous/ oak/ forests, mixed/ fires-burns/ habitat management/

restoration/ breeding/ communities/ density/ population ecology/ Quercus spp./ Ohio, Southern
Abstract: Fire is being experimentally reintroduced to the forests of southern Ohio to determine its effectiveness in restoring and maintaining mixed-oak (Quercus spp.) forest communities. The authors studied the effects of repeated burning (one to four years of annual burning) and recovery (one year after burning) on the breeding bird community. Burning resulted in incremental but temporary reductions in the availability of leaf litter, shrubs, and saplings, but it did not affect trees, snags, or understory vegetation cover. Of 30 bird species monitored, four were affected negatively and two were affected positively by burning. Population densities of ovenbirds (Seiurus aurocapillus), worm-eating warblers (Helmitheros vermivorus), and hooded warblers (Wilsonia citrina) declined incrementally in response to repeated burning and did not recover within one year after burning, suggesting a lag time in response to the changes in habitat conditions. Densities of northern cardinals (Cardinalis cardinalis) fluctuated among years in the control units, but remained low in the burned units. Densities of American robins (turdus migratorius) and eastern wood-pewees (Contopus virens) increased in response to burning, but these increases were apparent only after several years of repeated burning. In general, burning resulted in short-term reductions in the suitability of habitat for ground, and low-shrub-nesting birds, but it improved habitat for ground- and aerial-foraging birds. Overall, there were no changes in the composition of the breeding-bird community. Total breeding bird population levels were also unaffected by burning. The authors' results suggest that prescribed burning applied on a long-term basis or across large spatial scales is likely to have adverse effects on ground- and low-shrub-nesting bird species, but other changes in the composition of the breeding-bird community are likely to be minimal as long as the closed-canopy forest structure is maintained within the context of prescribed burning.
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1204. **Prescribed fire and raccoon use of longleaf pine forests: Implications for managing nest predation?**
Jones, D. D.; Conner, L. M.; Storey, T. H.; and Warren, R. J.
Wildlife Society Bulletin 32(4): 1255-1259. (2004)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2004)032 [1255:PFARUO]2.0.CO;2.
Descriptors: Georgia/ nest predation/ predation management/ prescribed fire/ Procyon lotor/ raccoon/ radiotelemetry/ carnivore/ management practices/ nest predation/ nesting success/ predator control/ prescribed burning/ Aves/ Pinus palustris/ Procyon/ Procyon lotor/ Quercus
Abstract: If nest predation at least partially results from incidental encounters between predators and nests, then management practices that reduce the probability of such encounters could increase nest success. Therefore, we studied effects of prescribed fire on raccoon (Procyon lotor; a documented nest predator) use of longleaf pine (Pinus palustris) and mixed longleaf pine-hardwood (Quercus spp.) forests in southwestern Georgia during the nesting seasons of ground- and shrub-nesting birds (i.e., mid-April-mid-August) of 1999 and 2000. Forested stands that had been burned since the previous growing season were 52% and 80% less likely to be used by raccoons than unburned stands during 1999 and 2000, respectively. Overall, prescribed fire after the previous growing season resulted in a 62% reduction in probability of use by raccoons during the nesting season. Prescribed fire may serve as a tool to reduce incidental encounters between raccoons and nests, but further work is needed to determine the overall effect of prescribed fire on nest success.
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1205. **Presence and absence of bats across habitat scales in the upper coastal plain of South Carolina.**
Ford, W. Mark; Menzel, Jennifer M.; Menzel, Michael A.; Edwards, John W.; and Kilgo, John C.
Journal of Wildlife Management 70(5): 1200-1209. (2006)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Vespertilionidae/ Chiroptera/ Microchiroptera/ loblolly pine/ longleaf pine/ Myotis austroriparius/ Pinus palustris/ Pinus taeda/ southeastern myotis/ habitat use/ environmental restoration/ foods-feeding/ foraging habitat relationship/ forestry practices/ habitat alterations/ ecosystems/ habitat clutter/ habitat conservation/ insect abundance/ land zones/ nutrition/ riparian zone proximity/ South Carolina/ upper coastal plain/ wildlife management/ acoustical sampling/ bat foraging/ Carolina Bay/ echolocation/ habitat model/ pine savanna/ microchiroptera/ abundance/ distribution/ dispersion/ field technique/ vocalization/ ultra-infrasound
Abstract: During 2001, we used active acoustical sampling (Anabat II) to survey foraging habitat relationships of bats on the Savannah River Site (SRS) in the upper Coastal Plain of South Carolina. Using an a priori information-theoretic approach, we conducted logistic regression analysis to examine presence of individual bat species relative to a suite of microhabitat, stand, and landscape-level features such as forest structural metrics, forest type, proximity to riparian zones and Carolina bay wetlands, insect abundance, and weather. There was considerable empirical support to suggest that the majority of the activity of bats across most of the 6 species occurred at smaller, stand-level habitat scales that combine measures of habitat clutter (e.g., declining forest canopy cover and basal area), proximity to riparian zones, and insect abundance. Accordingly, we hypothesized that most foraging habitat relationships were more local than landscape across this relatively large area for generalist species of bats. The southeastern myotis (Myotis austroriparius) was the partial exception, as its presence was linked to proximity of Carolina bays (best-approximating model) and bottomland hardwood communities (other models with empirical support). Efforts at SRS to promote open longleaf pine (Pinus palustris) and loblolly pine (P. taeda) savanna conditions and to actively restore degraded Carolina bay wetlands will be beneficial to bats. Accordingly, our results should provide managers better insight for crafting guidelines for bat habitat conservation that could be linked to widely accepted land management and environmental restoration practices for the region.
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1206. **Presence of cavities in snags retained in forest cutblocks: Do management policies promote species retention?**
Everett, Kim T. and Otter, Ken A.
Canadian Field Naturalist 118(3): 354-359. (2004)
NAL Call #: 410.9 Ot8; ISSN: 0008-3550
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land zones/ Canada/ Vertebrata: forestry/ conservation/ habitat management/ snag retention/ forest cutblocks/ species retention/ habitat utilization/ snag cavity use/ forest and woodland/ British Columbia, Prince George area/ chordates/ vertebrates
Abstract: Tree cavities, which are frequently excavated by primary cavity nesters, are typically used by a number of avian and non-avian species and are thus important components in maintaining biodiversity in forest ecosystems. One way to provide these habitat opportunities in harvested areas is through the retention of snags. In this study, we assessed the habitat and snag characteristics that promote cavity excavation, using the presence of cavities to infer activity of primary cavity excavators. Snags retained closer to the forest/cutblock edge contained a greater density of cavities than trees further from edge. However, the proportion of cavities found within cutblocks declined at a more rapid rate with distance from edge than did those in adjacent forested stands. There was also a tendency for cavities to occur more frequently in trees that were at the advanced stages of decay. The results of our study suggest management for snags in harvest areas should include the retention of snags closer to the forest edge combined with incorporating trees showing signs of advanced decay.
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1207. **Prey ecology of Mexican spotted owls in pine-oak forests of northern Arizona.**
Block, W. M.; Ganey, J. L.; Scott, P. E.; and King, R.
Journal of Wildlife Management 69(2): 618-629. (2005)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2005)069 [0618:PEOMSO]2.0.CO;2.
Descriptors: Brush mouse/ deer mouse/ diet/ habitat selection/ Mexican spotted owl/ Mexican woodrat/ Neotoma mexicana/ Arizona/ Peromyscus boylii/ ponderosa pine-Gambel oak forest/ prey abundance/ prey habitat/ Strix occidentalis lucida/ diet/ habitat selection/ predator-prey interaction/ prey availability/ raptors/ relative abundance/ wildlife management/ Arizona/ Cervidae/ Cricetinae/ Mammalia/ Microtus mexicanus/ Muridae/ Neotoma/ Neotoma mexicana/ Peromyscus/ Peromyscus maniculatus/ Pinus ponderosa/ Quercus gambelii/ Strigiformes
Abstract: We studied Mexican spotted owl (Strix occidentalis lucida) diets and the relative abundance and habitat associations of major prey species in a ponderosa pine (Pinus ponderosa)-Gambel oak (Quercus gambelii) forest in north-central Arizona, USA, from 1990 to 1993. The owl's diet was comprised of 94% mammals by biomass and consisted of primarily the deer mouse (Peromyscus maniculatus), brush mouse (P. boylii), Mexican woodrat (Neotoma mexicana), and Mexican vole (Microtus mexicanus). Spotted owl prey in our study area were smaller on average than prey in other locations, and the total biomass of potential prey was less than that reported in other areas within the owl's geographic range. Although all prey populations exhibited seasonal fluctuations in relative abundance, only the deer mouse exhibited significant temporal variation in population abundance. The general pattern was for prey populations to rise during spring, peak during summer, decline in fall, and reach a winter low. Deer mice exhibited the greatest amplitude in population change as evidenced by the shift from a high of 12.2 mice/ha (SE = 2.3) during summer 1991 to a low of 3.3 mice/ha (SE = 0.7) during winter 1991-1992. Woodrats and brush mice used areas on slopes >20° with relatively more rocks and shrub cover than found in other areas. In contrast, deer mice were found in forests with relatively open understories and little Gambel oak. Conservation measures for the Mexican spotted owl must include management directed at sustaining or increasing prey numbers rather than assuming that managing for owl nesting and roosting habitat will provide favorable conditions for the prey as well. Management practices that increase and sustain shrub and herbaceous vegetation should receive the highest priority. This can be accomplished by thinning small diameter trees, using prescribed fire, and managing grazing pressures.
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1208. **Proposed forest management changes in southern Appalachian Mountain national forests should benefit bat conservation.**
Krusac, Dennis L.
Bat Research News 43(4): 157-158. (2002)
NAL Call #: QL737.C5 B328; ISSN: 0005-6227.
Notes: Conference: 32nd Annual North American Symposium on Bat Research, Burlington, VT, USA, November 06-09, 2002.
Descriptors: Chiroptera/ Corynorhinus rafinesquii/ Corynorhinus townsendii/ Myotis leibii/ Myotis sodalis/ Vespertilionidae/ forestry practices/ habitat alterations/ wildlife management/ prescribed burning/ U.S. Forest Service/ buffer zones/ caves/ channeled ephemeral drains/ cliffline habitats/ colony size/ forest management changes/ hibernacula/ man-made structures/ Rafinesque's big-eared bat/ Virginia big-eared bat/ eastern small-footed bat/ Indiana bat
Abstract: Currently, there are five national forests in the southern Appalachian Mountains of the eastern United States that are revising their forest management plans. The proposed management changes are a significant step forward in the U.S. forest Service's effort to conserve biological diversity. The management direction to benefit bats is a huge change from the direction in the early forest plans they are replacing. The current planning effort is an attempt to get consistent management direction in place across national forest lands stretching from northern Virginia to northern Alabama. Cliffline habitat, important to Virginia big-eared bat Corynorhinus townsendii virginianus, Rafinesque's big-eared bat C. rafinesquii, and eastern small-footed bat Myotis leibii will be protected with a 100 foot buffer above and a 200 foot buffer below the cliff face. The only management that will occur in the buffer zone will be done to benefit cliffline dependent species. All caves and mines are assumed to be used by federally threatened or endangered bats and protective measures are put in place until it is proven these sites are not important to listed bats or large concentrations of any bat species. Buffer zones ranging from one-quarter mile to five miles are placed around caves and mines depending on species

present and season of the year. For example, prescribed fire is prohibited within a five-mile buffer of Indiana bat M. sodalis hibernacula during the fall swarm to protect and avoid disturbing roosting bats. Gates or other structures are constructed and maintained at entrances to caves and mines occupied by federally listed species, rare species or significant populations of other species to minimize human disturbance. Before old buildings and other man-made structures are modified or demolished, they are surveyed for bats. If significant bat roosting is found within such structures, these structures will be maintained or alternate roosts suitable for the species and colony size will be provided before their adverse modification or destruction. Forested corridors are maintained along watercourses including channeled ephemeral drains. All immediately suitable roost trees are retained in timber harvest activities. Proposed management direction will be discussed in detail. The draft forest plan revisions will be available for public review and comment early in 2003.
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1209. **Quantifying the impacts on biodiversity of policies for carbon sequestration in forests.**
Matthews, S.; O'Connor, R.; and Plantinga, A. J.
Ecological Economics 40(1): 71-87. (2002)
NAL Call #: QH540.E26; ISSN: 09218009.
Notes: doi: 10.1016/S0921-8009(01)00269-5.
Descriptors: avian abundance/ carbon sequestration/ econometric models/ land-use change/ wildlife models/ afforestation/ biodiversity/ birds/ carbon sequestration/ forestry policy/ United States
Abstract: There is currently a great deal of interest in the use of afforestation (conversion of non-forest land to forest) to reduce atmospheric concentrations of carbon dioxide. To date, economic analyses have focused on the costs of forest carbon sequestration policies related to foregone profits from agricultural production. No studies have examined additional costs or benefits associated with impacts on biodiversity. The main objective of this paper is to estimate the changes in farmland and forest bird populations that are likely to occur under an afforestation policy. Econometric models of land use are used to simulate the response of private landowners to subsidies for tree planting on agricultural land. We evaluate subsidies that achieve conversion of 10% of the total agricultural land in each of three U.S. states (South Carolina, Maine, and southern Wisconsin). Bird density estimates are derived for 615 species with data from the national Breeding Bird Survey. Percentage changes in agricultural and forest land for each county are applied to county-level estimates of bird densities for farmland and forest birds. Despite considerable spatial variation in agricultural land conversion rates and farmland bird distributions within these states, statewide losses of farmland birds were relatively uniform at 10.8-12.2%. Increases in forest bird populations, however, varied substantially between states: 0.3% in Maine, 2.5% in South Carolina, and 21.8% in southern Wisconsin. Surprisingly, a net loss in total bird populations results in all three states (-2.0% in Maine, -2.3% in South Carolina, and -1.1% in southern Wisconsin), despite the prevailing wisdom as to bird-rich forests. The loss is due to the coincidence of centers of high farmland bird richness and low forest bird richness with areas economically suited to conversion. Additional gains in forest species may result, however, if afforestation within the economically optimal counties is concentrated to fill in existing forest fragments presently suffering avian losses to edge predators. Our results thus show that assessments of the biological consequences of afforestation for carbon sequestration must consider both current land cover and the distributional patterns of organisms as well as the policy's conversion goal.
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1210. **The relationship between forest management and amphibian ecology: A review of the North American literature.**
DeMaynadier, P. G. and Hunter, M. L.
Environmental Reviews 3(3/4): 230-261. (1995)
NAL Call #: GE140.E59; ISSN: 1181-8700.
Notes: Literature review.
Descriptors: amphibia/ species diversity/ geographical distribution/ microhabitats/ forests/ clearcutting/ age/ natural regeneration/ forest plantations/ prescribed burning/ roads/ riparian forests/ forest management/ plant succession/ nature conservation/ North America/ species abundance/ biodiversity/ logging roads
This citation is from AGRICOLA.

1211. **Relationships between avian richness and landscape structure at multiple scales using multiple landscapes.**
Mitchell, M. S.; Rutzmoser, S. H.; Wigley, T. B.; Loehle, C.; Gerwin, J. A.; Keyser, P. D.; Lancia, R. A.; Perry, R. W.; Reynolds, C. J.; Thill, R. E.; Weih, R.; White, D.; and Wood, P. B.
Forest Ecology and Management 221(1-3): 155-169. (2006)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2005.09.023.
Descriptors: avian communities/ forest management/ heterogeneity/ landscape/ richness/ United States, southeastern region/ biodiversity/ mathematical models/ regression analysis/ avian communities/ landslides/ avifauna/ land management/ landscape structure/ species richness/ regression analysis/ Aves
Abstract: Little is known about factors that structure biodiversity on landscape scales, yet current land management protocols, such as forest certification programs, place an increasing emphasis on managing for sustainable biodiversity at landscape scales. We used a replicated landscape study to evaluate relationships between forest structure and avian diversity at both stand and landscape-levels. We used data on bird communities collected under comparable sampling protocols on four managed forests located across the Southeastern US to develop logistic regression models describing relationships between habitat factors and the distribution of overall richness and richness of selected guilds. Landscape models generated for eight of nine guilds showed a strong relationship between richness and both availability and configuration of landscape features. Diversity of topographic features and heterogeneity of forest structure were primary determinants of avian species richness. Forest heterogeneity, in both age and forest type, were strongly and positively associated with overall avian richness and richness for most guilds. Road density was associated positively but weakly with avian richness. Landscape variables dominated all models generated, but no consistent patterns in metrics or scale were evident. Model fit was strong for neotropical migrants and relatively weak for short-distance migrants and resident species. Our

models provide a tool that will allow managers to evaluate and demonstrate quantitatively how management practices affect avian diversity on landscapes.
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1212. **Relationships between deer mice and downed wood in managed forests of southern British Columbia.**
Craig, Vanessa J.; Klenner, Walt; Feller, Michael C.; and Sullivan, Thomas P.
Canadian Journal of Forest Research 36(9): 2189-2203. (2006)
NAL Call #: SD13.C35; ISSN: 0045-5067
Descriptors: commercial activities/ conservation measures/ ecology/ population dynamics/ terrestrial habitat/ land zones/ North America/ Canada/ Peromyscus maniculatus: forestry/ habitat management/ population density/ population structure/ survival/ habitat utilization/ downed wood in managed forest habitat/ forest and woodland/ British Columbia/ Mammalia, Rodentia, Muridae/ chordates/ mammals/ rodents/ vertebrates
Abstract: We examined the relationship between deer mice (Peromyscus maniculatus (Wagner)) and downed wood in a low-elevation Douglas-fir (Pseudotsuga menziesii (Mirb.) Franco) forest and a high-elevation Engelmann spruce (Picea engelmannii Parry ex Engelm.) - subalpine fir (Abies lasiocarpa (Hook.) Nutt.) forest in the south-central interior of British Columbia. We experimentally manipulated the volume of downed wood on clear-cut and forested sites and monitored the response of deer mice with a mark-recapture study to assess population densities and survival and reproduction rates. Populations responded positively to harvesting at the low-elevation but not the high-elevation study area. At the low-elevation study area, the population dynamics of deer mice on clear-cut and forested treatments were not positively associated with patterns of vegetation cover or increasing downed-wood volumes. Instead, populations on clearcuts appeared to increase in response to an unknown factor associated with lower volumes. No relationship was detected between population dynamics of deer mice and downed-wood volumes at the high-elevation site. The population dynamics of deer mice on forests at the high-elevation site appeared to be more closely related to vegetation cover than to downed wood. The results indicated that downed wood is not a critical habitat component for deer mice in the south-central interior of British Columbia.
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1213. **Relationships between herpetofaunal community structure and varying levels of overstory tree retention in northern Alabama: First-year results.**
Zachary, I. Felix; Wang, Yong; and Schweitzer, Callie Jo
In: Proceedings of the 12th Biennial Southern Silvicultural Research Conference, General Technical Report-SRS 71/ Connor, Kristina F.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2004. pp. 7-10.
http://www.treesearch.fs.fed.us/pubs/6304
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land zones/ Amphibia/ Reptilia: forestry/ overstory tree retention/ community structure effects/ habitat management/overstory tree retention effects/ forest and woodland/ upland forest habitat/ Alabama/ Jackson County/ Cumberland Plateau/ Amphibia/ amphibians/ chordates/ reptiles/ vertebrates
Abstract: Forest managers are increasingly considering the effects their decisions have on the biodiversity of an area. However, there is often a lack of data upon which to evaluate these decisions. We conducted research to examine the relationship between silvicultural techniques, particularly shelterwood cuts with varying levels of basal area retention, and the community structure of amphibians and reptiles in the Cumberland Plateau of northern Alabama. We have implemented five levels of basal area retention at 15 plots (4 ha per site): 0 percent, 25 percent, 50 percent, 75 percent, and control (100 percent) with three replicates each. Drift fences with pitfall and funnel traps, and coverboards were used to quantify herpetofauna at each site. We predicted that plots with high basal area would provide better conditions for amphibians, sites with low basal area would be more favorable for reptiles, and sites with intermediate basal area would contain the most structurally and climatically complex habitats, and thus the highest species richness of herpetofauna. Our research will provide both a theoretical framework furthering our understanding of factors affecting the distribution and abundance of these organisms and applicable data that may be used to assist forest managers in sustaining these communities.
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1214. **Relationships between small mammal community structure and varying levels of overstory tree retention in northern Alabama.**
Felix, Z. I.; Wang, Y.; Schweitzer, C. Jo; and Gatens, L. J.
17th Colloquium on Conservation of Mammals in the Southeastern United States, Proceedings: 20-21. (2007).
Notes: Conference: 17th Colloquium on Conservation of Mammals in the Southeastern United States, Destin, Florida, February 15-16, 2007.
Descriptors: fences/ microhabitat/ forest treatment/ forestry practices/ small mammals/ Alabama
Abstract: Forest managers are increasingly considering the effects their decisions have on the biodiversity of an area. However, there is often a lack of data upon which to evaluate these decisions. We conducted research to examine the relationship between silvicultural techniques, particularly shelterwood cuts with varying levels of basal area retention, and the community structure of small mammals on the Cumberland Plateau of northern Alabama. We implemented three levels of basal area retention at 15 plots (4 ha/site)" clearcuts, 25-50%, and 75-100% retention with three replicates each. Drift fences with pitfall traps and funnel traps were used to trap mammals at each side. A total of eight species were captured on the sites including Peromyscus leucopus, P. gossypinus, Sorex longirostris, S. fumeus, S. hoyi, Blarina brevicauda, Cryptotis parva, and Microtus pinetorum. The only species showing a statistical differences in mean relative abundance were Cryptotis parva and Microtus pinetorum, both of which were more abundant on cut plots, with Cryptotis especially abundant on clearcuts. other species showed noticeable trends with respect to retention treatment, but these were not significant. Species richness, evenness, or diversity did not differ by treatment. Canonical Correspondence Analysis showed several species related to microhabitat variables such as herbaceous and woody regrowth on cut plots while abundance of the two Peromyscus seemed to relate to high basal area and slash coverage. These data, while only collected for one year, indicate some of the unique ways

small mammals respond to a common landuse in the Cumberland Plateau and suggest interesting avenues for further study.
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1215. **Reproductive success and habitat selection of Swainson's warbler in managed pine versus bottomland hardwood forests.**
Henry, Donata R.
New Orleans, LA: Tulane University, 2005.
Notes: Degree: PhD; Advisor: Sherry, Thomas W.
Descriptors: birds/ economic valuation/ population density/ habitat quality/ habitat selection/ loblolly pine/ Pinus taeda/ pine plantations/ habitat use/ bottomland hardwood forests/ reproductive success
Abstract: Understanding how commercial forests can be managed to benefit wildlife has important conservation implications, as silvicultural landscapes occur globally and have high economic value. in this study, I compared two habitat types in southeastern Louisiana, even-aged loblolly pine (Pinus taeda) and bottomland hardwood forests, both used for breeding by Swainson's Warbler (Limnothlypis swainsonii; SWWA). I investigated habitat quality and habitat selection patterns of SWWA to (1) assess the conservation value of pine plantations for understory-nesting birds, (2) identify ecological factors important in habitat selection at multiple scales, and (3) contribute needed information on the natural history and status of a species of conservation concern. the density of breeding pairs, timing of nesting, clutch size, hatching rates, and reproductive success of SWWA did not differ significantly between habitats. These results, coupled with similar patterns of habitat use at the nest site, suggest that the habitats are ecologically analogous for breeding. Similarities in morphology and behavior also suggest that ecotypic variation does not account for differences in ecological success or patterns of habitat selection in the two forest types. Predictions about habitat selection mechanisms were tested based on the foraging behaviors and nesting requirements of SWWA at specific scales. I found support for four hypotheses (Foraging Substrate, Potential Nest Site, Nest Decoy, and Nest Concealment), demonstrating that SWWA use different cues at the habitat, territory, nest patch, and nest site scales, but consistently across habitat types. Vegetation characteristics contributing to the nesting and foraging needs of this species served as mechanisms for habitat selection. These results support the conclusion that SWWA has expanded its breeding range into an anthropogenic habitat that meets its basic nesting requirements, despite structural and floristic differences between the two forest types. The implication of these findings is that the conservation value of the enormous area of commercial pine plantations in the southeastern United States can be significantly augmented by appropriate management choices.
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1216. **Reproductive success of forest-dependent songbirds near an agricultural corridor in south-central Indiana.**
Ford, T. B.; Winslow, D. E.; Whitehead, D. R.; and Koukol, M. A.
Auk 118(4): 864-873. (2001)
NAL Call #: 413.8 AU4 ; ISSN: 00048038
Descriptors: agricultural land/ brood parasitism/ ecological impact/ edge effect/ habitat corridor/ nest predation/ reproductive success/ songbird/ United States/ Molothrus ater
Abstract: Potential source populations of forest-breeding Neotropical migrant birds may be threatened by anthropogenic changes that increase brood parasitism by Brown-headed Cowbirds (Molothrus ater) and nest predation in heavily forested breeding areas. In south-central Indiana, corridors of agriculture and rural development, ranging from <50 m to several thousand meters in width, penetrate interior portions of the heavily forested landscape. These corridors provide habitat for cowbirds and nest predators. We monitored breeding success of six species of Neotropical migrants and one resident species near an agricultural corridor and in interior forest. We found that nest survival was lower near the agricultural corridor for most of the species in the nestling stage, but no consistent difference in nest survival was detected during the egg stage. Levels of cowbird parasitism were generally elevated near the agricultural corridor. Estimates of the number of fledglings per nesting attempt indicated that seasonal productivity was lower near the agricultural corridor for six of the seven species. Status of populations of birds in south-central Indiana as sources in the Midwest may be compromised by extensive intrusion of agricultural corridors within the contiguous, heavily forested landscape.
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1217. **Reproductive success of Lewis's woodpecker in burned pine and cottonwood riparian forests.**
Saab, Victoria A. and Vierling, Kerri T.
Condor 103(3): 491-501. (2001)
NAL Call #: QL671.C6; ISSN: 0010-5414
Descriptors: Melanerpes lewis/ birds/ productivity/ ecosystems/ ponderosa pine/ cottonwood/ riparian habitat/ fires-burns/ environmental factors/ nests-nesting/ nest predation/ predators/ wildlife-habitat relationships/ habitat alterations/ agricultural practices/ habitat management/ Lewis' woodpecker/ Pinus ponderosa/ Pinus spp./ Populus deltoides/ Colorado/ Idaho
Abstract: Lewis's woodpecker (Melanerpes lewis) has been characterized as a "burn specialist" because of its preference for nesting within burned pine forests. No prior study, however, has demonstrated the relative importance of crown-burned forests to this woodpecker species by examining its reproductive success in different forest types. The authors studied breeding Lewis's woodpeckers in cottonwood (Populus fremontii) riparian forest patches of Colorado and crown-burned ponderosa pine (Pinus ponderosa) forests of Idaho to compare their reproductive success, productivity, and potential source-sink status in the two forest types. Daily nest survival rates were significantly lower in cottonwood compared to burned pine forests. Nesting success was 46% (n = 65) in cottonwood forests and 78% (n = 283) in burned pine forests. Proportion of nests destroyed by predators was significantly higher in cottonwood forests (34%) compared to burned pine forests (16%). The authors consistently found crown-burned forests to be potential source habitat, whereas cottonwood riparian sites were more often concluded to be potential sink habitat. Cottonwood riparian forests were surrounded primarily by an agricultural landscape where the composition and abundance of nest predators was likely very different than the predator assemblage

occupying a large scale burn in a relatively natural landscape. Conversion of riparian and adjacent grassland landscapes to agriculture and prevention of wildfire in ponderosa pine forests have likely reduced nesting habitat for this species. Prescribed understory fire is the prevailing management tool for restoring ponderosa pine ecosystems. Conditions created by crown fire may be equally important in maintaining ponderosa pine systems and conserving nesting habitat for the Lewis's woodpecker.
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1218. **Residual tree retention ameliorates short-term effects of clear-cutting on some boreal songbirds.**
Tittler, R.; Hannon, S. J.; and Norton, M. R.
Ecological Applications 11(6): 1656-1666. (2001)
NAL Call #: QH540.E23 ; ISSN: 10510761
Descriptors: Alberta, Canada/ bird communities/ boreal mixed-wood/ clear-cut logging/ forest management/ forest songbirds/ neotropical migrants/ partial harvesting/ Populus tremuloides/ residual tree retention/ songbird conservation/ abundance/ clearcutting/ forest management/ songbirds/ species conservation/ Canada/ Animalia/ Aves/ Passeri/ Populus tremuloides
Abstract: Retention of residual trees in "cutblocks," logged blocks of forest, has been proposed as a method to conserve songbirds in landscapes fragmented by clear-cut logging. We examined songbird communities in the boreal mixed-wood forest of Alberta, Canada, to investigate the effect on songbird abundance of (1) logging and (2) retaining variable densities of residual trees in cutblocks (10-133 trees/ha or basal area of 0.50-10.65 m^2). We surveyed songbirds in logged and forested, aspen-dominated, mixed-wood stands in the year before, the year after, and three years after logging. We analyzed changes in abundance of 27 common songbird species: 23 present in the forest prior to logging and four that appeared after logging. Ten species declined with logging and were termed "forest species." Ten more species did not change with logging and were called "habitat generalists." The seven species that increased with logging were called "cutblock species." When the effect of residual tree retention was examined in terms of basal area (rather than density) of residual trees, more songbird species were found to be both positively and negatively affected by residual tree retention, despite the fact that the two tree measures were highly correlated. In the first year after logging, four bird species (two forest, one generalist, and one cutblock) increased, and none decreased with increasing residual tree retention in cutblocks. In the third year after logging, again four species increased with increasing retention, but these were different species than in the first year after logging (one forest and three generalist species). Furthermore, four cutblock species decreased with increasing retention. Based on these findings, we conclude that retention of residual trees may be beneficial to some species, although conservation of unlogged reserves is also important. Most importantly, we recommend that research be continued to examine a larger range of tree retention and longer term effects on the avifauna.
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1219. **Resistance of forest songbirds to habitat perforation in a high-elevation conifer forest.**
Leupin, Ernest E.; Dickinson, Thomas E.; and Martin, Kathy
Canadian Journal of Forest Research 34(9): 1919-1928. (2004)
NAL Call #: SD13.C35; ISSN: 0045-5067
Descriptors: British Columbia/ communities/ forests/ ecosystems/ forestry practices/ habitat alterations/ habitat management/ high elevation conifer forest/ perforation harvest patterns/ population ecology/ Sicamous area/ wildlife-human relationships/ Canada/ commercial enterprises/ conservation/ wildlife management/ disturbances/ habitat use/ land zones
Abstract: We examined responses of songbirds breeding in high-elevation Engelmann spruce / subalpine fir (Picea englemannii Parry ex Engelm. / Abies lasiocarpa (Hook.) Nutt.) forests to four perforation harvest patterns near Sicamous, British Columbia. Each treatment removed approximately 30% of the timber volume but varied the size of openings from 10-ha clearcuts to small gaps (<0.01 ha), where individual trees were removed. Abundance and diversity of breeding songbirds were monitored over a 4-year period, including 2 years each of pre- and post-harvest conditions. Two-thirds of the original songbird assemblage consisted of mature forest species that showed only modest changes in relative abundance following harvest. Two species showed significant responses to harvesting: golden-crowned kinglet (Regulus satrapa Lichtensteins) declined significantly postharvest, with the largest declines occurring in single-tree and 10-ha treatments; and dark-eyed junco (Junco hyemalis L.) responded positively to harvest. At high elevations, 30% volume removal allowed much of the songbird community to be accommodated immediately after harvest. Future research should address whether the apparent short-term accommodation of high-elevation birds persists across time and as more of the continuous forest cover is removed.
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1220. **Response of amphibian and reptile populations to vegetation maintenance of an electric transmission line right-of-way.**
Yahner, R. H.; Bramble, W. C.; and Byrnes, W. R.
Journal of Arboriculture 27(4): 215-221. (2001)
NAL Call #: SB436.J6; ISSN: 02785226
Descriptors: amphibians/ herbicides/ reptiles/ right-of-way/ salamanders/ snakes/ tree control/ turtles/ forest management/ herbicide/ relative abundance/ reptiles/ species diversity/ United States/ Ambystoma jeffersonianum/ Plethodon cinereus
Abstract: A 2-year study of amphibian and reptile populations was conducted on a 500-kV transmission line right-of-way (ROW) of PECO Energy in the Piedmont Physiographic Province, Montgomery County, Pennsylvania, U. S., from June through July 1999, September through October 1999, and March through October 2000. The objectives were to compare the diversity and relative abundance of amphibians and reptiles between the ROW and the adjacent forest, among five treatment units on the ROW, and between wire and borders zones on treatments on the ROW. Eight species were observed during the study, and the two most common species were Jefferson salamanders (Ambystoma jeffersonianum) and redback salamanders (Plethodon cinereus). All eight species were noted on the ROW, but only Jefferson and

redback salamanders occured in the adjacent forest. The number of species ranged from six species in the mowing plus herbicide unit to three each in the stem-foliage spray and foliage spray units. All species were found in the wire zones compared to only five species in the border zones. The ROW contained a greater diversity of amphibian and reptile species than the adjacent forest. Because forest-management practices can have negative impacts on populations of amphibians and reptiles, this study provides valuable information on forest-management practices required for the conservation of amphibians and reptiles.
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1221. **Response of amphibians to partial cutting in a coastal mixed-conifer forest: Management practices for retaining amphibian habitat in the Vancouver forest region.**
Dupuis, Linda A. and Waterhouse, F. Louise
Vancouver Forest Region Forest Research Extension Note EN-005: 1-12. (2001).
http://www.for.gov.bc.ca/RCO/research/wildlifereports/en005.pdf
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land zones/ Canada/ habitat management/ forest habitat retention practices/ community structure/ timber harvest practices/ population dynamics/ forest and woodland/ coastal mixed conifer forest/ abundance/ British Columbia/ Vancouver Forest Region/ population responses/ Amphibia/ amphibians/ chordates/ vertebrates
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1222. **Response of avian bark foragers and cavity nesters to regeneration treatments in the oak-hickory forest of northern Alabama.**
Wang, Yong; Schweitzer, Callie Jo; and Lesak, Adrian A.
In: Proceedings of the 13th Biennial Southern Silvicultural Research Conference, General Technical Report-SRS 92/ Connor, Kristina F.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2006. pp. 17-20.
http://www.treesearch.fs.fed.us/pubs/23305
Descriptors: commercial activities/ conservation measures/ nutrition/ feeding behavior/ reproduction/ reproductive behavior/ ecology/ terrestrial habitat/ land zones/ Aves: forestry/ forest regeneration treatment/ community structure/ habitat management/ foraging/ bark foragers/ breeding site/ cavity nesters/ habitat utilization/ oak hickory forest/ Alabama/ Cumberland Plateau/ birds/ chordates/ vertebrates
Abstract: We examined bark-foraging and cavity-nesting birds' use of upland hardwood habitat altered through a shelterwood regeneration experiment on the mid-Cumberland Plateau of northern Alabama. The five regeneration treatments were 0, 25, 50, 75, and 100 percent basal area retention. The 75 percent retention treatment was accomplished by stem-injecting herbicide into mostly midstory canopy trees; the other removal treatments were implemented through chain saw felling and grapple skidding. Density and species composition of bark-foraging and cavity-nesting birds were monitored during the breeding season of 2002 and 2003. Signs of bark-foraging and excavation activities were examined for permanently-marked trees in vegetation sampling plots in spring and fall of 2003 and spring, 2004. A total of 11 species were detected; 9 of them established breeding territories on the study plots. Tufted Titmice were the most abundant species (1.35 ± 0.12 territories per plot per year), followed by White-breasted Nuthatch (0.67 ± 0.08 territories per plot per year) and Downy Woodpecker (0.58 ± 0.11 territories per plot per year). Species richness, abundance, and diversity indices of bark-foraging and cavity-nesting birds varied by the regeneration treatments: Clearcut had the lowest values. Interestingly, no difference was detected among the other four treatments. The amount of snags (measured as total d.b.h.) differed among the treatments: Plots that received the 75 percent retention (herbicide) treatment had the highest value. The signs of bark foraging and excavation activities (number of pecks and excavations) were positively correlated with the availability of dead trees.
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1223. **Response of bird communities to selection harvesting in a northern tolerant hardwood forest.**
Holmes, S. B. and Pitt, D. G.
Forest Ecology and Management 238(1-3): 280-292. (2007)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2006.10.022.
Descriptors: BACI/ bird community response/ forest birds/ northern tolerant hardwoods/ selection harvest
Abstract: We investigated the responses of forest birds to habitat changes following timber harvest by selection cutting in three northern tolerant hardwood forest stands using a before-after control-impact (BACI) type of experimental design. We observed only minor effects on the bird community associated with mature forests. Ovenbird (Seiurus aurocapilla) abundances declined by about 80-90% in two of the three harvested blocks. Black-throated blue warblers (Dendroica caerulescens) declined in abundance by about 70% on a single block 2 and 3 years post-harvest. Mechanical disturbance of the shrub layer [primarily Canada yew (Taxus canadensis)] was coincident to this decline. Several bird species that prefer early successional or shrubby habitats, such as veery (Catharus fuscescens), cedar waxwing (Bombycilla cedrorum), chestnut-sided warbler (Dendroica pensylvanica), magnolia warbler (Dendroica magnolia), American redstart (Setophaga ruticilla), mourning warbler (Oporornis philadelphia) and white-throated sparrow (Zonotrichia albicollis), benefited from selection cutting, with the timing of individual species' responses related to changes in habitat structure and composition. Effects in one block were still evident 7 years after harvest. Guidelines that support a residual stocking target of 20 m^2/ha should promote the retention of mature forest bird communities, including ovenbird, while still providing habitat for early successional bird species. [Crown Copyright © 2006.]
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1224. **Response of birds to thinning young Douglas-fir forests.**
Hayes, John P.; Weikel, Jennifer M.; and Huso, Manuela M. P.
Ecological Applications 13(5): 1222-1232. (2003)
NAL Call #: QH540.E23 ; ISSN: 1051-0761
Descriptors: Certhia americana/ Coccothraustes vespertinus/ Dendroica nigrescens/ Empidonax difficilis/ Empidonax hammondii/ Ixoreus naevius/ Myadestes townsendi/ Piranga ludoviciana/ Regulus satrapa/ Turdus migratorius/ Vireo huttoni/ Passeriformes/ Picoides villosus/

Piciformes/ Aves/ forestry practices/ habitat alterations/ terrestrial ecology/ bird response/ forest management/ ecosystems/ information theory/ silviculture/ young Douglas-fir forest thinning/ Coast range, Tillamook Burn/ forests/ forest thinning/ habitat management/ Oregon/ status/ wildlife-human relationships/ commercial enterprises/ conservation/ wildlife management/ disturbances/ habitat use/ land zones/ population ecology/ abundance/ birds/ dispersion/ habitat change/ brown creeper/ evening grosbeak/ black-throated gray warbler/ Pacific-slope flycatcher/ Hammond's flycatcher/ varied thrush/ Townsend's solitaire/ western tanager/ golden-crowned kinglet/ American robin/ Hutton's vireo/ hairy woodpecker

Abstract: Silvicultural practices, such as thinning, are increasingly performed both for commodity production and to help achieve biodiversity goals and promote ecological restoration. However, relatively little research has examined effects of thinning conifer forests on vertebrates. We experimentally manipulated stands using a randomized block design to evaluate influences of two thinning intensities on populations of diurnal breeding birds in western Oregon. We conducted point counts of birds seven times each year in 1994 (prior to treatment) and from. 1995 through 2000 (subsequent to treatment). We analyzed data using multiple linear regression and information-theoretic approaches to model selection. Of the 22 species for which we had sufficient data for analysis, detections of nine species decreased and eight species increased in thinned stands relative to controls, and there was no strong evidence that thinning influenced numbers of five species. Of the 17 species that responded to thinning, the magnitude of response of eight species varied with thinning intensity; for each of these species, response was greatest in the more heavily thinned stands. Although no species was extirpated from stands following thinning, detections of Hutton's Vireos (Vireo huttoni), Golden-crowned Kinglets (Regulus satrapa), Brown Creepers (Certhia americana), Blackthroated Gray Warblers (Dendroica nigrescens), and Varied Thrushes (Ixoreus naevius) decreased to less than half of the detections in controls in one or more treatment types, suggesting thinning significantly reduces their numbers. In contrast, American Robins (Turdus migratorius), Townsend's Solitaires (Myadestes towizsendi), and Hammond's Flycatchers (Empidonax hammondii) were rare or absent in controls but regularly present in thinned stands, and detections of Western Tanagers (Piranga ludoviciana), Evening Grosbeaks (Coccothrazistes vespertinus), and Hairy Woodpeckers (Picoides villosus) increased by threefold or more in thinned stands relative to controls. Only Pacific-slope Flycatchers (Empidonax difficilis), Warbling Vireos (Vireo gilvus), and Western Tanagers showed strong evidence of temporal trends in response. For these species, differences between numbers in controls and treated stands became more extreme through time. Our findings suggest that thinning densely stocked conifer stands in landscapes dominated by younger stands enhances habitat suitability for several species of birds, but that some unthinned patches and stands should be retained to provide refugia for species that are impacted by thinning.
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1225. **Response of black bears to forest management in the southern Appalachian Mountains.**

Mitchell, Michael S. and Powell, Roger A.

Journal of Wildlife Management 67(4): 692-705. (2003)
NAL Call #: 410 J827; ISSN: 0022-541X

Descriptors: Ursus americanus/ Ursidae/ Carnivora/ black bear/ Ursus americanus/ behavior/ conservation/ terrestrial ecology/ time-series analysis/ habitat suitability index/ forests/ ecosystems/ forest management/ habitat management/ habitat use/ home range-territory/ North Carolina/ Pisgah National Forest/ wildlife management/ land zones/ American black bear/ food/ forests/ habitat/ habitat change/ habitat evaluation/ home-range/ silviculture/ telemetry

Abstract: We evaluated responses of black bears (Ursus americanus) to changes in habitat in the Pisgah National Forest in North Carolina, USA. Changes in habitat were due to forest management, which affected bear habitat in complex ways. Harvested stands provided plentiful food resources that decreased with regeneration of the canopy. However, their value was offset by a lack of resources associated with mature overstory. Following canopy closure, early-successional food resources in harvested stands tended to decrease, although some soft mast remained more abundant than in unharvested stands. We used a tested Habitat Suitability Index (HSI) to evaluate effects of harvest management on bear habitat. Values of HSI for harvested stands tended to differ little among young stands and older stands regenerating in pine (Pinus spp.) or hardwood, and all had lower HSI values than unharvested stands. Although effects of roads are modeled negatively in the HSI, proximity of harvested stands to logging roads did not bias comparisons to harvested stands. We used time-series analysis to characterize year-to-year changes on HSI maps for our study area from 1981 through 1994, and designated the results as an index of habitat change. We used this index to evaluate use of changed areas by black bears, estimated from 127 home ranges. Adult females used changed areas inversely proportional to the index of change, whereas adult and juvenile males showed no preferences. With respect to year-to-year variation at the peripheries of their home ranges, adult males and adult females selected habitat patches where suitability had increased and rejected patches where suitability had declined. Home ranges of adult males contained proportionally fewer areas of habitat decline than those of females or juvenile males. Adult females used areas where habitat suitability decreased, proportional to the decrease, but did not prefer them to areas of stable or improved suitability. Adult males appeared to avoid areas of decreased suitability altogether. Forest management positively affected some aspects of bear habitat but had an overall negative effect on habitat suitability in the southern Appalachians. Forest management will not improve bear habitat overall in areas where resources are abundant. Where soft mast is limiting, however, trade-offs between overall habitat suitability and improved productivity of soft mast may be warranted.
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1226. **The response of boreal forest songbird communities to fire and post-fire harvesting.**
Morissette, J. L.; Cobb, T. P.; Brigham, R. M.; and James, P. C.
Canadian Journal of Forest Research 32(12): 2169-2183. (2002)
NAL Call #: SD13.C35; ISSN: 00455067
Descriptors: fires/ harvesting/ wood/ songbird communities/ forestry/ avifauna/ community structure/ ecological impact/ forest fire/ harvesting/ silviculture/ Pinus banksiana/ Populus tremuloides
Abstract: Post-fire timber harvesting (salvage logging) is becoming more prevalent as logging companies try to recover some of the economic losses caused by fire. Because salvaging is a relatively new practice and because of the common perception that burned areas are of little value to wildlife, few guidelines exist for salvaging operations. We surveyed birds in unburned and burned stands of jack pine (Pinus banksiana Lamb.), mixedwood, and trembling aspen (Populus tremuloides Michx.) to characterize the post-fire bird community in commercially important forest types. The effects of salvage logging were examined in mixedwood and jack pine. Using fixed-radius point counts, a total of 1430 individuals representing 51 species were detected during this study. Community analysis revealed that burned forests supported a distinct species assemblage of songbirds relative to unburned forests and that salvage logging significantly altered this community. An examination of guild composition showed that resident species, canopy and cavity nesters, and insectivores were the least likely to be detected in salvaged areas. Species less sensitive to salvage logging tended to be habitat generalists, omnivores, and species that nest on the ground or in shrubs. We suggest alternative management strategies that may help reduce the impact of salvage logging on the boreal forest songbird community.
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1227. **Response of breeding bird communities to forest harvest around seasonal ponds in northern forests, USA.**
Hanowski, J.; Danz, N.; and Lind, J.
Forest Ecology and Management 229(1-3): 63-72. (2006)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2006.03.011.
Descriptors: breeding bird communities/ forest harvest/ seasonal ponds
Abstract: We examined response of breeding bird communities to varying levels of timber harvest in and around 16-forested seasonal ponds in northern Minnesota, USA. This experimental study employed a before-after-control-impact design with three different harvest treatments. Treatments were assigned randomly (n = 4 ponds/treatment) and were applied within 17 m wide buffers outward from the ponds' edge: clear-cut harvest (reduction of basal area to <2 m^2/ha), partial cut harvest (reduction of basal area to 7-10 m^2/ha), and no harvest (no cut). Forest stands around treatment buffers (n = 12) were clear-cut harvested (ranging from 6.5 to 12.5 ha). Ponds with no harvest in the adjacent forests (controls) or buffers surrounding the ponds (n = 4) were maintained throughout the 5-year study. Prior to harvest, we found no significant difference (P > 0.05) in bird community composition around seasonal ponds versus nearby forest habitat, suggesting that seasonal ponds do not affect bird community structure in a mature forest setting at this scale. Overall bird numbers and species richness increased (P < 0.05) in all pond buffers compared to controls over the 4 years after harvest. Increases in bird numbers on treated versus control pond buffers were found across all migration and nesting guilds, and among the forest edge guild. Bird community species composition also changed within the treated versus control pond buffers after harvest. Differences in bird communities among treatments were small the first year after harvest, but continued to diverge from controls over the 4 years after harvest. Bird communities of the clear-cut treatment were most dissimilar to controls. Both the partial and no cut buffer bird communities were more similar to the control than the clear-cut treatment. Treated pond buffers had more birds associated with early successional habitat. In contrast, many interior forest-associated bird species did not occur in any of the buffers after harvest. We found no difference in breeding bird community composition between pond buffers and other residual patches left on harvested sites, but there was a significant difference between harvest treatments when we combined pond buffer and residual patch birds on each site. Early successional habitat-associated bird species were more abundant in residual patches on sites that had a clear-cut pond buffer and forest-associated species were more abundant in residual patches on sites with no cut pond buffers. Habitat for mature forest-associated bird species can be maintained on harvest sites by leaving no cut or partial cut buffers around seasonal ponds or in similar sized residual patches in other areas of the harvest.
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1228. **The response of ground beetles (Coleoptera: Carabidae) to selection cutting in a South Carolina bottomland hardwood forest.**
Ulyshen, Michael D.; Hanula, James L.; Horn, Scott; Kilgo, John C.; and Moorman, Christopher E.
Biodiversity and Conservation 15(1): 261-274. (2006)
NAL Call #: QH75.A1B562; ISSN: 0960-3115
Descriptors: commercial activities/ ecology/ community structure/ terrestrial habitat/ land zones/ Carabidae: forestry/ selection cutting/ relative abundance/ faunal responses/ selection cutting/ bottomland hardwood forest/ species diversity/ species richness/ forest and woodland/ bottomland hardwood forest/ South Carolina/ Aiken/ Savannah River Site Nuclear Production Facility/ Insecta, Coleoptera, Adephaga, Caraboidea/ arthropods/ beetles/ insects/ invertebrates
Abstract: We compared the response of ground beetles (Coleoptera: Carabidae) to the creation of canopy gaps of different size (0.13, 0.26, and 0.50 ha) and age (1 and 7 years) in a bottomland hardwood forest (South Carolina, USA). Samples were collected four times in 2001 by malaise and pitfall traps placed at the center and edge of each gap, and 50 m into the surrounding forest. Species richness was higher at the center of young gaps than in old gaps or in the forest, but there was no statistical difference in species richness between old gaps and the forests surrounding them. Carabid abundance followed the same trend, but only with the exclusion of Semiardistomis viridis (Say), a very abundant species that differed in its response to gap age compared to most other species. The carabid assemblage at the gap edge was very similar to that of the forest, and there appeared to be no distinct edge community. Species known to occur in open or disturbed

habitats were more abundant at the center of young gaps than at any other location. Generalist species were relatively unaffected by the disturbance, but one species (Dicaelus dilatatus Say) was significantly less abundant at the centers of young gaps. Forest inhabiting species were less abundant at the centers of old gaps than in the forest, but not in the centers of young gaps. Comparison of community similarity at various trapping locations showed that communities at the centers of old and young gaps had the lowest similarity (46.5%). The community similarity between young gap centers and nearby forest (49.1%) and old gap centers and nearby forest (50.0%) was similarly low. These results show that while the abundance and richness of carabids in old gaps was similar to that of the surrounding forest, the species composition between the two sites differed greatly.
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1229. **Response of northwestern chipmunks (Tamias amoenus) to variable habitat structure in young lodgepole pine forest.**
Sullivan, T. P. and Klenner, W.
Canadian Journal of Zoology 78(2): 283-293. (2000)
NAL Call #: 470 C16D; ISSN: 00084301
Descriptors: habitat/ population dynamics/ abundance/ habitat structure/ population dynamics/ response analysis/ rodent/ thinning/ Canada/ Pinus contorta/ Tamias amoenus
Abstract: Abstract: This study was designed to test the hypothesis that large-scale habitat alteration by stand thinning over a range of densities would increase the abundance and related population dynamics of northwestern chipmunks (Tamias amoenus) in young lodgepole pine (Pinus contorta) forest. Replicate study areas were located near Penticton, Kamloops, and Prince George in south-central British Columbia, Canada. Each study area had three stands thinned to densities of ≃ 500 (low), 1000 (medium), and 2000 (high) stems/ha, with an unthinned young pine stand and an old-growth pine stand for comparison. Chipmunk populations were sampled intensively in thinned stands from 1989 to 1991 and in the unthinned and old-growth stands from 1990 to 1991. Habitat structure was sampled in all stands in 1990. For herbs and shrubs, the crown volume index values were similar among stands; for trees, this index was lowest for the low-density stands, with the index for all three thinned stands being lower than that for the unthinned stands. Species diversity and the structural diversity of vegetation were similar among stands. The abundance of chipmunks was significantly higher in low-density than in high-density thinned stands at Penticton (1.3-1.9 times higher) and Prince George (2.4-3.8 times higher) but not at Kamloops. Chipmunks were less abundant in old-growth stands than in the other four treatment stands. Breeding performance and recruitment followed the same pattern as abundance. Chipmunk survival was generally similar among stands. There were heavier chipmunks in the low-density stands in some years at Penticton. Northwestern chipmunks appear to prefer 'open' habitats generated by heavy thinning of young lodgepole pine stands. This result was achieved in three different forest ecological zones and may enhance the overall forest ecosystem.
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1230. **Response of prothonotary warblers to timber harvest and hydrology in a bottomland hardwood forest.**
Cooper, Robert J. and Gannon, Jill J.
In: 88th Annual Meeting of the Ecological Society of America held jointly with the International Society for Ecological Modeling - North American Chapter, Savannah, Georgia, USA; August 03-08, 2003.; Vol. 88.; pp. 72; 2003.
Descriptors: forestry/ freshwater ecology: ecology, environmental sciences/ terrestrial ecology: ecology, environmental sciences/ single tree selection harvesting / applied and field techniques/ small patch cut harvesting/ active forest management/ bottomland hardwood forest/ fledging/ flooding/ hydrology/ natural disturbance/ nest depredation/ nest success/ productivity/ territory/ timber harvest/ water management projects
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1231. **Response of white-footed mice (Peromyscus leucopus) to fire and fire surrogate fuel reduction treatments in a southern Appalachian hardwood forest.**
Greenberg, C. H.; Otis, D. L.; and Waldrop, T. A.
Forest Ecology and Management 234: 355-362. (Oct. 2006)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: Peromyscus leucopus/ hardwood/ deciduous forests/ forest fires/ wildfires/ prescribed burning/ fire hazard reduction/ small mammals/ forest habitats/ wildlife habitats/ forest-wildlife relations/ understory/ forest litter/ ground vegetation/ fire ecology/ North Carolina/ forest fuels/ understory removal
This citation is from AGRICOLA.

1232. **Response of wildlife to prescribed fire in southwest Florida pine flatwoods.**
Main, M. B. and Richardson, L. W.
Wildlife Society Bulletin 30(1): 213-221. (2002)
NAL Call #: SK357.A1W5; ISSN: 00917648
Descriptors: Florida habitat/ Infrared camera/ management/ Meleagris gallopavo/ Odocoileus virginianus/ pine flatwoods/ prescribed fire/ white-tailed deer/ wild turkey/ wildlife/ ecological impact/ gamebird/ habitat management/ mammal/ prescribed burning/ United States/ Meleagris gallopavo/ Odocoileus virginianus
Abstract: We conducted an experiment using infrared-triggered camera traps to document relative abundance of wildlife in pine flatwoods habitat at different stages of post-fire recovery at the Florida Panther National Wildlife Refuge in southwest Florida. Total wildlife, which for the purposes of this study was defined as records of wild turkey (Meleagris gallopavo) and all mammals captured on film, used pine flatwoods habitat in a fire management unit (FMU) with a post-fire recovery history of 24 months significantly more than adjacent pine flatwoods in an FMU with a post-fire recovery history of 48 months (P=0.04). Data suggested that the relative abundance of white-tailed deer (Odocoileus virginianus) was also higher in the 24-month post-fire FMU (P=0.12) compared to the 48-month FMU. To evaluate response of wildlife to prescribed fire, we burned the 48-month FMU and, after approximately 8 weeks, repeated the camera-trap surveys in the newly burned (<6-month) FMU and the adjacent FMU, now at approximately 30-months post-fire recovery. We

documented a significant increase in use of the recently burned (<6-month) FMU compared to previous levels of use (48-month FMU) by total wildlife (P=0.04) and white-tailed deer (P=0.02). Use of the <6-month FMU by wild turkey also appeared to increase (P=0.13). No difference was detected between the <6-month and the adjacent 30-month FMU in use by total wildlife (P=0.52), white-tailed deer (P=0.43), Florida panther (P=0.23), or wild turkey (P=0.14), although data suggested that wild turkey may have preferred the newly burned area. More importantly, our data suggested that wildlife did not avoid pine flatwoods habitat at up to 30-month post-fire recovery. Wildlife use of pine flatwoods habitat, therefore, was observed to increase in areas recently burned (<6 months post-fire), was similar between FMUs with post-fire recovery of <6 and up to 30 months, and was lowest in habitat that had not been burned for 48 months. Maintaining a prescribed-fire rotation of ≤48 months, therefore, appears to improve habitat quality of pine flatwoods for white-tailed deer, wild turkey, and other wildlife in southwest Florida.
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1233. **Responses of bird communities to early successional habitat in a managed landscape.**
Yahner, Richard H.
Wilson Bulletin 115(3): 292-298. (2003)
NAL Call #: 413.8 W692; ISSN: 0043-5643
Descriptors: Passerina cyanea/ Seiurus aurocapillus/ Setophaga ruticulla/ Spizella pusilla/ Vireo olivaceus/ Passeriformes/ Aves/ conservation/ forestry practices/ habitat alterations/ terrestrial ecology/ avian community responses/ breeding bird communities/ early successional habitat/ forest managements/ forested landscape/ managed landscape/ mature forest/ population trends/ species abundances/ species richness/ Centre County, Barrens Grouse Management Area/ communities/ forests/ ecosystems/ managed forest/ Pennsylvania/ status/ succession/ wildlife-human relationships/ commercial enterprises/ disturbances/ habitat use/ land zones/ population ecology birds/ biocenosis/ brood-egg/ habitat management/ silviculture/ fauna/ indigo bunting/ ovenbird/ American redstart/ field sparrow/ red-eyed vireo/ Populus ssp./ Quercus spp.
Abstract: I examined short and long term responses of breeding bird communities to the systematic creation of early successional habitat resulting from forest management at a 1,120-ha study site in the Ridge and Valley Province of Pennsylvania, from 1998 through 2002. Species richness and abundances of all species combined and of early successional species increased from precut (1998-1999) to postcut eras (2001-2002) in a treated sector (aspen, Populus spp., and mixed oak, Quercus spp., areas combined), an uncut control sector, and the total study site (treated and control sectors combined) after the fourth cutting cycle. Abundances of a woodland species (Red-eyed Vireo, Vireo olivaceus) and four early successional species (e.g., Field Sparrow, Spizella pusilla) also increased. Over the past 15 years, which spans the third and the fourth cutting cycles at the study site, three woodland species increased significantly in both treated and control sectors (Red-eyed Vireo) or in the treated sector only (Ovenbird, Seiurus aurocapillus, and American Redstart, Setophaga ruticilla). The population of an early successional species (Indigo Bunting, Passerina cyanea) increased significantly in both treated and control sectors. Population trends of three woodland and three early successional species at the study site paralleled statewide or provincial increases in these species over the past two decades. My study has shown that the management of early successional habitats in extensively forested areas will be of benefit for the long term conservation of both early successional and mature forest bird species within a forested landscape.
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1234. **Responses of small mammal populations to riparian buffers in western Washington.**
West, Stephen D.
Northwestern Naturalist 81(2): 92. (2000)
NAL Call #: QL671.M8; ISSN: 1051-1733
Descriptors: habits-behavior/ biometrics/ census-survey methods/ ecosystems/ forestry practices/ habitat alterations/ habitat use/ mammals/ riparian habitat/ species diversity/ techniques/ transect surveys/ wildlife/ habitat relationships/ Washington, western area
Abstract: Habitat occupancy patterns and relative abundance of small mammals within riparian zones and uplands were documented two years before and after harvest on six control sites, on six sites harvested under Forest Practices guidelines, and on six modified harvests. Snap and pitfall traps captured 9,163 individuals of 18 species. On riparian transects, species richness and evenness did not differ significantly among treatments. Species composition of the riparian transects was very similar between harvest treatments. No species showed a statistically significant change in capture rate with respect to treatment on riparian transects. Knowing if species will persist that had declining trends over the two-year post-harvest period requires additional sampling.
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1235. **Responses of songbirds to diameter-limit cutting in the central Appalachians of West Virginia, USA.**
Weakland, C. A.; Wood, P. B.; and Ford, W. M.
Forest Ecology and Management 155(1-3): 115-129. (2002)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/S0378-1127(01)00552-7.
Descriptors: diameter-limit/ high-grading/ nesting success/ partial harvesting/ songbirds/ biodiversity/ hardwoods/ harvesting/ silviculturally-accepted systems/ forestry/ abundance/ forestry/ harvesting/ reproduction/ songbirds/ United States/ Aves/ Junco hyemalis/ Passeri/ Wilsonia canadensis
Abstract: Diameter-limit harvesting is a commonly-used forest harvesting technique among landowners in West Virginia as opposed to silviculturally-accepted systems such as clearcutting, single-tree selection, and two-age harvesting. Songbird species respond both negatively and positively to these systems, and ornithologists suggest these techniques can be used when managing for songbirds at the stand and landscape levels. However, little is known about the effects of diameter-limit harvesting on songbird abundances and their reproductive success. We evaluated the effects of this technique on songbird populations at the Westvaco Wildlife and Ecosystem Research Forest (WWERF) in the Allegheny Mountains of West Virginia. The area is an industrial forest composed predominantly of Appalachian hardwoods 60-80 years old. We examined songbird abundances throughout the forest and nesting success on four 40 ha plots in 1996. In 1997,

two plots were harvested using the diameter-limit technique where most trees ≥ 45.7 cm were removed. Abundance and nesting success were monitored again in 1997 and 1998. Results indicate that the abundances of most songbird species present prior to harvest changed little after the timber removal. Two species, the Canada warbler (Wilsonia canadensis) and dark-eyed junco (Junco hyemalis), were more abundant in harvested areas than unharvested forest. One habitat group, interior/edge species, and total abundance of songbirds also had higher abundance in harvested areas. Overall nest survival in harvested areas was higher both 1- (37.7%) and 2-years (46.4%) after harvesting than before harvesting (14.9%). Only large-diameter trees were removed on the WWERF, and intermediate and subcanopy trees remained standing, retaining considerable structural heterogeneity. Stands that were harvested differed from unharvested stands by having more snags, higher density of trees ≥ 8-14.9 cm, and a higher percent cover of down wood. Canopy cover over 24 m, density of saplings, and the amount of leaf litter decreased after harvesting, while canopy cover ≥ 0.5-3 m and the percent of bareground increased. Diameter-limit harvesting at the low intensity in our study might not adversely affect forest-dwelling songbirds in the central Appalachians in the short-term and forest bird communities could be retained.
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1236. **Responses of southeastern amphibians and reptiles to forest management: A review.**
Russell, Kevin R.; Wigley, T. Bently; Baughman, William M.; Hanlin, Hugh G.; and Ford, W. Mark
In: Southern Forest Science: Past, Present, and Future, General Technical Report-SRS 75/ Rauscher, H. M. and Johnsen, K; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2004. pp. 319-334.
Notes: Literature review.
Descriptors: commercial activities/ conservation measures/ ecology/ land zones/ Amphibia/ Reptilia: forestry/ faunal responses/ forest management/ habitat management/ ecology/ United States, southeastern region/ amphibians/ chordates/ reptiles/ vertebrates
Abstract: Forest managers in the Southeast increasingly need information about amphibian and reptile responses to silvicultural practices in order to guide sustainable forestry programs. A review of existing literature indicates that effects of silvicultural practices on herpetofauna often are region- and species-specific, with individual taxa responding positively, negatively, or not at all in the short term. Responses of herpetofauna to forestry likely are influenced by adaptations of taxa to historical disturbance regimes. Few studies have evaluated long-term population or landscape-level implications of silvicultural practices for herpetofauna. Furthermore, many existing studies lack pretreatment data, replication, or appropriate reference conditions. We suggest that future research focus on manipulative and retrospective studies designed to identify forestry practices that successfully blend economic objectives with herpetofaunal conservation.
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1237. **Resting and denning sites of American martens in northeastern Oregon.**
Bull, E. L. and Heater, T. W.
Northwest Science 74(3): 179-185. (2000)
NAL Call #: 470 N81; ISSN: 0029344X
Descriptors: den/ forest management/ habitat use/ mustelid/ site selection/ United States/ Arceuthobium/ Chrysomyxa arctostaphyli/ Martes americana/ Melampsorella caryophyllacearum
Abstract: Resting and denning sites of the American marten (Martes americana) are important habitat components because they provide protection from predators, inclement weather, and thermal stress. Resting sites (n = 1184) used by 35 radiocollared martens were in trees with natural platforms (43%), in trees with cavities (23%), subnivean (under snow) (23%), in hollow logs or slash piles (7%), and underground (3%). Thirty natal and post-natal dens were in trees with cavities (40%), in hollow logs (37%), underground (17%), and in slash piles (6%). Resting and denning sites in cavities and hollow logs were typically large-diameter structures with extensive heartwood decay that had created hollow chambers. The majority of platforms used as resting sites were formed by broom rust (Chrysomyxa arctostaphyli and Melampsorella caryophyllacearum) and dwarf mistletoe (Arceuthobium spp.). Incorporating habitat needs of martens in forest management practices by retaining coarse woody debris and trees with brooms is one component necessary for maintaining viable populations of the species.
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1238. **Restoration efforts for plant and bird communities in tallgrass prairies using prescribed burning and mowing.**
Van Dyke, F.; Van Kley, S. E.; Page, C. E.; and Van Beek, J. G.
Restoration Ecology 12(4): 575-585. (2004)
NAL Call #: QH541.15.R45R515; ISSN: 10612971.
Notes: doi: 10.1111/j.1061-2971.2004.00352.x.
Descriptors: DeSoto National Wildlife Refuge/ edge species/ grassland birds/ grassland plants/ mowing/ prescribed burning/ tallgrass prairie/ habitat management/ mowing/ prairie/ prescribed burning/ restoration ecology/ DeSoto National Wildlife Refuge/ Iowa/ Aves
Abstract: Recent losses and fragmentation of tallgrass prairie habitat to agriculture and urban development have led to corresponding declines in diversity and abundance of plants and birds associated with such habitat. Mowing and burning are alternative management strategies for restoring and rejuvenating prairies in fragmented landscapes, but their specific, comparative effects are the subjects of ongoing evaluation. We compared the responses of plant and bird communities on four sets of mowed, burned, and untreated sites of small (3-10ha), fragmented tallgrass prairies at the DeSoto National Wildlife Refuge (DNWR), Iowa, U.S.A., during May-July in 1998 and 1999. Species richness and diversity of plants, resident grassland birds, and communities of birds associated with grassland edges (edge species) were independent of treatment. Although not affecting species richness and diversity in plant communities, mowed sites ranked lower in total plant coverage and total forb coverage than burned sites or untreated sites. In contrast, untreated sites had more coverage by shrubs, suggesting that mowing and burning

did retard shrub encroachment. Overall, abundance and diversity of plants and birds were generally insensitive to management strategies. Small, fragmented sites of rare habitat may not respond in the short term to management treatments and may not be capable of supporting highly diverse communities, no matter how intensively manipulated. It is more probable that diversity of native prairie communities can be enhanced and restored only through long-term efforts, acquisition of large land units capable of supporting stable populations, and deliberate reintroduction of species of high conservation Value. © 2004 Society for Ecological Restoration International.
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1239. **Restoration of hard mast species for wildlife in Missouri using precocious flowering oak in the Missouri River floodplain, USA.**
Grossman, B. C.; Gold, M. A.; and Dey, D. C.
Agroforestry Systems 59(1): 3-10. (2003)
NAL Call #: SD387.M8A3; ISSN: 0167-4366.
http://mdc.mo.gov/documents/forest/mast.pdf
Descriptors: Cervidae/ Artiodactyla/ forestry practices/ habitat alterations/ terrestrial ecology/ direct seeding/ agroforestry/ hard mast species restoration/ herbivory/ natural regeneration/ precocious flowering oak use/ survival/ vegetation growth
Abstract: Increased planting of hard mast oak species in the Lower Missouri River floodplain is critical as natural regeneration of oak along the Upper Mississippi and Lower Missouri Rivers has been limited following major flood events in 1993 and 1995. Traditional planting methods have limited success due to frequent flood events, competition from faster growing vegetation and white-tailed deer herbivory. Results of early growth response of swamp white oak (Quercus bicolor Willd.) seedlings in relation to initial acorn mass and size, and early rapid shoot growth for seedlings produced by containerized root production method (RPMTM), are presented. Containerized RPMTM seedlings grown in the greenhouse under optimal conditions demonstrate that seed size had no discernable impact on first-year root or shoot size. Seedling survival for the first two years and acorn production for the first three years after outplanting are presented, comparing use of containerized RPMTM swamp white oak seedlings to nursery stock. Flood tolerant precocious RPMTM oak seedlings in the floodplain provide a source of food for acorn-consuming wildlife ten to fifteen years sooner than oaks originating, from natural regeneration, direct seeding or traditional bare root planting. Compared to bare root nursery stock that produced no acorns, some RPMTM swamp white oak seedlings averaged 4.3, 5.2, and 6.3 acorns/seedling in the first three years after fall outplanting.
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1240. **Restoring bottomland hardwood ecosystems in the Lower Mississippi Alluvial Valley.**
Stanturf, John A.; Gardiner, Emile S.; Hamel, Paul B.; Devall, Margaret S.; Leininger, Theodor D.; and Warren, Melvin E.
Journal of Forestry 98(8): 10-16. (2000)
NAL Call #: 99.8 F768 ; ISSN: 0022-1201
Descriptors: bottomlands/ ecosystem management/ ecosystems/ forests, deciduous/ funding/ habitat management/ management/ restoration/ riparian habitat/ wildlife/ Mississippi River and Basin
Abstract: Management of the bottomland hardwood ecosystems of the lower Mississippi River Alluvial Valley is described. This valley has experienced the most widespread loss of bottomland hardwood forests and is one of the most endangered ecosystems in the United States. Information is provided on the history of the hardwoods in the valley and on the details of the current restoration projects for wildlife refuges, wetland mitigation, and wetland reserves. The most intensive restoration technique is to interplant a nurse crop of fast-growing species, such as the eastern cottonwood, with a slower-growing hardwood tree.
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1241. **Restructuring the forest: Goshawks and the restoration of southwestern ponderosa pine.**
Long, James N. and Smith, Frederick W.
Journal of Forestry 98(8): 25-30. (2000)
NAL Call #: 99.8 F768 ; ISSN: 0022-1201
Descriptors: Accipitridae/ Ciconiiformes/ Accipiter gentilis/ behavior/ birds/ ecosystem management/ ecosystems/ forestry practices/ forests, coniferous/ habitat management/ habitat use/ habits-behavior/ home range-territory/ management/ ponderosa pine/ restoration/ techniques/ wildlife/ wildlife-habitat relationships/ northern goshawk/ United States, Southwest
Abstract: The authors discuss the management of northern goshawk habitat in the southwestern United States. Guidelines have been adopted that will cause substantial changes in the structure of vegetation of ponderosa pine forests. In this article, ways are reviewed in which foresters and wildlife biologists are attempting to implement the goshawk guidelines and the resulting silvicultural challenges are highlighted.
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1242. **A review of the long-term effects of post-harvest silviculture on vertebrate wildlife, and predictive models, with an emphasis on boreal forests in Ontario, Canada.**
Thompson, I. D.; Baker, J. A.; and Ter-Mikaelian, M.
Forest Ecology and Management 177(1-3): 441-469. (2003)
NAL Call #: SD1.F73; ISSN: 03781127
Descriptors: amphibians/ biodiversity/ birds/ boreal forest/ Intensive forest management/ mammals/ Ontario/ biodiversity/ fertilizers/ fibers/ harvesting/ vertebrates species/ forestry/ boreal forest/ silviculture/ vertebrate/ yield/ biodiversity/ fibers/ forests/ harvesting/ silviculture/ Canada/ Picoides arcticus
Abstract: Greater fibre yields may be possible in commercial forests through an increased application of post-harvest silvicultural techniques. In Canadian boreal forests, while basic silvicultural regeneration techniques such as planting, seeding, scarifying, and tending, have been employed since the 1940's, more intensive techniques (intensive forest management (IFM)) such as increased area planted, pre-commercial and commercial thinning, extra tending events, fertilizing, and short rotations may soon be used. There may be effects of basic and more intensive silviculture on biodiversity in the long-term, compared to natural regeneration following logging or especially stand development following natural disturbances. We reviewed approximately 50 papers that reported studies of the long-term effects of post-harvest silviculture on vertebrate wildlife. In particular, large impacts to biodiversity universally occur when native forest types

are replaced by rapidly-growing exotic tree species. However, in boreal forests, native tree species are usually planted, and so any effects on associated wildlife communities may be considerably less than in non-native species plantations. Limited long-term information is available, but published studies of effects of basic silviculture and IFM suggested that loss of structures in forest stands was an important common impact that resulted in vertebrate species responses. Fewer structural features in managed forests compared to in natural forests likely results in reduced numbers of animal species dependent on those structures, such as cavity-using species and species for which large decaying woody debris is important. Simplifying stand structures and species composition may result in systems with low connectivity, making them vulnerable to insect and mammalian herbivory. Concentration of IFM in stands on highly productive sites could exacerbate effects (positive or negative), owing to the positive relationship between forest productivity and animal and plant diversity. Species such as black-backed woodpeckers (Picoides arcticus) may be reduced over large areas by stand conversion to mixedwoods, stand structural changes and especially age-class truncation. On the other hand, IFM may contribute increased habitats to species favoring young to mature coniferous-dominated forests, that normally decline across a landscape following clearcutting in boreal mixed and upland conifer stands. An aspatial model, based on published and local information and expert opinion, suggested that IFM and post-harvest silviculture in Ontario's boreal forests would produce positive and negative species-specific effects on the vertebrates that we modeled. However, IFM appeared to result in little increased effect over basic post-harvest silviculture. We also expect that stand-level effects of IFM on species would accumulate through time over landscapes, as more stands come under intensive management and the level of effects will be cumulative. [Crown Copyright © 2002]
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1243. **A review of wildlife changes in southern bottomland hardwoods due to forest management practices.**
Wigley, T. Bently and Roberts, Thomas H.
Wetlands 14(1): 41-48. (1994)
NAL Call #: QH75.A1W47; ISSN: 0277-5212
Descriptors: United States, southern region/ wildlife abundance/ wildlife diversity
Abstract: One function of bottomland hardwood forests is provision of wildlife diversity and abundance. In this paper, we discuss the temporal and spatial changes in wildlife diversity and abundance often associated with forest management practices in bottomland hardwoods. Forest management activities alter forest composition, structure, and spatial hetereogeneity, thereby changing the composition, abundance, and diversity of wildlife communities. Special habitat features such as snags, den trees, and dead and down woody material also may be impacted by forestry practices. More research is needed to fully understand landscape-level impacts of forest management.
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1244. **Richness, distribution and conservation status of cavity nesting birds in Mexico.**
Monterrubio-Rico, T. C. and Escalante-Pliego, P.
Biological Conservation 128(1): 67-78. (2006)
NAL Call #: S900.B5; ISSN: 00063207.
Notes: doi: 10.1016/j.biocon.2005.09.017.
Descriptors: cavity nesting birds/ Mexican avifaunas/ protected areas/ birds/ conservation status/ management practices/ nest site/ species richness/ Mexico/ North America/ Aves/ Psittacidae/ Strigidae
Abstract: A considerable number of bird species depend on tree cavities availability for nesting in temperate and tropical forests in Mexico. Tree cavity availability is reduced in heavily managed forests, making cavity nesting species particularly vulnerable to the high rates of forest loss and degradation that occur every day in the remaining wilderness areas of the country. We analyzed information about nesting behavior, distribution, and conservation status of resident landbird avifauna from 35 important and protected bird areas of Mexico. The main intention was to determine the proportion of resident bird species that nest in tree cavities and are more sensitive to intensive forest management practices. Our results revealed that 17% (112 species) of the resident landbird avifauna need tree cavities for nesting. Cavity nesters represented a higher proportion of endangered and threatened species than non-cavity nesters. The families Strigidae and Psittacidae represented the highest number of tree cavity nesting species in status. In the 35 avifaunas examined, the mean percentage of cavity nesting species ranged from 17% to 21%. The cloud forest reserve of "El Triunfo" with 43 species, is the area with the highest concentration of cavity nesting species in Mexico.
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1245. **Riparian zone forest management and the protection of biodiversity: A problem analysis.**
Sarr, D. A.; Odion, D. C.; Hibbs, D. E.; Weikel, J.; Gresswell, R. E.; Bury, R. B.; Czarnomski, N. M.; Pabst, R. J.; Shatford, J.; and Moldenke, A. R.
NCASI Technical Bulletin(908)(2005); ISSN: 08860882
Descriptors: aquatic invertebrates/ biodiversity/ birds/ buffer/ disturbance regime/ endangered species/ fish/ forest zones/ fungi/ keystone species/ mammals/ plants/ riparian/ stream amphibians/ vegetation/ biodiversity/ crops/ plants (botany)/ seed/ disturbance regime/ endangered species/ forest zones/ forestry/ birds/ farm crops/ fishes/ forestry/ logs/ seeds/ Amphibia/ Aves/ bacteria (microorganisms)/ fungi/ Invertebrata/ Mammalia
Abstract: This report evaluates the general effects of forestry practices on biodiversity along streams in the Pacific Northwest and northern California. There are four parts to the report. In Part I, we present concepts of biodiversity and the processes underlying it. Biodiversity is expressed as a general concept for species, habitat, and genetic diversity of all groups of organisms. We describe the interacting processes that govern riparian biodiversity by integrating those operating over large spatial extents, such as climate, with interrelated ones that have more localized influences, such as disturbance and habitat heterogeneity. The effects of forestry on biodiversity are then analyzed in the context of these controls, and how

they are influenced by disturbances. We predict that habitat heterogeneity and retention of pre-disturbance biological legacies (trees, snags, logs, seed and spore banks that can be important to growth of populations of organisms after disturbance) are two of four key determinants of biodiversity because they may act as mechanisms that promote species coexistence. Habitat heterogeneity is especially scale-dependent. Physiological stress and related resource availability are the other two primary controllers of biodiversity because they may limit the number of species that coexist. These limiting factors are strongly influenced by geography. All four factors are combined into a simple graphical model for predicting how disturbance regimes in general, and forestry practices in particular, will affect biodiversity. Disturbance regimes that are intermediate in influence are predicted to best maintain biodiversity. Geographic variation, as described in Appendices A and B, must be considered when implementing the conceptual model, and we illustrate this by contrasting how a variety of forestry practices are predicted to affect biodiversity in relative extremes in the Pacific Northwest: wet forests west of the Cascades vs. dry forests on the east slope of the range. The primary controllers of species diversity will have different effects on organisms depending on their life histories. Therefore, in Part II, we provide separate chapters by selected authors summarizing information about the effects of forestry practices on biodiversity along streams in the study area for specific taxonomic groups. These summaries contain the most current information on the ecology of the taxonomic groups, and how they and their habitats may be affected by forestry practices. Each section also suggests forestry practices that may sustain the selected taxonomic group. Finally, research needed to improve understanding of these taxa-specific topics is described. Synthesizing this information in Part III, we stress that there may be tradeoffs in managing for different elements of biodiversity, which leads to complications in managing for overall biodiversity. This highlights the need for clear articulation of management goals. For improving overall biodiversity maintenance, the principles outlined in Part I lead to potentially cost-effective stand-level management actions. In terms of enhancing habitat heterogeneity, planting multiple crop species, leaving some native trees unharvested to remain through a second rotation, lengthening rotations and earlier thinning schedules may all be effective, depending on the circumstances. Woody debris and snags are critical habitat features for many species that can be maintained or created to improve legacy retention. Site preparation following harvesting that creates biological legacies that occur with natural disturbances and that conserves coarse woody debris can help maintain many non-crop species. Controlling exotic species that act as artificial keystones/pest plants can reduce physiological stress and maintain more natural resource availability for native species. We also describe strategies for maintaining biodiversity at the landscape scale. Specifically, we discuss some advantages and limitations of disturbance regime-based management, riparian buffers, and conservation reserves as means to protect biodiversity. The report concludes in Part IV with a draft research agenda to complement taxon-specific research recommended in Part II. This research agenda is based on reviews of existing literature and ongoing research, which exhibits geographic and taxonomic biases. The goal of the research proposed is to improve understanding of how to protect biodiversity in managed forests. There is a need for much basic ecological information about both the ecology of lesser known riparian taxa, as well as applied research determining their sensitivity to forestry related disturbance.
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1246. **The road to recovery.**
Kulynycz, Erin
Wildlife Rehabilitation Today 13(2): 19-21. (2004);
ISSN: 1044-2618
Descriptors: Sciurus niger cinereus/ mammals/ study methods/ endangered-threatened species/ wildlife-habitat relationships/ habitat alterations/ stocking-transplanting/ restoration/ forestry practices/ marking/ tagging/ monitoring/ telemetry/ home range-territory/ status/ wildlife management/ habitat management/ fires-burns/ timber harvest/ Delmarva fox squirrel/ Virginia: Chincoteague National Wildlife Refuge
Abstract: Research methods such as tagging, monitoring, and studying habitat criteria are essential to the recovery of the Delmarva fox squirrel, one of the largest tree squirrels in the Western Hemisphere. The author reports on the recovery program for this species. Thirty squirrels were released at Chincoteague National Wildlife Refuge, Virginia, from 1969 to 1971. This translocation was successful. Research conducted in 2001 focused on the effects on the squirrels of timber removal resulting from an infestation of southern pine beetles. The researcher also studied the home range, population size, and monitoring techniques used to study the squirrel. Ongoing research focuses on improving habitat at Chincoteague by studying the effects of prescribed burns on the squirrel's habitat use. Biologists used fire in May and June to reduce the thick vine and shrub layer of the forest. The refuge staff also conducted vegetation surveys to determine changes in composition due to the fires. Mast trees important to the squirrels are red maples, loblolly pines, and oaks. The removal of understory vegetation, such as greenbrier, should aid in the movement and predator vigilance of the Delmarva fox squirrel. This is the first study of its kind to assess the effects of prescribed burns on fox squirrels. The researchers hope the fire will provide a new tool for managers and landowners to improve the status of Delmarva fox squirrels and make habitat more suitable throughout the area.
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1247. **Roads as edges: Effects on birds in forested landscapes.**
Ortega, Yvette K. and Capen, David E.
Forest Science 48(2): 381-390. (2002)
NAL Call #: 99.8 F7632; ISSN: 0015-749X
Descriptors: terrestrial ecology/ fixed-radius point counting/ degree of forestation/ forested landscapes/ interior transects/ landscape factors/ narrow forest canopy breaks/ nest concealment/ nest predation rates/ road edge habitat/ territory density/ unpaved roads/ forests/ ecosystems/ forest roads/ forestry practices/ habitat alterations/ Green Mountain National Forest/ habitat management/ mortality/ roads/ Vermont/ wildlife-human relationships/ commercial enterprises/ conservation/ wildlife management/ disturbances/ habitat use/ land zones/ artificial structures/ population ecology
Abstract: Numerous studies have documented that forest edges affect habitat use and reproductive success of forest

birds, but few studies have considered edges created by narrow breaks in the forest canopy. We compared predation rates on artificial nests placed within forest habitat along edge transects, 10 m from unpaved roads, and along interior transects, 300 m from forest-road boundaries. Local factors, such as nest concealment, and landscape factors, such as the degree of forestation in surrounding areas, were accounted for when testing for edge effects on nest predation. We conducted fixed-radius point counts to compare relative abundance of 34 bird species on edge and interior transects. Also, seven study plots were established adjacent to unpaved roads to map the distribution of bird territories within edge areas, 0-150 m from unpaved roads, and interior areas, 150-300 m from roads. Rates of nest predation on artificial nests did not differ between edge and interior transects, but the distribution of forest birds was influenced by unpaved roads. Four of 18 forest-interior species had lower relative abundance or territory density adjacent to roads, while four of six species categorized as edge nesters had higher relative abundance on edge transects. Our results suggest that narrow openings within forested landscapes may affect habitat use but not nest predation levels, emphasizing the need to frame definitions of "edge effects" within the context of multiple ecological processes.
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1248. **Roberts Creek Study Forest: Habitat use of a dispersed retention area by breeding winter wrens.**
Waterhouse, F. Louise and Harestad, Alton S.
Vancouver Forest Region Forest Research Technical Report TR-020: Unpaginated. (2002).
http://www.for.gov.bc.ca/RCO/research/wildlifereports/tr020.pdf
Descriptors: commercial activities/ conservation measures/ reproduction/ reproductive behavior/ behavior/ ecology/ terrestrial habitat/ land zones/ North America/ Canada/ Troglodytes troglodytes pacificus: forestry/ Dispersed retention system/ habitat management/ breeding site/ territoriality/ habitat utilization/ effects of dispersed retention harvest practices on territories and breeding sites/ forest and woodland/ Mature forest/ British Columbia/ Roberts Creek Study Forest/ Aves, Passeriformes, Troglodytidae/ birds/ chordates/ vertebrates
Abstract: The Winter Wren (Troglodytes troglodytes pacificus) is a common bird in British Columbia and is typically associated with pockets of complex forest structure. From 1995 to 1997, on the south coast of British Columbia, we studied Winter Wrens' use of habitat in a 13.1-ha pilot study block of mature (>120 years) forest. In the central area of the block, 7.1-ha had been harvested in 1993 to produce a uniform dispersed retention of single dominant Douglas- fir and western redcedar trees. We chose to study the Winter Wren because it is distributed throughout forests of the Pacific Northwest, and its habitat use and life history traits are sensitive to forestry practices. We focused on territorial and nesting behaviour of male wrens. Our results indicate that during the immediate post-harvest years, habitat quality of the dispersed retention area may be sub-optimal for breeding males because of changes to forest structure and amounts of habitat attributes. As well, habitat quality for Winter Wrens depends on site tenacity, annual weather, and proximity of structurally complex, closed canopy forest. Furthermore, we suggest streams and seeps may provide higher quality sites for nesting and foraging in either dispersed retention or mature forest despite their overall differences in stand structure. Based on these findings, we think that the overall effect of the dispersed retention system on wildlife will depend on the size of the block and its juxtaposition to other forest types. Understanding how forest practices affect a species, such as the Winter Wren, helps managers design forest practices that can provide habitat to wrens and other forest dwelling organisms which rely on similar structures and ecological processes.
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1249. **Rodent communities of native woodland, replanted, and secondary succession sites in the lower Rio Grande Valley, Texas.**
Sternberg, Mitchell A. and Judd, Frank W.
Texas Journal of Science 58(2): 99-118. (2006)
NAL Call #: 470 T31; ISSN: 0040-4403
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Rodentia: habitat management/ biomass/ native woodland/ replanted and secondary succession sites/ community structure/ forest and woodland/ Texas/ Lower Rio Grande Valley/ Mammalia/ chordates/ mammals/ rodents/ vertebrates
Abstract: Wildlife habitat is rapidly disappearing in the Lower Rio Grande Valley of Texas and is in critical need of protection. United States Fish and Wildlife Service plans call for protection of 53,420 ha in the area, with the Rio Grande serving as the major corridor linking tracts of native and restored vegetation. Species richness, diversity, density, biomass and similarity of rodent communities were compared among a native woodland, a replanted field, and an unaided secondary succession site to obtain information on the efficacy of vegetation efforts in promoting rodent community diversity. Species diversity varied from H' = 0.0 to 0.65 depending on habitat, grid and season. Species richness ranged from 5 to 9 among the three habitats and a total of 10 species was captured. Density for all species combined ranged from 269 to 388 rodents/ha. Sigmodon hispidus, Peromyscus leucopus, and Liomys irroratus were the most abundant rodents in the native woodland and replanted habitats where they together comprised 88% and 90%, respectively, of the individuals captured. Mus musculus replaced P. leucopus in abundance in the unaided succession habitat. Biomass was greatest where S. hispidus was most abundant. Community similarity was greater between the two successional habitats than either was to the native woodland. The native woodland had fewer species but greater evenness than either successional habitat. The replanting technique used by the United States Fish and Wildlife Service in a formerly cultivated field produced greater diversity of rodents in less time than unaided secondary succession of a fallow field. Variation in application of planting techniques can produce significant differences in vegetation and rodent communities on small replanted areas.
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1250. **The role of dead wood in maintaining arthropod diversity on the forest floor.**
Hanula, James L.; Horn, Scott.; and Wade, Dale D.
In: Insect Biodiversity and Dead Wood: Proceedings of a Symposium for the 22nd International Congress of Entomology, General Technical Report-SRS 93/ Grove, Simon J. and Hanula, James L.; Asheville, NC: Southern

Research Station, Forest Service, U.S. Department of Agriculture, 2006. pp. 57-66.
Notes: Symposium held August 15-21, 2004 at Brisbane, Australia.
http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs093/gtr_srs093.pdf
Descriptors: commercial activities/ conservation measures/ nutrition/ diet/ feeding behavior/ associations/ parasites diseases and disorders/ hosts/ ecology/ community structure/ predators/ terrestrial habitat/ land zones/ Arthropoda: forestry/ dead wood role in maintaining faunal diversity on forest floor/ endangered avian predator relations/ habitat management/ food plants/ associations/ plant hosts/ biological breakdown/ species diversity/ avian predators/ Picoides borealis/ endangered predator relationships/ habitat utilization/ forest and woodland/ Florida/ North/ Osceola National Forest/ Aves, Piciformes, Picidae/ arthropods/ birds/ chordates/ invertebrates/ vertebrates
Abstract: Dead wood is a major component of forests and contributes to overall diversity, primarily by supporting insects that feed directly on or in it. Further, a variety of organisms benefit by feeding on those insects. What is not well known is how or whether dead wood influences the composition of the arthropod community that is not solely dependent on it as a food resource, or whether woody debris influences prey available to generalist predators. One group likely to be affected by dead wood is ground-dwelling arthropods. We studied the effect of adding large dead wood to unburned and frequently burned pine stands to determine if dead wood was used more when the litter and understory plant community are removed. We also studied the effect of annual removal of dead wood from large (10-ha) plots over a 5-year period on ground-dwelling arthropods. In related studies, we examined the relationships among an endangered woodpecker that forages for prey on live trees, its prey, and dead wood in the forest. The results of these and other studies show that dead wood can influence the abundance and diversity of the ground-dwelling arthropod community and of prey available to generalist predators not foraging directly on dead trees.
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1251. **The role of herbicides for enhancing forest productivity and conserving land for biodiversity in North America.**
Wagner, R. G.; Newton, M.; Cole, E. C.; Miller, J. H.; and Shiver, B. D.
Wildlife Society Bulletin 32(4): 1028-1041. (2004)
NAL Call #: SK357.A1W5; ISSN: 00917648.
Notes: doi: 10.2193/0091-7648(2004)032[1028:TROHFE]2.0.CO;2.
Descriptors: forest plantations/ forest vegetation management/ growth and yield/ high-yield conservation/ Intensive silviculture/ biodiversity/ conservation/ forest management/ herbicide/ wildlife management/ wood quality/ yield
Abstract: Herbicide technology has evolved with forest management in North America over the past 60 years and has become an integral part of modern forestry practice. Forest managers have prescribed herbicides to increase reforestation success and long-term timber yields. Wildlife managers and others interested in conserving biodiversity, however, have often viewed herbicide use as conflicting with their objectives. Do herbicides increase forest productivity, and are they compatible with the objectives of wildlife management and biodiversity conservation? Results from the longest-term studies (10-30 years) in North America suggest that the range of wood volume yield gains from effectively managing forest vegetation (primarily using herbicides) is 30-450% in Pacific Northwest forests, 10-150% in the southeastern forests, and 50-450% in northern forests. Most of the 23 studies examined indicated 30-300% increases in wood volume yield for major commercial tree species and that gains were relatively consistent for a wide range of site conditions. Meeting future demands for wildlife habitat and biodiversity conservation will require that society's growing demand for wood be satisfied on a shrinking forestland base. Increased fiber yields from intensively managed plantations, which include the use of herbicides, will be a crucial part of the solution. If herbicides are properly used, current research indicates that the negative effects on wildlife usually are short-term and that herbicides can be used to meet wildlife habitat objectives.
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1252. **Ruffed grouse (Bonasa umbellus) brood microhabitat selection in the southern Appalachians.**
Haulton, G. S.; Stauffer, D. F.; Kirkpatrick, R. L.; and Norman, G. W.
American Midland Naturalist 150(1): 95-103. (2003)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: gamebird/ ground cover/ habitat management/ habitat selection/ microhabitat/ United States/ Bonasa umbellus
Abstract: Brood cover is a critical component of ruffed grouse habitat during a period when chick mortally, may be high. We compared microhabitat characteristics at ruffed grouse (Bonasa umbellus) brood locations with random locations to determine characteristics selected by females with broods in the Appalachian region of Virginia and West Virginia. Females with broods used forested sites with a well-developed overstory canopy (>70%). These sites had a higher abundance of arthropods in the first 3 wk after hatch ($P = 0.02$), taller ground cover ($P < 0.1$) and higher percent ground cover ($P < 0.1$) in the first 6 wk after hatch than random sites. Total woody stem densities were not different ($P > 0.1$) between brood and random sites as has been found in several studies from more northern sites. Most management prescriptions for ruffed grouse brood habitat are based on increasing hardwood stem densities; our results suggest alternative habitat management techniques that promote ground cover, such as prescribed burning and forest stand thinning, may be more appropriate in the southern Appalachian region.
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1253. **Ruffed grouse brood habitat use in mixed softwood-hardwood nordic-temperate forests, Quebec, Canada.**
Giroux, W.; Blanchette, P.; Bourgeois, J. C.; and Cabana, G.
Journal of Wildlife Management 71(1): 87. (Jan. 2007)
NAL Call #: 410 J827
Descriptors: ruffed grouse/ wildlife habitat/ nesting/ brood rearing/ Quebec/ Canada
Abstract: Adequate cover is a critical component of ruffed grouse (Bonasa umbellus) habitat during the brood-rearing period when chick mortality is high. We assessed habitat use by ruffed grouse during the brood-rearing period by

comparing characteristics of tree, shrub, and ground layers at ruffed grouse brood and random locations. We captured and radiomarked 29 females with broods in 2 forest settings of the Reserve faunique de Portneuf, Quebec, Canada. We described grouse habitat using ground surveys and forest maps, and we identified the used habitat characteristics using analysis of variance and logistic regression. Females with broods used mixed and regenerated clearcut stands that were 1.5-7 m tall and 11-20 years old. Compared with random locations, grouse locations had higher lateral obstruction (76% vs. 68%), higher small-stem density (29,085 stems/ha vs. 19,340 stems/ha), and were closer to roads and trails. Percentage of coverage by ground vegetation was not higher at grouse locations as often reported in previous studies. Results from this study will help orient ruffed grouse habitat management on Quebec public land and elsewhere in nordic-temperate mixed hardwood-softwood forests to maintain suitable brood habitat after logging operations. Forest management should promote growth of young mixed stands with high horizontal and vertical cover provided by high small-stem density, which offers protection against aerial and terrestrial predation. Edges such as roadsides are also important in brood habitat as they provide food and cover.
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1254. **Ruffed grouse population ecology in the Appalachian Region.**
Devers, Patrick K.; Stauffer, Dean F.; Norman, Gary W.; Steffen, Dave E.; Whitaker, Darroch M.; Sole, Jeffrey D.; Allen, Tom J.; Bittner, Steve L.; Buehler, David A.; Edwards, John W.; Figert, Daniel E.; Friedhoff, Scott T.; Giuliano, William W.; Harper, Craig A.; Igo, William K.; Kirkpatrick, Roy L.; Seamster, Michael H.; Spiker, Harry A.; Swanson, David A.; and Tefft, Brian C.
Wildlife Monographs 168: 1-36. (2007)
NAL Call #: 410 W64; ISSN: 0084-0173
Descriptors: Galliformes/ Phasianidae/ Bonasa umbellus/ Appalachian Region/ forests/ ecosystems/ habitat management/ population ecology/ productivity/ conservation/ wildlife management/ habitat use/ land zones/ reproduction/ Carya spp./ Quercus spp.
Abstract: The Appalachian Cooperative Grouse Research Project (ACGRP) was a multistate cooperative effort initiated in 1996 to investigate the apparent decline of ruffed grouse (Bonasa umbellus) and improve management throughout the central and southern Appalachian region (i.e., parts of Ohio, Pennsylvania, Rhode Island, Kentucky, West Virginia, Virginia, and North Carolina, USA). Researchers have offered several hypotheses to explain the low abundance of ruffed grouse in the region, including low availability of early-successional forests due to changes in land use, additive harvest mortality, low productivity and recruitment, and nutritional stress. As part of the ACGRP, we investigated ruffed grouse population ecology. Our objectives were to estimate reproductive rates, estimate survival and cause-specific mortality rates, examine if ruffed grouse harvest in the Appalachian region is compensatory, and estimate ruffed grouse finite population growth. We trapped >3,000 ruffed grouse in autumn (Sep-Nov) and spring (Feb-Mar) from 1996 to September 2002 on 12 study areas. We determined the age and gender of each bird and fitted them with necklace-style radiotransmitters and released them at the trap site. We tracked ruffed grouse ≥2 times per week using handheld radiotelemetry equipment and gathered data on reproduction, recruitment, survival, and mortality. Ruffed grouse population dynamics in the Appalachian region differed from the central portion of the species' range (i.e., northern United States and Canada). Ruffed grouse in the Appalachian region had lower productivity and recruitment, but higher survival than reported for populations in the Great Lakes region and southern Canada. Population dynamics differed between oak (Quercus spp.)-hickory (Carya spp.) and mixed-mesophytic forest associations within the southern and central Appalachian region. Productivity and recruitment were lower in oak-hickory forests, but adult survival was higher than in mixed-mesophytic forests. Furthermore, ruffed grouse productivity and recruitment were more strongly related to hard mast (i.e., acorn) production in oak-hickory forests than in mixed-mesophytic forests. The leading cause of ruffed grouse mortality was avian predation (44% of known mortalities). Harvest mortality accounted for 12% of all known mortalities and appeared to be compensatory. Population models indicated ruffed grouse populations in the Appalachian region are declining (λ = 0.7-0.95), but differences in model estimates highlighted the need for improved understanding of annual productivity and recruitment. We posit ruffed grouse in the Appalachian region exhibit a clinal population structure characterized by changes in life-history strategies. Changes in life history strategies are in response to gradual changes in forest structure, quality of food resources, snowfall and accumulation patterns, and predator communities. Management efforts should focus on creating a mosaic of forest stand ages across the landscape to intersperse habitat resources including nesting and brood cover, adult escape cover, roosting sites, and, most importantly, food resources. Land managers can intersperse habitat resources through a combination of clearcutting, shelterwood harvests, group selection, and timber stand improvement (including various thinnings and prescribed fire). Managers should maintain current ruffed grouse harvest rates while providing high quality hunting opportunities. We define high quality hunting as low hunting pressure, low vehicle traffic, and high flush rates. Managers can provide high quality hunting opportunities through use of road closures in conjunction with habitat management.
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1255. **Safe harbor for the red-cockaded woodpecker: Private forest landowners share their views.**
Zhang, D. and Mehmood, S. R.
Journal of Forestry 100(5): 24-29. (2002)
NAL Call #: 99.8 F768 ; ISSN: 00221201
Descriptors: endangered species/ nonindustrial private forestland/ policy/ wildlife/ behavioral research/ combustion/ forestry/ landowners/ biodiversity/ environmental legislation/ management practices/ public attitude/ species conservation/ Picoides borealis
Abstract: We surveyed North Carolina and South Carolina private forest landowners to learn their attitudes about the Safe Harbor Program initiated by the US Fish and Wildlife Service and the Environmental Defense Fund. Landowners who own large amounts of forestland near active clusters of red-cockaded woodpeckers (Picoides borealis), whose forest have a high proportion of mature pine, and who practice prescribed burning or chemical or mechanical methods to control understory hardwoods are most likely to sign an agreement to participate. We found that the views

of program participants and nonparticipants were similar concerning the Endangered Species Act and the alternatives to the Safe Harbor Program.
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1256. **Sciurid habitat relationships in forests managed under selection and shelterwood silviculture in Ontario.**
Holloway, Gillian L. and Malcolm, Jay R.
Journal of Wildlife Management 70(6): 1735-1745. (2006)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: commercial activities/ conservation measures/ ecology/ population dynamics/ terrestrial habitat/ land zones/ North America/ Canada/ Glaucomys sabrinus/ Glaucomys volans/ Tamias striatus/ Tamiasciurus hudsonicus: forestry/ shelterwood and selection silviculture/ population density impact/ habitat management/ silviculture methods in forest habitat/ population density/ forest management impact/ forest and woodland/ silviculture impact on population density/ Ontario/ Algonquin Provincial Park/ silviculture impact on forest population density/ Mammalia, Rodentia, Sciuridae/ chordates/ mammals/ rodents/ vertebrates
Abstract: Although partial forest harvesting is practiced over large areas, managers know little about its impacts on sciurid rodents, particularly on northern (Glaucomys sabrinus) and southern flying squirrels (G. volans) in the northeastern United States and Canada. We examined habitat relationships of sciurid rodents (northern flying squirrels, southern flying squirrels, red squirrels (Tamiasciurus hudsonicus), and eastern chipmunks (Tamias striatus)) at 2 spatial scales in managed and unmanaged coniferous and hardwood forests of Algonquin Provincial Park, Ontario, Canada. We live-trapped rodents in 26 northern hardwood stands and in 16 white pine (Pinus strobus) stands from 2002 to 2004. Northern flying squirrel and red squirrel densities were significantly lower in recently harvested (3-10 yr since harvest) shelterwood stands than in unmanaged stands. In contrast, southern flying squirrel densities were higher in selection-harvested stands than in old-forest areas. The densities of northern flying squirrels and red squirrels had a strong relationship with the density of large spruce (Picea sp.) and hardwood trees and snags in conifer sites. Southern flying squirrel numbers had a positive association with the density of mast trees at the landscape level but not at the stand level in hardwood forests. Eastern chipmunk density had a positive correlation with the volume of old downed woody debris and the stems per hectare of declining trees. We recommend forest managers retain more large spruce and hardwood trees to mitigate the impacts of shelterwood harvesting on northern flying squirrels and red squirrels, and that they maintain high mast availability at the landscape level to ensure the persistence of southern flying squirrels.
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1257. **Seasonal activity of adult, ground-occurring beetles (Coleoptera) in forests of northeastern Wisconsin and the Upper Peninsula of Michigan.**
Werner, S. M. and Raffa, K. F.
American Midland Naturalist 149(1): 121-133. (2003)
NAL Call #: 410 M58; ISSN: 00030031
Descriptors: abundance/ beetle/ community composition/ forest management/ seasonality/ species diversity/ species richness/ United States/ Calathus ingratus/ Calosoma frigidum/ Carabus nemoralis/ Carabus sylvosus/ Coleoptera/ Geotrupes bayli/ Nicrophorus defodiens/ Nicrophorus sayi/ Nicrophorus tomentosus/ Oiceoptoma noveboracensis/ Platynus decentis/ Pterostichus adstrictus/ Pterostichus melanarius/ Pterostichus mutus/ Pterostichus pensylvanicus/ Pterostichus tristis/ Sphaeroderus lecontei/ Synuchus impunctatus/ Wisconsin/ Michigan
Abstract: Seasonal activity of 24 species of ground-occurring, forest Coleoptera in northern Wisconsin and the Upper Peninsula of Michigan was assessed using pitfall traps during the spring and summer of 1996 and 1997. Overall, species richness, abundance and diversity remained relatively constant throughout the season, although species composition varied considerably. Trap catch of seven species was greatest from early May to late June: Calosoma frigidum Kirby, Carabus nemoralis Muller, Platynus decentis (Say), Pterostichus adstrictus Eschscholtz, P. mutus (Say), P. pensylvanicus LeConte and Sphaeroderus lecontei Dejean. Two species, Carabus sylvosus Say and Nicrophorus sayi Laporte, showed both early and late peaks in trap catch. Trap catch of eight species was greatest from early July to late August: Calathus ingratus Dejean, Synuchus impunctatus (Say), Pterostichus melanarius (Illiger), Pterostichus tristis (Dejean), Geotrupes bayli Jekel, Nicrophorus defodiens Mannerheim, N. tomentosus Weber and Oiceoptoma noveboracensis Forster. Implications for studies that assess impacts of forest management practices on beetle biodiversity are discussed.
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1258. **Seasonal and annual home ranges of female eastern wild turkeys in a managed pine landscape in Mississippi.**
Miller, Darren A. and Conner, L. Mike
Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies 59: 89-99. (2005)
NAL Call #: SK1.S6; ISSN: 0276-7929
Descriptors: conservation measures/ behavior/ ecology/ terrestrial habitat/ land zones/ Meleagris gallopavo silvestris: habitat management/ home range/ seasonal and annual home ranges/ females/ managed pine landscape/ distribution within habitat/ forest and woodland/ Mississippi/ Kemper County/ Interior Flatwoods Resource Area/ Aves, Galliformes, Phasianidae/ birds/ chordates/ vertebrates
Abstract: Eastern wild turkeys (Meleagris gallopavo silvestris) are an important recreational resource throughout their range. Previous research has shown that intensively managed pine forests can sustain huntable populations of eastern wild turkeys. However, little research has examined patterns of spatial use of turkeys within these systems. An expected increase in acreage of intensively managed pine forests over the next half century requires a basic understanding of wild turkey ecology in these systems. Therefore, we used a long-term (1986-1993) data set to estimate annual and seasonal home range size of female eastern wild turkeys from a landscape dominated by intensively managed pine forests in east-central Mississippi. Mean seasonal home range size was 406 ha ± 20 ha (mean ± SE; N = 268). Home ranges were larger during fall/winter (524 ± 43.5 ha) than preincubation (326 ± 23.2 ha) and summer (392 ± 32.5 ha). Aver-age annual home range size was 796 ha ± 46.0 ha and was smaller in 1993 ($P < 0.05$) than other years. We documented wide variability in seasonal and annual home ranges likely in

response to localized resource availability and individual female behavior. For some females, home range size was affected by seasonal movements between intensively managed pine stands in spring and summer and a large bottomland hardwood and agriculture complex during fall-winter. Managers need to understand movements within home ranges to better understand spatial use by wild turkeys. We suggest managers consider spatial distribution of vegetation types, particularly mature hardwoods, important to turkeys when making management decisions.
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1259. **Seasonal avifauna responses to fuel reduction treatments in the upper piedmont of South Carolina: Results from Phase 1 of the National Fire and Fire Surrogate Study.**
Zebehazy, Laura A.; Lanham, J. Drew; and Waldrop, Thomas A.
In: Proceedings of the 12th Biennial Southern Silvicultural Research Conference, General Technical Report-SRS 71/ Connor, Kristina F.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2004. pp. 82-86.
http://www.treesearch.fs.fed.us/pubs/6304
Descriptors: commercial activities/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ Aves: forestry/ prescribed burning and thinning/ community structure effects/ forest habitats/ community structure/ prescribed burning and thinning effects/ forest and woodland/ pine and mixed forest habitats/ fire/ prescribed burning/ South Carolina/ upper piedmont/ Aves/ birds/ chordates/ vertebrates
Abstract: We examined avian species and assemblage responses to prescribed burns and thinning in a southeastern Piedmont pine and mixed pine-hardwood forest as part of the National Fire and Fire Surrogate Study (NFFS) examining the effects of fuel reduction on forest health. Point counts conducted during the non-breeding and breeding seasons of 2000-2002 showed that winter bird species abundance and evenness (J') did not change significantly between pre- and post-treatment winter surveys. However, bird species richness increased significantly between years. No differences were found between treatments for species abundance, richness, or evenness during the breeding season. However, foliage-gleaning and canopy-nesting breeding species were detected significantly more often in thinned than burned or control sites. Nest searches and monitoring found 79 nests (thin, n = 30; burn, n = 27; control, n = 22) with a 49-percent failure rate over the 2-year period. Most of these failures (41 percent) occurred in thinned stands.
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1260. **Seasonal bird use of canopy gaps in a bottomland forest.**
Bowen, Liessa T.; Moorman, Christopher E.; and Kilgo, John C.
Wilson Journal of Ornithology 119(1): 77-88. (2007)
NAL Call #: QL671.W55 ; ISSN: 1559-4491
Descriptors: conservation/ ecology/ terrestrial habitat/ land zones/ Aves: conservation measures/ Implications of seasonal use of canopy gaps/ habitat utilization/ seasonal use of canopy gaps in bottomland forest/ conservation implications/ forest and woodland/ bottomland forest/ seasonal use of canopy gaps/ South Carolina/ Savannah River Site/ Aves/ birds/ chordates/ vertebrates
Abstract: Bird use of small canopy gaps within mature forests has not been well studied, particularly across multiple seasons. We investigated seasonal differences in bird use of gap and forest habitat within a bottomland hardwood forest in the Upper Coastal Plain of South Carolina. Gaps were 0.13- to 0.5-ha, 7- to 8-year-old group-selection timber harvest openings. Our study occurred during four bird-use periods (spring migration, breeding, postbreeding, and fall migration) in 2001 and 2002. We used plot counts and mist netting to estimate bird abundance in canopy gaps and surrounding mature forest habitats. Using both survey methods, we observed more birds, including forest-interior species, forest-edge species, field-edge species, and several individual species in canopy gap and gap-edge habitats than in surrounding mature forest during all periods. Interactions between period and habitat type often were significant in models, suggesting a seasonal shift in habitat use. Bird activity generally shifted between the interior of canopy gaps and the immediate gap edge, but many species increased their use of forested habitat during the breeding period. This suggests that many species of birds selectively choose gap and gap-edge habitat over surrounding mature forest during the non-breeding period. Creation of small canopy gaps within a mature forest may increase local bird species richness. The reasons for increased bird activity in gaps remain unclear.
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1261. **Seasonal habitat selection by raccoons (Procyon lotor) in intensively managed pine forests of central Mississippi.**
Chamberlain, Michael J.; Conner, L. Mike; and Leopold, Bruce D.
American Midland Naturalist 147(1): 102-108. (2002)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: Procyon lotor/ Procyonidae/ Carnivora/ mammals/ behavior/ habitat use/ seasonal activities/ habitat management/ forestry practices/ ecosystems/ pine/ coniferous forests/ deciduous forests/ age-sex relationships/ breeding season/ care and rearing of young/ home range-territory/ habitat alterations/ terrestrial ecology/ radio-telemetry/ breeding ecology/ forest management/ habitat selection/ forests/ Jasper County/ Mississippi/ pine forests/ seasonal habitat selection/ wildlife-human relationships/ commercial enterprises/ disturbances/ land zones/ reproduction/ common raccoon/ desert habitat/ silviculture/ abundance/ dispersion/ telemetry
Abstract: Raccoons (Procyon lotor) are ecological generalists, existing in diverse landscapes. Although general habitat use patterns of raccoons have been extensively described, little research has examined raccoon habitat selection within landscapes managed intensively for wood fiber production. Furthermore, no published studies using radio-telemetry have detailed raccoon habitat selection at multiple spatial scales. The authors monitored 31 raccoons on a 2000 ha area characterized by short-rotation (<35 years) pine forests in central Mississippi during 1996-1997 and examined seasonal habitat selection at three spatial scales. Habitat selection at the home range scale differed (p = 0.004) between genders. Gender and season interacted to affect habitat selection at the core area scale of selection. Both male and female core areas contained greater proportions of mature hardwood habitats during breeding and young-rearing. Habitat use within

home ranges, as determined by point locations, did not differ (P > 0.440) with gender or season. However, raccoons used habitats disproportionately (P = 0.016) relative to habitat composition of the home range. The authors' findings illustrate the importance of examining individual habitat selection at multiple scales, as raccoon habitat selection in this study varied by scale. Furthermore, their results indicate the importance of hardwood dominated habitats for raccoons existing in pine-dominated landscapes.
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1262. **Seasonal habitat use and movements of mountain goats, Oreamnos americanus, in east-central British Columbia.**
Poole, Kim G. and Heard, Douglas C.
Canadian Field Naturalist 117(4): 565-576. (2003)
NAL Call #: 410.9 Ot8; ISSN: 0008-3550
Descriptors: conservation measures/ techniques/ ecology/ habitat utilization/ terrestrial habitat/ land zones/ North America/ Canada/ Oreamnos americanus: habitat management/ forested buffers/ forestry disturbance avoidance/ tracking techniques/ GPS accuracy/ forest canopy closure effect/ distribution within habitat/ seasonal habitat use/ forestry disturbance/ habitat preference/ mineral licks/ forest and woodland/ British Columbia/ Robson Valley surrounds/ Mammalia, Artiodactyla, Bovidae/ chordates/ mammals/ ungulates/ vertebrates
Abstract: To identify the potential for adverse effects of forest development on Mountain Goats (Oreamnos americanus), we documented the patterns of forest use by goats and the factors influencing goat habitat use. We used a combination of 15 very high frequency (VHF) and six global positioning system (GPS) radiocollars to document the distribution and movements of 21 (15 female, 6 male) goats from 1997 to 1999 in the mountains surrounding the Robson Valley in east-central British Columbia. Because canopy closure reduces the likelihood that a GPS receiver will obtain a location fix, we estimated that GPS collars underrepresented forest use by about 23%. Three goats used separate winter and summer ranges separated by 8-13 km, while most simply exhibited seasonal shifts in elevation. In winter, goats were more often at lower elevations, in commercial forest stands, on southerly aspects, and moved less each hour and over the course of the winter. Goat use declined in areas >500 m from escape terrain and goats were found lower in elevation from evening to dawn compared to daylight hours. Collared goats used high elevation licks, which were either within their home range, or in two cases, 6 and 14 km from their typical home range. We documented use of known mid-elevation mineral licks by three collared goats, but no use of known low elevation (valley bottom and lower slopes) mineral licks. Robson Valley goats appeared to be at relatively low risk from disturbances related to logging, because although forest use was documented during winter, it occurred primarily on high elevation, steep slopes where trees are currently of low commercial value, and goats made little use of low elevation mineral licks. We recommend that in this area a forested buffer of 500 m around cliffs be left to reduce the possibility of adverse effects on goats especially, on southerly aspects above 1300 m.
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1263. **Selection of nest and roost trees by pileated woodpeckers in coastal forests of Washington.**
Aubry, K. B. and Raley, C. M.
Journal of Wildlife Management 66(2): 392-406. (2002)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: Abies amabilis/ decadent tree/ Dryocopus pileatus/ forest management/ heart-rot fungi/ nest/ Pacific Northwest/ Pacific silver fir/ pileated woodpecker/ roost/ snag/ Thuja plicata/ Tsuga heterophylla/ Western hemlock/ Western redcedar/ birds/ forest management/ habitat management/ nesting/ roost site/ species conservation/ United States/ Abies amabilis/ Dryocopus pileatus/ Thuja plicata/ Tsuga heterophylla
Abstract: Providing adequate habitat for the pileated woodpecker (Dryocopus pileatus) is a key component of federal forest management plans in the Pacific Northwest, yet information is extremely limited on characteristics of trees selected by this species for nesting or roosting in coastal forests. We investigated selection by pileated woodpeckers of both individual tree and site characteristics for nesting and roosting in coastal forests, and evaluated the efficacy of current management prescriptions for these woodpeckers on federal lands. From 1990 to 1995, we used call surveys, ground searches, and radiotelemetry to locate 25 nest and 144 roost trees used by 31 adult pileated woodpeckers (16 females, 15 males) in western hemlock (Tsuga heterophylla) forests located about 20 km east of the Pacific coast in Washington, USA. Nesting pairs typically excavated nest cavities in different trees each year, and individual birds used an average of 7 different roost trees during the nonbreeding season. Pileated woodpeckers used decadent live trees as often as snags for both nesting and roosting. They selected Pacific silver fir (Abies amabilis) for nesting and western redcedar (Thuja plicata) for roosting, and selected against western hemlock for both activities. For nesting, pileated woodpeckers used only trees 65-154 cm in diameter at breast height (dbh) but were not selective within this range; for roosting, they selected trees 155-309 cm dbh and selected against trees <125 cm dbh. For both nesting and roosting, pileated woodpeckers selected trees ≥ 27.5 m tall and selected against trees <17.5 m tall. Decay characteristics of trees used by pileated woodpeckers for nesting differed su'ongly from those used for roosting. Site characteristics also influenced selection of nest and roost trees by pileated woodpeckers; 0.4-ha plots around nest and roost trees contained a higher diversity of tree species and higher densities of decadent trees ≥ 20 cm dbh and snags ≥ 50 cm dbh than availability plots. The Northwest Forest Plan specifies the retention of 1 large, hard snag per 17 ha of harvested forest to provide nest trees for pileated woodpeckers. Our results indicate that providing adequate habitat for pileated woodpeckers in coastal forests of the Pacific Northwest may require a more comprehensive management strategy that also includes provisions for roost trees and that emphasizes retention of both snags and decadent trees, especially those infected with heart-rot decay fungi.
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1264. **Short-term breeding bird response to two harvest practices in a bottomland hardwood forest.**
Harrison, Charles A. and Kilgo, John C.
Wilson Bulletin 116(4): 314-323. (2004)
NAL Call #: 413.8 W692; ISSN: 0043-5643
Descriptors: commercial activities/ conservation measures/ ecology/ community structure/ population dynamics/ terrestrial habitat/ land zones/ clearcutting and patch retention harvesting/ short term breeding population responses/ habitat management/ forest management/ species diversity/ breeding species richness/ harvest practices/ population density/ breeding population/ clearcutting/ patch retention harvesting/ forest and woodland/ short term breeding population responses/ South Carolina/ Lower Coastal Plain/ Coosawhatchie River/ bottomland hardwood forest/ Aves/ birds/ chordates/ vertebrates
Abstract: Clearcutting is the preferred timber harvest method in bottomland hardwood forests because it is most likely to result in regeneration of preferred species. However, clearcutting generally has negative impacts on forest birds. Patch-retention harvesting may provide similar silvicultural benefits, but its effects on birds are unknown. We surveyed breeding birds in uncut control, clearcut, and patch-retention treatment areas (11-13 ha) for one season prior to harvest and two seasons postharvest in a bottomland hardwood forest in the Lower Coastal Plain of southeastern South Carolina. Bird observations recorded along line transects were analyzed using the software EstimateS to estimate species richness and program Distance to estimate densities. We found greater species richness and bird densities in the patch-retention treatment than in the clearcut in both postharvest seasons. We detected no forest-interior birds in the clearcut after the harvest, but by the second postharvest season in the patch-retention treatment, the density of forest-interior birds had returned to approximately half of its preharvest level. Thus, based on density response, patch-retention harvesting appears to be less detrimental to forest birds than clearcutting. However, additional work is needed to determine whether retained patches influence avian survival and productivity.
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1265. **Short-term effects of fire and other fuel reduction treatments on breeding birds in a southern Appalachian upland hardwood forest.**
Greenberg, C. H.; Tomcho, A. L.; Lanham, J. D.; Waldrop, T. A.; Tomcho, J.; Phillips, R. J.; and Simon, D.
Journal of Wildlife Management 71(6): 1906-1916. (Aug. 2007)
NAL Call #: 410 J827
Descriptors: fire ecology/ forest fires/ forest habitats/ forest wildlife relations/ wildlife habitats/ fire hazard reduction/ prescribed burning/ wildland fire management/ montane forests/ wild birds/ understory/ shrubs/ forest trees/ tree mortality/ canopy gaps/ population density/ species diversity/ Sialia sialis/ duration/ forest litter/ forest insects/ hardwood forests/ Appalachian region/ North Carolina/ Passerina cyanea/ Contopus virens/ Mniotilta varia/ Wilsonia citrina/ Helmitheros vermivorus/ natural resources, environment, general ecology, and wildlife conservation/ animal ecology and behavior/ forestry related/ forest fire management
This citation is from AGRICOLA.

1266. **Short-term effects of fuel reduction on pileated woodpeckers in northeastern Oregon: A pilot study.**
Bull, Evelyn L.; Clark, Abe A.; and Shepherd, Jay F.
Portland, OR: Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture; Research Paper-PNW 564, 2005. 17 p.
Notes: 0882-5165 (ISSN).
Descriptors: commercial activities/ nutrition/ feeding behavior/ ecology/ terrestrial habitat/ land zones/ Dryocopus pileatus: forestry/ foraging/ fuel reduction impact in forest habitat/ habitat utilization/ forest and woodland/ Oregon/ La Grande/ Aves, Piciformes, Picidae/ birds/ chordates/ vertebrates
Abstract: To determine the short-term effects (1 to 3 years posttreatment) of fuel reduction on pileated woodpeckers (Dryocopus pileatus) in northeastern Oregon, we compared measures of abundance of logs, snags, stumps, and of woodpecker foraging in mixed-conifer stands that had undergone the following treatments: prescribed burning after mechanical fuel reduction, mechanical fuel reduction without prescribed burning, or no treatment. Pileated woodpecker foraging was significantly more abundant in the stands that were not treated or had mechanical fuel reduction only. Ants, the primary prey of pileated woodpeckers, were also significantly more abundant in these stands.
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1267. **Short-term effects of harvest technique and mechanical site preparation on arthropod communities in jack pine plantations.**
Bellocq, M. Isabel; Smith, Sandy M.; and Doka, Margaret E.
Journal of Insect Conservation 5(3): 187-196. (2001)
NAL Call #: QL362.J68; ISSN: 1366-638X
Descriptors: commercial activities/ conservation measures/ ecology/ population dynamics/ land and freshwater zones/ Canada/ Arthropoda: forestry/ silvicultural practices/ habitat management/ jack pine plantations/ community structure/ population density/ Ontario, northern/ Chapleau/ arthropods/ invertebrates
Abstract: Arthropods play a key role in the functioning of forest ecosystems and contribute to biological diversity. However, the influence of current silvicultural practices on arthropod communities is little known in jack pine (Pinus banksiana) forests, a forest type comprising a major portion of the Canadian boreal forest. In this study, the effects of silvicultural treatments on arthropod communities were compared to identify those treatments that minimize ecological impacts on arthropods. The influence of harvesting techniques and mechanical site preparations on insect family richness and abundance of arthropods (total, by orders and by trophic groups) was examined in young (three-year-old) jack pine plantations of northern Ontario. Each of the following treatments were conducted in three plots: (1) tree length harvest and trenching; (2) full tree harvest and trenching; (3) full tree harvest and blading; and (4) full tree harvest and no site preparation. Arthropods were collected using sweepnets and pitfall traps over two years. Blading significantly reduced insect family richness, the total abundance of arthropods, abundance of Orthoptera, Heteroptera, Hymenoptera, Diptera, insect larvae, and plant feeders when compared to the other treatments. The use of either full tree or tree length harvesting had similar short-term effects on family richness and the abundance of arthropods. Arthropod diversity

declined with increasing post-harvest site disturbance. These results suggest that arthropod communities in the understory and on the ground are reduced most on sites mechanically prepared by blading, but are similar under conditions immediately following either full tree or tree length harvesting. The implications for regenerating jack pine in the boreal forest are discussed.
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1268. **Short-term effects of wildfires on spotted owl survival, site fidelity, mate fidelity, and reproductive success.**
Bond, Monica L.; Gutierrez, R. J.; Franklin, Alan B.; LaHaye, Williams S.; May, Christopher A.; and Seamans, Mark E.
Wildlife Society Bulletin 30(4): 1022-1028. (2002)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: Strix occidentalis/ Strigiformes/ Strigidae/ behavior/ terrestrial ecology/ controlled burning/ forested landscapes/ habitat restoration/ mate fidelity/ reproductive success/ short-term effects/ site fidelity/ survival/ wildfires/ fires and burns/ forests/ ecosystems/ pair formation/ breeding/ productivity/ United States, Southwest/ territorial defense/ home range-territory/ environmental factors/ habitat use/ land zones/ population ecology/ reproduction/ spotted owl/ habitat change/ habitat management/ philopatry/ mortality/ territory/ mating
Abstract: The effects of wildfire on wildlife are important considerations for resource managers because of recent interest in the role of fire in shaping forested landscapes in the western United States. This is particularly true of wildfire effects on spotted owls (Strix occidentalis) because of the uncertainty of impacts of controlled burning within spotted owl habitat. Therefore, we documented minimum survival, site fidelity, mate fidelity, and reproductive success for 21 spotted owls after large (>540 ha) wildfires occurred within 11 owl territories in California, Arizona, and New Mexico. In each territory, fire burned through the nest and primary roost sites. Eighteen owls (86%) were known to be alive at least 1 year after the fires, which was similar to reported annual adult survival probabilities for the species. Of 7 pairs of which both members were later resighted, all were located together on the same territories during the breeding season following fires, and 4 pairs produced a total of 7 fledglings. No pair separations were observed after fire. On 8 territories where fire severities were mapped, 50% experienced predominantly low- to moderate-severity fires while 50% experienced high-severity fires that burned large (>30%) areas of the territories. We hypothesize that wildfires may have little short-term impact on survival, site fidelity, mate fidelity, and reproductive success of spotted owls. Further, prescribed burning could be an effective tool in restoring habitat to natural conditions with minimal short-term impact on resident spotted owls. While we do not advocate wholesale prescribed burning in spotted owl territories at this time, we believe our observations justify large-scale experiments on effects of prescribed burning on spotted owls to corroborate our observations and to establish cause-and-effect relationships.
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1269. **Short-term response of shrews to prescribed fire and mechanical fuel reduction in a southern Appalachian upland hardwood forest.**
Greenberg, Cathryn H.; Miller, Stanlee; and Waldrop, Thomas A.
Forest Ecology and Management 243(2-3): 231-236. (2007)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ conservation measures/ ecology/ community structure/ terrestrial habitat/ land zones/ Blarina brevicauda/ Sorex fumeus/ Sorex hoyi/ Sorex longirostris: forestry/ burning and mechanical understorey reduction/ relative abundance/ habitat management/ relative abundance/ forest and woodland/ hardwood forest/ North Carolina/ Polk County/ Green River Game Land/ Mammalia, Insectivora, Soricidae/ chordates/ Insectivores/ mammals/ vertebrates
Abstract: As part of the multidisciplinary National Fire and Fire Surrogate study, we used drift fences with pitfall traps from May to September 2003 and 2004 to determine how three fuel reduction techniques affected shrews in the Southern Appalachian Mountains of North Carolina. Ground-dwelling macroarthropods also were collected from a subset of pitfall traps to assess relative prey availability among the treatments. Four experimental units, each > 14 ha were contained within each of three replicate blocks. Treatments were (1) prescribed burning; (2) mechanical felling of shrubs and small trees; (3) mechanical felling + burning; (4) forested controls. Mechanical understory felling treatments were conducted in winter 2001-2002, and prescribed burning was conducted in March 2003. High-intensity fires and high tree mortality increased canopy openness in mechanical felling + bum treatment compared to the others. Burning reduced leaf litter depth in both the burned treatments (burn only and mechanical felling + bum), whereas mechanical understory felling alone increased leaf litter depth in that treatment. Dry biomass of ground-dwelling macroarthropods was similar among the treatments and control. We collected a total of 269 shrews of four species during 2003 and 2004, including northern short-tailed shrews (Blarina brevicauda), smokey shrews (Sorex fumeus), pygmy shrews (S. hoyi), and southeastern shrews (S. longirostris). Relative abundance of all shrews combined and pygmy shrews was lowest in the mechanical felling + burn treatment, but differed significantly only from the mechanical understory felling treatment where the contrast in leaf litter depth was high. Our results indicate that low-intensity fuel reduction treatments, with minimal change to canopy cover or leaf litter depth, have little impact on shrews. However, high-intensity disturbance, such as prescribed burning that kills trees and dramatically reduces shade and leaf litter depth, can reduce the abundance of some shrew species and all shrews combined, at least in the short term. © 2007 Published by Elsevier B.V.
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1270. **Short-term responses of the small mammal communities to forest management within Missouri Ozark forest ecosystem project sites.**
Fantz, Debby K. and Renken, Rochelle B.
In: Proceedings of the Second Missouri Ozark Forest Ecosystem Project Symposium: Post-treatment Results of the Landscape Experiment, General Technical Report-NC 227/ Shifely, S. R. and Kabrick, J. M.; St. Paul, MN: North

Central Forest Experiment Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 161-170.
Notes: 0363-616X (ISSN).
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Mammalia: habitat management/ forest management/ small taxa/ community structure/ forest and woodland/ Missouri/ Ozarks/ Mammalia/ chordates/ mammals/ vertebrates
Abstract: We conducted a capture-recapture study on the northeast-facing slopes of the MOFEP sites in south central Missouri to determine the initial effects of even-and uneven-aged forest management on species composition, species richness, and relative abundance of the small mammal communities. We compared changes between pre-treatment (1994-1995) and post-treatment (1998-2000) measures. Species richness ranged from two to six species per site across years; eight different species were caught across all nine sites and years. Overall small mammal relative abundance estimates ranged from 0.23 to 7.75 individuals captured per 100 trap nights per site across years. Qualitative and quantitative evaluations indicate that forest management had no short-term effect on species composition or species richness, but did have an effect upon total small mammal relative abundance 2, 3, and 4 years after harvest. Even-aged management, and uneven-aged management to a lesser extent, appeared to have dampened a natural decline in small mammal relative abundance that was observed on control sites. Relative abundance estimates on treated sites were slightly higher than those on control sites.
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1271. **Silvicultural guidelines for creating and managing wildlife habitat in west-side production forests.**
Harrington, Timothy B. and Tappeiner, John C.
In: Managing for wildlife habitat in westside production forests, General Technical Report-PNW 695; Portland, OR: Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture, 2007. pp. 49-59.
http://www.fs.fed.us/pnw/pubs/pnw_gtr695.pdf
Descriptors: wildlife management: conservation/ germination/ spatial arrangement/ competition control/ wildlife habitat management/ sprouting/ planting/ west side production forest/ rhizome expansion
Abstract: Conventional silvicultural treatments (planting, competition control, and thinning) are being considered as techniques for creating and managing wildlife habitat in Westside production forests of the Pacific Northwest. These methods can be used to diversify forest structure (i.e., species, size, age, and spatial arrangement of trees and other vegetation) and facilitate development of old-forest characteristics. Pre-treatment planning is essential for identifying management intensities appropriate for a given area, retaining existing structural elements, or providing conditions for development of new structural elements. Hardwoods and shrubs from the pre-harvest stand can be managed for habitat within a new conifer plantation if they are given sufficient growing space. Conifer seedlings can be established successfully under low overstory densities, but their growth can be strongly reduced by competition from overstory trees and understory vegetation. Combining thinning and moderate soil disturbance during harvest will create favorable conditions for germination, sprouting, and rhizome expansion of understory species. Thinning will result in a heterogeneous forest structure if it is applied with uneven spacing and retains minor species, standing dead trees, and pockets of tree regeneration. Site-specific characteristics, such as rootrot pockets, soil and topographic variability, and potential for wind damage, should be considered when designing a thinning treatment. The inherent productivity of a forest site will determine the rate at which a diverse stand structure will develop; however, some characteristics of old forests (large cavities in snags, high abundance of coarse woody debris, and nesting platforms on large limbs) will take decades to develop.
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1272. **Silvicultural practices and management of habitat for bats.**
Guldin, James M.; Emmingham, William H.; Carter, Andrew; and Saugey, David A.
In: Bats in Forests: Conservation and Management/ Lacki, M. J.; Hayes, J. P.; and Kurta, A.
Baltimore, MD: Johns Hopkins University Press, 2007.
Notes: Literature review; 0801884993 (ISBN).
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ land zones/ Chiroptera: forestry/ silvicultural practice/ habitat management/ forest habitat management/ forest and woodland/ forest habitat management related to silvicultural practice/ North America/ Mammalia/ Bats/ chordates/ mammals/ vertebrates
Abstract: In the twenty-first century, we expect that the practice of silviculture will broaden to increasingly encompass ecosystem-based goals such as restoration and enhancement of habitat for desired plant and animal species and communities. The array of reproduction cutting methods, re-generation treatments, and intermediate treatments that constitute a silvicultural system can be configured to meet the habitat requirements of bats. The choices among overall reproduction cutting methods, and between even-aged and uneven-aged methods, have implications for bats, especially with regard to roosting and the management of foraging habitat. Special attention needs to be focused on creating and retaining structural and legacy features such as relict trees and snags. Once the type, amount, and distribution of such features are known, they can be incorporated into a variety of silvicultural systems. To satisfy management objectives for species whose habitat requirements transcend individual stands, the forester should plan silvicultural practices in concert across stands and, increasingly, across ownerships. There are some important hurdles to implementing bat-friendly silviculture. Foremost for bat biologists will be the definition and quantification of those attributes that are of value to bats. Once those needs are understood, biologists and silviculturists can work together to develop prescriptions that meet the needs of bats in forests. The challenge for biologists is to learn as much as possible about roosting, foraging, and other habitat requirements for the bat species of interest. The challenge for silviculturists working with biologists concerned about bats is to incorporate ways to satisfy habitat requirements of bats while meeting other forest management objectives.
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1273. **Silvicultural treatments for enhancing and recruiting spotted owl habitat in British Columbia.**
D'Anjou, Brian; Parish, Roberta; and Waterhouse, Louise
Vancouver Forest Region Forest Research Technical Report TR-033: 1-36. (2006).
Notes: Literature review.
http://www.for.gov.bc.ca/rco/research/silvreports/tr033.pdf
Descriptors: commercial activities/ conservation measures/ nutrition/ diet/ ecology/ habitat utilization/ terrestrial habitat/ land zones/ North America/ Canada/ Strix occidentalis caurina: forestry/ silviculture/ habitat management/ silvicultural management techniques/ prey/ habitat preference/ forest and woodland/ old growth forest/ British Columbia/ old growth forest availability/ silvicultural techniques/ habitat enhancement/ Aves, Strigiformes, Strigidae/ birds/ chordates/ vertebrates
Abstract: British Columbia forms the northern periphery of the Northern Spotted Owl's habitat (Strix occidentalis caurina); this owl is an endangered species that depends on old-growth forest for its survival and reproduction. Stand-level definitions, which are based on Washington State research, describe two classes of Spotted Owl habitat: superior quality habitat (Type A) which is appropriate for nesting, foraging, roosting, and dispersing; and moderate quality habitat (Type B) which is unsuitable for nesting but appropriate for other owl activities. Spotted Owl Management Plans have identified the need to create new suitable habitats and enhance existing ones within permanent Special Reserve Management Zones. This report reviews how forest structure in British Columbia provides habitat for the Spotted Owl and its primary prey. It also reviews the harvesting systems that are proposed for creating stands containing Spotted Owl habitat, and it summarizes field reviews of partial harvesting and heavy volume removal approaches that would integrate timber harvesting opportunities while meeting objectives for owl habitat. Preliminary TASS modelling was used to project outcomes of harvesting and silvicultural practices on indicators of owl habitat quality, and results are provided. This report identifies opportunities to improve development of harvest systems and silvicultural treatments for developing Spotted Owl habitat.
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1274. **Similarities and differences between harvesting- and wildfire-induced disturbances in fire-mediated Canadian landscapes.**
Lecomte, N.; Simard, M.; Asselin, H.; Nappi, A.; Noel, J.; and Bergeron, Y.
NCASI Technical Bulletin(924): 1-64. (2006);
ISSN: 08860882.
Notes: Literature review.
Descriptors: biodiversity/ clearcut/ coarse woody debris/ compound disturbance/ disturbance regime/ forest productivity/ harvesting landscape/ landscape composition/ landscape configuration/ Salvage logging/ scientific soil nutrients/ soil organic matter
Abstract: For decades, many have hypothesised that the effects of harvesting and wildfire differed significantly and that this would have significant effects on ecosystem processes and biodiversity. However, it is only recently that an appreciable amount of scientific data has emerged on this topic. In this report, we present our review of the similarities and differences between the ecological effects of fire- and harvesting-induced disturbances that have been noted in the scientific literature. Comparisons of the effects of these disturbances on numerous forest attributes (coarse woody debris, soil nutrients, productivity, plant diversity, wildlife response) are presented at two distinct spatial scales: stand and landscape. At the stand scale, our review noted significant differences between harvesting and wildfire early after disturbance. Structurally, young post-fire stands are characterized by more snags, less downed woody debris, and significantly thinner forest floors than logged sites. Additionally, while both disturbances generate a pulse of extractable nutrients, the intensity of the pulse is greater after wildfire than clearcut harvesting and an increase in soil pH is observed after fire as opposed to little change or a slight decrease after harvesting. Early after disturbance, biodiversity elements significantly differ between burned and logged sites. Dissimilar understory vascular and non-vascular communities generally colonize burned and logged sites, although differences are usually a question of abundance rather than species absence/presence. As compared to fire, faunal assemblages, be it mammals, invertebrates or birds, all seem to respond differently to harvesting. Among these faunal groups, species specifically associated with snags were the most likely to show a contrasting response to harvesting- and wildfire-induced disturbances. Tree species respond differently to fire- and harvesting-induced disturbances, with harvesting favouring the establishment of deciduous species (notably trembling aspen, Populus tremulpides) and of coniferous tree species not adapted to fire such as balsam fir (Abies balsamea). Furthermore, there are commonly more residual deciduous trees in clearcuts than in fires. Because of this and the differential response of tree species to these two types of disturbances, divergent successional patterns with respect to overstory tree species compositions can be observed in burned and harvested stands. While we noted some variability among studies, stand and tree productivity are generally similar in burned and logged sites. When the effects of harvesting- and wildfire-induced disturbances are compared at longer temporal scales, our review noted that most forest attributes that were reported as dissimilar early after disturbance converged a few decades post-disturbance. Nonetheless, thicker forest floors observed after logging as compared to fire appear to persist numerous decades after disturbance. Additionally, while faunal communities do become less different as time passes, late in succession, some species present in burned stands are either significantly less abundant or absent in similarly aged logged stands. Finally, several studies warn that while the effects of wildfire- and harvesting-induced disturbances do not significantly differ after a few decades, there is some concern about the ability of harvesting-induced disturbances to recreate the full range of natural variability observed during post-fire stand succession. Unfortunately, little research has compared the effects of alternative silvicultuial interventions (partial retention, partial cutting, etc.) or site preparation techniques (controlled burning, scarification, etc.) to the effects of wildfires. However, the few studies comparing the effects of post-logging control burns and different levels of retention indicate that these practices may attenuate some of the differences observed early after disturbance. Our review indicates that as compared to wildfire alone, salvage logging can have significant effects on ecological processes, biological legacies and the abundance of species commonly encountered only after fire. Removal of

fire-killed trees can affect tree regeneration, understory composition, the abundance and distribution of dead wood, wildlife habitat, and soil properties. Nonetheless, many of these effects are site-specific; hence, additional investments in research are needed to support management decisions and policy development. At the landscape scale, the main difference between fire and harvesting regimes is the distribution of stand age classes. The proportion of stands older than the rotation period (usually 100 yrs) tends toward zero under a fully regulated harvesting regime, while it is around 35% under a fire regime of similar rotation period. This fundamental difference results in a significant loss of advanced seral stage forests in managed landscapes, thereby affecting organisms that are primarily associated with such stands. Interestingly, since harvesting-induced disturbances are unable to recreate the conditions commonly found in young burned stands, landscapes under the influence of harvesting will also be characterized by a reduction of stands capable of replacing the ecological role of young burned stands within landscapes. Unfortunately, only a few studies have empirically compared the effects of wildfire and harvesting at the landscape scale under similar rotation periods. Nonetheless, research demonstrates that fires usually produce more heterogeneous landscapes than clearcuts, with more remnant islands. Fires are also more complex in shape, and have edges that are more gradual than clearcuts. In conclusion, our review reveals two main challenges faced by forest managers in order to generate similar ecological effects as produced by fire. First, managers need to improve management practices in order to minimize the differences observed between young post-harvest stands and young post-fire stands, particularly with respect to coarse woody debris and soil conditions. Second, managers need to maintain some areas with the tree species composition and structural attributes characteristic of over-mature fire-origin stands. Such stands can occupy a significant portion of fire-mediated landscapes. This may necessitate lengthening the rotation period of a certain proportion of stands within managed landscapes or may require the application of alternative harvesting methods that can recreate the structure and tree composition characteristic of advanced serai stage stands. This review concludes by identifying future research needs that might help meet these challenges. © 2006 by the National Council for Air and Stream Improvement, Inc.
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1275. **Simulated adaptive management for timber and wildlife under uncertainty.**
Hughell, David A. and Roise, Joseph P.
In: Seventh Symposium on Systems Anaylsis in Forest Resources, General Technical Report-NC 205/ Vasievich, J. M.; Fried, J. S.; and Leefers, L. A., eds.; St. Paul, MN: North Central Forest Experiment Station, Forest Service, U.S. Department of Agriculture, 2000. pp. 130-134.
Notes: 0363-616X (ISSN); Conference held 1997 May 28-31 in Traverse City, MI; General Technical Report NC-205; North Central Forest Experiment Station.
http://www.ncrs.fs.fed.us/pubs/gtr/other/gtr-nc205/pdffiles/ p56.pdf
Descriptors: commercial activities/ conservation measures/ land and freshwater zones/ Picoides borealis/ habitat management/ United States/ forestry management/ behavior simulation models/ coupling/ Picidae/ Piciformes/ Aves/ birds/ chordates/ vertebrates
Abstract: A spatially explicit stochastic behavior simulation model for the endangered red-cockaded woodpeckers (Picoides borealis) is coupled with a forest management optimization algorithm to simulate adaptive (feedback) management within an uncertain environment. To update the adaptive forest harvest schedule in a timely manner during each management planning period, a genetic algorithm heuristic is employed. This model is used to evaluate management policies for the production of timber and red-cockaded woodpeckers.
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1276. **Simulated effects of forest management alternatives on landscape structure and habitat suitability in the midwestern United States.**
Shifley, S. R.; Thompson, F. R.; Dijak, W. D.; Larson, M. A.; and Millspaugh, J. J.
Forest Ecology and Management 229(1-3): 361-377. (2006)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2006.04.030.
Descriptors: coarse woody debris/ disturbance/ fire/ habitat suitability index/ LANDIS/ oak-hickory/ Ozark Highlands/ simulation/ timber harvest/ wildlife/ wind
Abstract: Understanding the cumulative effects and resource trade-offs associated with forest management requires the ability to predict, analyze, and communicate information about how forest landscapes (1000s to >100,000 ha in extent) respond to silviculture and other disturbances. We applied a spatially explicit landscape simulation model, LANDIS, and compared the outcomes of seven forest management alternatives including intensive and extensive even-aged and uneven-aged management, singly and in combination, as well as no harvest. We also simulated concomitant effects of wildfire and windthrow. We compared outcomes in terms of spatial patterns of forest vegetation by age/size class, edge density, core area, volume of coarse wood debris, timber harvest, standing crop, and tree species composition over a 200-year simulation horizon. We also used habitat suitability models to assess habitat quality for four species with diverse habitat requirements: ovenbird (Seiurus aurocapilla), prairie warbler (Dendroica discolor), hooded warbler (Wilsonia citrina), and gray squirrel (Sciurus carolinensis). Management alternatives with similar levels of disturbance had similar landscape composition but different landscape patterns. The no-harvest scenario resulted in a tree size class distribution that was similar to scenarios that harvested 5% of the landscape per decade; this suggests that gap phase replacement of senescent trees in combination with wind and fire disturbance may produce a disturbance regime similar to that associated with a 200-year timber rotation. Greater harvest levels (10% per decade) resulted in more uniform structure of small or large patches, for uneven- or even-aged management, respectively, than lesser levels of harvest (5% or no harvest); apparently reducing the effects of natural disturbances. Consequently, the even-aged management at the 10% level had the greatest core area and least amount of edge. Habitat suitability was greater, on average, for species dependent on characteristics of mature forests (ovenbird, gray squirrel) than those dependent on disturbance (prairie warbler, hooded warbler) and habitat suitability for disturbance dependent species was more sensitive to the management alternatives. The approach

was data-rich and provided opportunities to contrast the large-scale, long-term consequences for management practices from many different perspectives. [Crown Copyright © 2006.]
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1277. **Sixth-year results following partial cutting for timber and wildlife habitat in a mixed oak-sweetgum-pine stand on a minor creek terrace in southeast Louisiana.**
Lockhart, B. R. and Linnartz, N. E.
Proceedings of the Eleventh Biennial Southern Silvicultural Research Conference: 209-213. (2002).
Notes: USDA Forest Service General Techincal Report Southern Research Station no. SRS-48.
http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs048/article/gtr_srs048-lockhart01.pdf
Descriptors: basal area/ botanical composition/ bottomland forests/ diameter/ forest management/ forests/ growth/ habitats/ increment/ mixed forests/ pines/ silviculture/ species richness/ stand structure/ thinning/ wetlands/ wildlife conservation/ wildlife management/ Liquidambar styraciflua/ Pinus/ Quercus
Abstract: Hardwood management has primarily focused on highly productive river bottom and upland sites. Less is known about hardwood growth and development on terrace sites. Such sites are usually converted to other uses, especially pine [Pinus] plantations. The objectives of this study, implemented in a mixed oak [Quercus]-sweetgum [Liquidambar styraciflua]-pine stand in a minor creek terrace in southeast Louisiana, USA, were to describe changes in stand composition and structure following partial cutting for 3 different management objectives: (1) maximize timber production; (2) maximize wildlife habitat; and (3) improve timber production and wildlife habitat. Stand composition in 1985 prior to treatment was heavy to oak (72% based on importance values) compared to sweetgum (10%) and pine (16%). Greater diameter growth occurred in the treated plots compared to control 6 years after cutting. Diameter growth differences were also found between crown classes and species groups. Few differences were found in basal area growth between the treatments and the controls while stocking in the treated plots increased relative to the controls. Results indicate that hardwoods will respond to partial cutting on terrace sites, making hardwood or mixed pine-hardwood management options viable.
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1278. **Small mammal and herpetile community responses to prescribed burning and selective herbicide (imazapyr) treatments in thinned, mid-rotation loblolly pine plantations in Mississippi.**
Carroll, Austin David. Mississippi State University, 2004.
Notes: Advisor: Leopold, Bruce D.; Miller, Darren A.; Thesis/ Dissertation
Descriptors: agriculture/ forestry/ wildlife/ United States, prescribed fire/ loblolly pine/ Mississippi/ small mammals/ herpetile community/ abundance
Abstract: Forest managers of pine plantations in the southeastern United States have used prescribed fire and herbicides extensively for non-pine vegetation control. this study used 6 replicate stands, containing 4, 10-ha treatment plots randomly assigned one of 4 treatments (herbicide, prescribed burning, herbicide followed by prescribed burning, and control) that were previously established within thinned, mid-rotation loblolly pine stands in Mississippi. Small mammal and herpetile abundance, diversity, and richness 2 to 3 years post-treatment was examined. Vegetation structure, microhabitat characteristics at traps, and environmental conditions were correlated with treatments and mean capture rates using ordination analyses. Results indicated small mammal and herpetile community metrics (richness and diversity) generally were not affected by changes in vegetation, yet individual species responses were related to the aforementioned ordination variables. a mosaic of habitat types including rotationally burned and no-treatment areas would provide habitat for small mammal and herpetile species with differing life history requirements.
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1279. **Small mammal and herpetile response to mid-rotation pine management in Mississippi.**
Hood, Sybil A.; Miller, Darren A.; Leopold, Bruce D.; and Burger, L. Wes
Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies 56: 171-186. (2002)
NAL Call #: SK1.S6; ISSN: 0276-7929
Descriptors: commercial activities/ terrestrial habitat/ abiotic factors/ chemical factors/ physical factors/ land zones/ Reptilia: forestry/ midrotation pine management// community structure/ forest and woodland/ pine plantation/ fertilizers and pesticides/ herbicide application/ fire/ burning/ Mississippi/ Kemper County/ Amphibia/ amphibians/ chordates/ mammals/ reptiles/ vertebrates
Abstract: Prescribed burning and/or herbicide applications are performed in managed pine (Pinus spp.) forests to control non-pine vegetation. Little research has examined small mammal or herpetile community response to these treatments in mid-rotation pine stands. Therefore, our objective was to determine prescribed burning and herbicide treatments effects on small mammal and herpetile communities within mid-rotation pine plantations in Mississippi. We established 4 treatments (herbicide only, herbicide/burn, burn only, control) with 6 replicates within thinned, mid-rotation (18-22 years old) loblolly pine (P. taeda) stands. We applied 697-872 m1/ha of Arsenal herbicide during September 1999 and conducted prescribed burning during January 2000. We captured small mammals and herpetiles to examine abundance, richness, and diversity as related to habitat conditions before and 2 years after treatment. We captured 15 species of small mammals and 21 species of herpetiles. Use of a skidder for herbicide application may have reduced small mammal richness and diversity during the first win-ter after treatment. Overall species diversity and richness did not differ between the pre-treatment growing season and the first year post-treatment growing season. However, small mammals, particularly peromyscids, generally responded favorably to burning and burning with herbicide treatments the first and second growing seasons after treatment. Treatments in mid-rotation pine plantations that maintain early successional vegetation and open canopy structure should be beneficial to small mammal and herpetile communities, although more years of post-treatment response are needed to make definitive management recommendations.
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1280. **Small mammal communities of streamside management zones in intensively managed pine forests of Arkansas.**
Miller, D. A.; Thill, R. E.; Melchiors, M. A.; Wigley, T. B.; and Tappe, P. A.
Forest Ecology and Management 203(1-3): 381-393. (2004)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2004.08.007.
Descriptors: Akaike's information criterion/ Arkansas/ intensive forestry/ pine plantations/ riparian zones/ small mammals/ ecology/ hardwoods/ water quality/ habitat diversity/ streamside management zones (SMZ)/ wildlife communities/ community structure/ relative abundance/ species diversity/ wildlife management/ Ouachita Mountains/ Blarina brevicauda/ Blarina carolinensis/ Carolinensis/ Cricetinae/ Mammalia/ Ochrotomys nuttalli/ Peromyscus/ Riparia/ Soricidae
Abstract: Streamside management zones (SMZs), composed primarily of hardwoods in the southeastern United States, provide habitat diversity within intensively managed pine (Pinus spp.) plantations. However, effects of SMZ width and adjacent plantation structure on riparian wildlife communities are poorly understood. Therefore, during 1990-1995, we examined small mammal communities within 5 SMZ width classes (1-20 to >100 m) embedded within three types of pine plantations (young, open canopy; closed canopy; and thinned) and three natural riparian stands in the Ouachita Mountains of Arkansas, USA. We captured small mammals for 10 consecutive days each February using four to six traplines each consisting of nine trap stations with three snap traps at each station. We estimated relative abundance [catch-per-unit-effort (CPUE)], species richness, species diversity, and species evenness for all captures and captures just along the stream course. Within the SMZ/plantation settings and three natural stands, we captured 1701 small mammals of 11 species in 114,285 trapnights. Golden mice (Ochrotomys nuttalli), southern short-tailed shrews (Blarina carolinensis), and Peromyscus spp. comprised 88% of all captures. Our study suggests that narrow (≤20 m wide) SMZs in managed pine forests tend to have higher small mammal abundance and species richness than wider SMZs. Additionally, species richness and CPUE was greater in SMZs within young, open canopy and thinned plantations versus closed canopy plantations. Plantation structure appears to influence small mammal community structure within SMZs more than SMZ width. Shortening the amount of time plantations spend in closed canopy conditions would likely improve habitat conditions for small mammals existing in SMZs within intensively managed pine landscapes. Streamside management zones in the South designed to meet voluntary water quality standards are likely sufficient for small mammal conservation.
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1281. **Small mammal population and habitat responses to forest thinning and prescribed fire.**
Converse, S. J.; Block, W. M.; and White, G. C.
Forest Ecology and Management 228(1-3): 263-273. (2006)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2006.03.006.
Descriptors: forest restoration/ Neotoma mexicana/ Peromyscus maniculatus/ Pinus ponderosa/ population density/ Spermophilus lateralis/ Tamias cinereicollis
Abstract: We examined changes in small mammal habitat and densities of four small mammal species, including deer mice (Peromyscus maniculatus), gray-collared chipmunks (Tamias cinereicollis), golden-mantled ground squirrels (Spermophilus lateralis), and Mexican woodrats (Neotoma mexicana), 2-3 years after thinning and prescribed fire treatments in ponderosa pine (Pinus ponderosa) forests of northern Arizona, US. These treatments were designed to simultaneously reduce high-severity fire risk while returning forests to conditions more representative of pre-European settlement structure and function. Treatments resulted in changes in important components of small mammal habitat, including increased herbaceous vegetation, decreased shrub density, and decreased woody debris. Deer mouse densities were negatively related to tree densities. Gray-collared chipmunks were negatively affected by treatment, negatively related to tree density, and positively related to woody debris. Golden-mantled ground squirrels did not appear to vary strongly with either treatment or treatment-related habitat changes, but appeared to be somewhat positively related to shrub cover. Mexican woodrats were positively related to shrub cover, and were positively, but weakly, related to woody debris. Overall, forest thinning can be expected to increase densities of small mammals in these forests, and retention of slash in fuel reduction/restoration treatments may further increase small mammal densities in the post-treatment community. However, reduction of shrubs and woody debris with overly frequent prescribed fire entries may reduce small mammal densities.
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1282. **Small-mammal responses to pine regeneration treatments in the Ouachita Mountains of Arkansas and Oklahoma, USA.**
Perry, Roger W. and Thill, Ronald E.
Forest Ecology and Management 219(1): 81-94. (2005)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ conservation measures/ ecology/ community structure/ population dynamics/ terrestrial habitat/ land zones/ Mammalia: forestry/ small taxa abundance/ montane forests/ pine regeneration treatments/ habitat management/ relative abundance/ population density/ forest and woodland/ montane forests/ small taxa abundance related to pine regeneration treatments/ mountain habitat/ Arkansas/ Ouachita Mountains/ Oklahoma/ Mammalia/ chordates/ mammals/ vertebrates
Abstract: We compared the initial effects of four forest regeneration treatments (single-tree selection, group selection, shelterwood, and clearcut), and unharvested controls (mature, second-growth forest) on relative abundance of small mammals and small-mammal habitat throughout the Ouachita Mountains of western Arkansas and eastern Oklahoma. We compared small-mammal capture rates in 20 forest stands (4 replicates of 5 treatments) for 2 years prior to harvest treatments, and 1.5, 3.5, and 5.5 years after treatment. We also examined relationships among small mammals, treatments, and habitat conditions. Before harvest, all stands where characterized by high basal areas (BA), little understory vegetation, and low small-mammal capture rates. Compared with pre-harvest numbers, the number of individuals captured increased nearly five-fold in treated stands 1.5 years after harvest. After harvest, capture rates

for all taxa combined were significantly greater in harvested stands (regardless of treatment) than in unharvested controls. Fulvous harvest mice (Reithrodontomys fulvescens) capture rates were greatest in clearcuts. Fulvous harvest mice, cotton rats (Sigmondon hispidus), and pine voles (Microtus pinetorum) were associated with abundant herbaceous vegetation in the understory and low BA. Eastern woodrats (Neotoma floridana), golden mice (Ochrotomys nuttalli), and Peromyscus spp. were associated with moderate to dense woody vegetation in the understory and intermediate BA levels. No taxon of terrestrial small mammal was captured exclusively in unharvested stands; most taxa we captured appear to be either disturbance-adapted or tolerant to disturbances from timber harvest. Published by Elsevier B.V.
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1283. **Small mammal responses to silvicultural and precipitation-related disturbance in northeastern Missouri riparian forests.**
Elliott, A. G. and Root, B. G.
Wildlife Society Bulletin 34(2): 485-501. (2006)
NAL Call #: SK357.A1W5; ISSN: 0091-7648
Descriptors: flooding/ forest litter/ forest management/ forests/ precipitation/ riparian forests/ silviculture/ small mammals/ species richness/ Blarina brevicauda/ Microtus/ Peromyscus/ Sorex
Abstract: Information about factors influencing forest floor small mammals of midwestern riparian forests in agriculture-dominated areas is necessary for improved forest management. We determined occurrence and capture rates of forest floor small mammal taxa at 4 riparian forests in northeastern Missouri, USA, during 1995-2002. We modelled the effects of year, study site, and precipitation (flooding) on relative abundance of commonly captured taxa. We also evaluated changes in the species assemblage and capture rates resulting from silvicultural treatments (clearcut, basal area retention, and unharvested) at a 215-ha forest tract. We captured 12 taxa of forest floor small mammals, of which 10 were captured at all sites. The species assemblages were dominated by habitat generalists, such as Peromyscus spp. and Sorex spp. Among-year variation in capture rates was large for all common taxa. Precipitation amounts during spring and summer were negatively correlated with relative abundances of several forest floor small mammal taxa. We measured few changes in taxonomic composition or abundances of forest floor small mammals in response to silvicultural treatments. There was some indication that Peromyscus spp. and short-tailed shrew (Blarina brevicauda) abundance decreased in areas where treatments increased fragmentation, but among-year differences accounted for more variation than treatment effects. We suggest that small mammal assemblages in fragmented midwestern riparian forests are dominated by habitat generalists and their abundances are primarily affected by variability in environmental conditions (especially flooding during the breeding season). Silvicultural treatments may have minimal effects on taxonomic composition or abundance, as long as forests are allowed to regenerate, mature forest blocks are maintained, and other important factors (e.g., hydrology) are not altered.
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1284. **Small mammal responses to thinning and wildfire in ponderosa pine-dominated forests of the southwestern United States.**
Converse, S. J.; White, G. C.; and Block, W. M.
Journal of Wildlife Management 70(6): 1711-1722. (2006)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2006)70[1711:SMRTTA]2.0.CO;2.
Descriptors: biomass/ effective trapping area/ fire surrogate/ mark-recapture/ model selection/ Peromyscus/ population density/ small mammals/ Tamias/ thinning/ weighted regression/ wildfire
Abstract: As part of a national experiment, the Fire and Fire Surrogate Project, we evaluated the effects of forest thinning on small mammal population densities and total small mammal biomass in ponderosa pine (Pinus ponderosa) - dominated forests at 2 study areas in northern Arizona and northern New Mexico, USA. We also evaluated the effects of wildfire on small mammal population densities and biomass after a wildfire burned a portion of one study area. Our statistical methods consisted of estimation of population densities in combined analyses across space and time, followed by a weighted regression analysis of treatment effects on densities. We hypothesized that habitat change postdisturbance would be the critical determinant of population responses to thinning and wildfire within 1 year of disturbances. Our results largely supported this hypothesis, as we documented predicted positive responses to thinning for deer mice (Peromyscus maniculatus), gray-collared chipmunks (Tamias cinereicollis), and least chipmunks (T. minimus). We also observed predicted positive responses to wildfire for deer mice, although our results did not support predicted negative responses to wildfire for least chipmunks. Total small mammal biomass generally increased following both thinning and wildfire. Our results suggest that fuel reduction treatments will have the largest positive impact on small mammal populations in areas where tree densities are especially high.
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1285. **Small mammals and forest fuel reduction: National-scale responses to fire and fire surrogates.**
Converse, S. J.; White, G. C.; Farris, K. L.; and Zack, S.
Ecological Applications 16(5): 1717-1729. (Oct. 2006)
NAL Call #: QH540.E23
Descriptors: forest fires/ fire hazard reduction/ prescribed burning/ forest thinning/ animal ecology/ small mammals/ forest habitats/ wildlife habitats/ population density/ population ecology/ Tamias/ Spermophilus/ Peromyscus/ wildlife management/ Alabama/ Florida/ United States, western region/ forest fuel reduction/ National Fire And Fire Surrogate Project/ natural resources/ ecology/ wildlife conservation/ forest fire management
This citation is from AGRICOLA.

1286. **Small mammals as bioindicators of sustainable boreal forest management.**
Pearce, Jennie and Venier, Lisa
Forest Ecology and Management 208(1-3): 153-175. (2005)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ conservation measures/ ecology/ habitat utilization/ terrestrial habitat/ land zones/ North America/ Canada/ Mammalia: forestry/ sustainable boreal forest management/ small taxa evaluation as

bioindicators/ habitat management/ population dynamics/ Bioindicators of sustainable boreal forest management/ small taxa evaluation/ habitat preference/ environmental indicators/ forest and woodland/ boreal forest/ Bioindicators of sustainable forest management/ Ontario/ White River area/ Mammalia/ chordates/ mammals/ vertebrates
Abstract: Small mammals such as mice and voles have potential as indicators of sustainable forest management. They have an important functional role in forests, they are economically important as prey for furbearer populations, and they respond to disturbance in a characteristic manner. In Ontario, Canada, several small mammal species have been suggested as bioindicators. However, strong year-to-year variation in population levels independent of forest disturbance means that very long time frames would be required to detect trends. Models of habitat supply have been suggested as a method of monitoring small mammals. We explore the feasibility of monitoring structural measurements and habitat supply for small mammal species using an area near White River, Ontario, Canada, as a case study. Small mammals were surveyed in the region for 3 years, and associations with mapped and stand level habitat attributes examined. Thirteen species were recorded, but only five species were recorded in sufficient numbers for habitat associations to be examined. The deer mouse and red-backed vole were recorded from all mature forest habitats, although both were more prevalent in mixedwood stands. Red-backed vole abundance was linearly related to stand age and the volume of downed logs. Deer mice were most abundant in recently clearcut stands, with abundance declining sharply in 5-15-year-old stands. They were also abundant in mature forest, where they were significantly associated with downed wood volume. Vegetation complexity was also significant for both species. Habitat supply maps for both species could be readily developed, and structural attributes modified by forest practices were important. However, strong year-to-year variation in the abundance of both species in mature forest prevented carrying capacities from being reliably assigned to habitat supply maps. Thus, while relative changes in the availability of high, medium and low quality habitat are identifiable, expected changes in minimum population size cannot be inferred. The effect of cumulative disturbances on the quality of available habitat is also unknown. Without this information, change in habitat supply cannot be used to assess the sustainability of forest management actions. We suggest that dynamic landscape meta-population (DLMP) models may provide one solution, and require further exploration as a sustainability assessment tool. © 2004 Elsevier B.V. All rights reserved.
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1287. **Small mammals in agricultural landscapes of Prince Edward Island (Canada): Effects of habitat characteristics at three different spatial scales.**
Silva, Marina; Hartling, Leslie; and Opps, Sheldon B.
Biological Conservation 126(4): 556-568. (2005)
NAL Call #: S900.B5; ISSN: 0006-3207
Descriptors: biogeography: population studies/ terrestrial ecology: ecology, environmental sciences/ biodiversity/ wildlife management: conservation/ species richness/ habitat fragmentation/ microhabitat/ agricultural landscape/ macrohabitat/ habitat characteristic effect/ landscape spatial scale
Abstract: We examined the influence of habitat characteristics at the microhabitat, macrohabitat, and landscape spatial scales on small mammals occurring in 12 forest patches within four agricultural landscapes of Prince Edward Island (Canada). Landscape features were important determinants of small mammal variables at all levels, but especially at the community level, whereas microhabitat characteristics tended to influence small mammals at the population level. Macrohabitat characteristics had only minor effects on small mammals occurring in our study sites. Species richness was most strongly influenced by patch area, reaching a threshold at forest patches of roughly 8-10 ha. The proportions of both forest and hedgerow cover within 400 m from the study site were also significant determinants of small mammals species diversity, possibly reflecting their ability to perceive suitable habitats, forage in areas outside the forest patches, and/or disperse in agricultural landscapes. At least one small mammal species (Napaeozapus insignis) benefitted from the presence of agricultural fields at distances up to 1000 m. Tamias striatus benefitted from the presence of hedgerow cover within 400 In from forest patches, possibly allowing them to move between forest patches. Clearly, the maintenance of forest patches of 8-10 ha and of forest cover within 400 m from them is fundamental for the conservation of small mammals inhabiting agricultural landscapes on the Island. Conservation strategies should also consider the establishment of more effective regulations to prevent and/or reduce hedgerow removal on Prince Edward Island. © 2005 Elsevier Ltd. All rights reserved.
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1288. **Snag density and use by cavity-nesting birds in managed stands of the Black Hills National Forest.**
Spiering, D. J. and Knight, R. L.
Forest Ecology and Management 214(1-3): 40-52. (2005)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2005.03.054.
Descriptors: Black Hills/ cavity-nesting birds/ managed forests/ Pinus ponderosa/ ponderosa pine/ snags/ biodiversity/ data acquisition/ surveys/ snag density/ snag variables/ forestry/ habitat use/ United States/ Aves/ Parus atricapillus/ Picoides villosus/ Poecile atricapillus/ Sitta canadensis
Abstract: We examined whether cavity-nesting bird abundance was related to the density of snags in managed ponderosa pine stands (Pinus ponderosa Laws.) on the Black Hills National Forest. We also examined whether snag variables were related to bird use of snags as nest sites and for foraging. Study plots (n = 144 plots) were established throughout the forest in managed ponderosa pine stands and data on the density, size, and condition of 2886 snags were collected. We searched snags for cavities and signs of foraging, and surveyed plots for cavity-nesting birds (n = 272 counts). Nine species of cavity-nesting birds were detected, with red-breasted nuthatch (Sitta canadensis), black-capped chickadee (Poecile atricapillus), and hairy woodpecker (Picoides villosus) occurring most frequently. The mean number of cavity-nesting birds at a plot was independent of snag density or other plot variables. Larger DBH and greater snag height were positively associated with the presence of a cavity, and advanced stages of decay and the presence of a broken

top were negatively associated with the presence of a cavity. Snags in larger DBH size classes had more evidence of foraging than expected based on abundance. Combining the data on the presence of a cavity and evidence of foraging, snags with large DBH were used most by cavity-nesting birds. Our study found no relationship between the number of cavity-nesting birds and snag density across the range of snag densities, snag sizes, and snag conditions measured. However, the densities of large snags may have been too low to influence the abundance of cavity-nesting birds, limiting our ability to detect such an effect.
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1289. **Snags, cavity-nesting birds, and silvicultural treatments in western Oregon.**
Walter, S. T. and Maguire, C. C.
Journal of Wildlife Management 69(4): 1578-1591. (2005)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: cavity-nesting birds/ Douglas-fir/ Green-tree retention/ Oregon Coast range/ Pseudotsuga menziesii/ snags
Abstract: We examined cavity-nesting bird use of natural snags (n = 221) and 10- to 12-year-old snags (n = 836) created by topping mature conifers in 3 silvicultural treatments (group-selection cuts, 2-story regeneration harvests, clearcuts with retained trees) and 2 snag arrangements (clustered, scattered) in 30 Douglas-fir (Pseudotsuga menziesii) stands in the Oregon Coast Range. Eight bird species nested in created snags. Open-canopy stands (2-story and clearcut treatments) had higher levels of avian nesting, species richness, and species diversity compared to closed-canopy, group-selection stands. We did not find a difference in nesting levels between clustered and scattered snags. In created snags, most active nests were in the top 25% of the bole, cavity entrances typically faced northeast, and the presence of dead branches did not alter use of snags for nesting. Topped conifers that remained alive (n = 102) were rarely used for nesting or foraging. Since the last survey 6 years prior to our survey, the number of cavities per created snag per silvicultural treatment increased 3.3- to 6-fold, and we observed 4 additional avian species nesting; 3 were secondary cavity nesters. Total cavities per snag averaged 5.1, 4.3, and 2.5 for created snags, natural snags >12 years old, and natural snags <12 years old, respectively. Only 1 created snag fell in the decade since topping. Natural new snag recruitment resulting from residual green tree mortality was highest in 2-story stands (0.76 snag/ha) and lowest in clearcuts (0.20 snag/ha). Snags created by topping large conifers provided nesting and foraging structures for cavity-nesting birds under a range of silvicultural conditions, and use was influenced more by residual green tree density than snag arrangement. In addition, created snags increased in value for birds through their first decade (88% had cavities). Because snags created by topping last long and are readily used by birds, they should be considered a management option to improve avian habitat in managed forests.
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1290. **Solution of forest health problems with prescribed fire: Are forest productivity and wildlife at risk?**
Tiedemann, Arthur R.; Klemmedson, James O.; and Bull, Evelyn L.
Forest Ecology and Management 127(1/3): 1-18. (2000)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: ecosystems/ fires-burns/ forestry practices/ forests/ habitat alterations/ habitat management/ management/ snags/ succession/ wildlife/ wildlife-habitat relationships/ forest/ fire/ dead wood/ Larix spp./ Pinus ponderosa/ Pinus spp./ ponderosa pine/ Oregon/ Washington
Abstract: Advanced forest succession and associated accumulations of forest biomass in the Blue Mountains of Oregon and Washington and Intermountain area have led to increased vulnerability of these forests to insects, diseases, and wildfire. One proposed solution is large-scale conversion of these forests to seral conditions that emulate those assumed to exist before European settlement: open-spaced stands (ca. 50 trees per ha), consisting primarily of ponderosa pine (Pinus ponderosa Laws.) and western larch (Larix occidentalis Nutt.). We question how well presettlement forest conditions are understood and the feasibility and desirability of conversion to a seral state that represents those conditions. Current and future expectations of forest outputs and values are far different from those at presettlement times. Emphasis on prescribed fire for achieving and maintaining this conversion raises questions about how well we understand fire effects on forest resources and values. We consider here potential effects of prescribed fire on two key aspects of forest management-productivity and wildlife. Use of large-scale prescribed fire presents complex problems with potential long-term effects on forest resources. Before implementing prescribed fire widely, we need to understand the range of its effects on all resources and values. Rather than attempting to convert forests to poorly described and understood presettlement seral conditions, it would seem prudent to examine present forest conditions and assess their potential to provide desired resource outputs and values. Once this is achieved, the full complement of forest management tools and strategies, including prescribed fire, should be used to accomplish the desired objectives. We suggest a more conservative approach until prescribed fire effects are better understood.
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1291. **Songbird abundance and avian nest survival rates in forests fragmented by different silvicultural treatments.**
Duguay, J. P.; Wood, P. B.; and Nichols, J. V.
Conservation Biology 15(5): 1405-1415. (2001)
NAL Call #: QH75.A1C5; ISSN: 08888892.
Notes: doi: 10.1046/j.1523-1739.2001.99023.x.
Descriptors: breeding population/ conservation management/ ecological impact/ forest management/ habitat fragmentation/ silviculture/ songbird/ United States
Abstract: Concerns over declining songbird populations have led to investigations of the effects of various silvicultural practices on breeding songbirds. Few studies published, however, have examined both songbird populations and avian nest success among harvesting treatments, particularly in forested landscapes. We conducted a study in the Monongahela National Forest of

West Virginia during the summers of 1993 to 1996 to compare breeding-bird abundance and daily nest survival rates among different sivicultural treatments: a two-age treatment (a type of deferred removal in which 37-49 mature trees/ha remain after a harvest until the next rotation), clearcutting treatments 15 years after harvest, unharvested forest surrounding the harvested stands, and unharvested stands not adjacent to cuts. Abundance and daily nest-survival rates did not differ among treatments (p>0.05) for four of the five species for which the most nests were found: Wood Thrush (Hylocichla mustelina), Rose-breasted Grosbeak (Pheucticus ludovicianus), Acadian Flycatcher (Empidonax virescens), Veery (Catharus fuscescens), Red-eyed Vireo (Vireo olivaceus). Parasitism rates were low (6%), and most parasitized nests were associated with the two-age harvest treatment. A source-sink model for the Wood Thrush revealed that all treatments were likely population sources for this species. Thus, it appears that 15 years after harvest, cuts placed within otherwise extensively forested areas do not result in the type of edge effects (population sinks) observed in areas fragmented by agriculture in the midwestern United States. Further, because neither nest success nor avian abundance was lower in the two-age than clearcut harvests, we conclude that two-age management is a viable conservation alternative to clearcutting in large forested landscapes where Brown-headed Cowbird (Molothrus ater) parasitism is not a concern.
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1292. **Songbird abundance in clear-cut and burned stands: A comparison of natural disturbance and forest management.**
Simon, N. P. P.; Schwab, F. E.; and Otto, R. D.
Canadian Journal of Forest Research 32(8): 1343-1350. (2002)
NAL Call #: SD13.C35; ISSN: 00455067.
Notes: doi: 10.1139/x02-057.
Descriptors: biodiversity/ vegetation/ natural disturbances/ forestry/ avifauna/ ecological impact/ forest management/ succession/ timber harvesting/ wildfire/ Canada/ Aves/ Canidae/ Catharus guttatus/ Coniferophyta/ Dendroica coronata/ Dendroica petechia/ Passerella/ Passeri/ Passeridae/ Picea/ Picea mariana/ Turdidae
Abstract: To evaluate the efficacy of forest management to emulate natural disturbance, we compared bird abundances among burned and clear-cut, former black spruce (Picea mariana (Mill.) BSP) sites, after 5, 14, and 27 years of succession. Total bird density was lower in clear-cut sites resulting from fewer hermit thrushes, yellow warblers, Swainson's thrushes, and fox sparrows. Hermit thrushes were positively correlated with snag density while yellow warblers and Swainson's thrushes were positively associated with deciduous tree cover and negatively correlated with conifer cover. Only yellow-rumped warblers had higher densities on clear-cut sites, likely due to greater conifer cover. Bird densities and species richness peaked in the 14-year-old burns and exceeded that of mature forests reported for Labrador. This demonstrates the importance of natural early successional forests for birds. Although logged areas support several species found in natural young burns, logging does not precisely mimic fire. This suggests that forest managers should allow some forests to burn naturally.
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1293. **Songbird community variation among five levels of overstory retention in northern Alabama.**
Lesak, Adrian A.; Wang, Yong.; and Schweitzer, Callie Jo
In: Proceedings of the 12th Biennial Southern Silvicultural Research Conference, General Technical Report-SRS 71/ Connor, Kristina F.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2004. pp. 11-17.
http://www.treesearch.fs.fed.us/pubs/6304
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land zones/ Oscines: forestry/ overstory retention/ habitat management/ community structure/ overstory retention effects/ distribution within habitat/ habitat utilization/ forest and woodland/ oak hickory forest/ Alabama/ Jackson County/ Cumberland Plateau/ Aves, Passeriformes/ birds/ chordates/ vertebrates
Abstract: We compared songbird communities among varying degrees of overstory tree retention in the oak-hickory forest of the southern Mid-Cumberland Plateau region. Three 20-ha complete block replicates of 5 experimental treatments (15 treatment units, 4 ha per unit) were used. The five treatments were operational shelterwood stands with target overstory retention levels of approximately 0, 25, 50, 75, and 100 percent. The residual basal area and resultant canopy cover of these overstory retentions were compared among treatments and both showed three distinct conditions, closed canopy, open forest, and clearcut. Territory spot-mapping was used to quantify bird species richness and density during the first post-treatment year, between mid-April and July 2002. Sixty bird species were detected with 34 of those defending territories on the sites. Clearcuts (0 percent retention) had significantly lower values than the other four treatment types for overall bird territory density, species richness, and Shannon diversity index. Territorial density of breeding songbirds was highest in the 50 percent retention treatments, while species richness and Shannon diversity peaked in the units with 25 percent basal area retention.
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1294. **Songbird, forest owl and small mammal diversity in mature and harvested aspen and mature mixed-woodforests in the Dawson Creek Forest District: Summary of research and related survey projects, 1992-1999.**
Darling, Laura M.; Booth, Barry; Merkens, Markus; and Gebauer, Martin
Wildlife Working Report WR-104: i-xii, 1-66. (2002); ISSN: 0831-4330
Descriptors: conservation measures/ ecology/ community structure/ terrestrial habitat/ land zones/ North America/ Canada/ Aves: habitat management/ forest management/ long term research projects/ species diversity/ mature vs harvested aspen forests/ mature mixed wood forests/ biodiversity comparisons/ British Columbia/ Dawson Creek Forest District/ Passeriformes/ birds/ chordates/ mammals/ vertebrates
Abstract: From 1992 to 1999, we assessed species diversity, relative abundance and community dominance of forest songbirds and small mammals in mature (control) and recently harvested, aspen forests near Chetwynd, B.C. Resident owls were surveyed during March-April 1997. We also assessed vegetation cover, security cover, woody debris and wildlife trees in the harvested and control stands. This report focuses on results of the songbird and small mammal study components and highlights the results

of the other surveys. The reader is referred to details presented in unpublished annual progress reports. Small mammal species richness and abundance varied between years and between mature and harvested stands. Multi-year population cycles and stochastic weather events likely accounted for much of the between-year variation. Several mammal species encountered within mature stands during this study were never captured in clearcut areas. Some species were captured exclusively within clearcuts. Only Deer Mouse and Meadow Vole were significantly affected by clearcutting, though the effect of clearcutting was not consistent over the duration of the study. Retention patches of sufficient size within clearcuts may provide interior-forest species with suitable habitat or corridors. Our forest songbird results are based on "presence" of apparently breeding (i.e., singing or calling) individuals of a species, not whether they are successfully reproducing. Analyses of point-count data indicate that there were significant differences in species abundance between years for 15 of 24 bird species recorded in seven mature stands monitored from 1993 to 1997. However, fluctuations in abundance in mature stands appeared to be part of the normal variation in songbird abundance rather than population trends. Variations in diversity, abundance and dominance patterns were recorded among mature stands and among harvested stands of various age classes. The magnitude of these variations has potentially significant implications for interpretation of short-term "control-versus-treatment" studies. The number of bird species recorded in mature stands and clearcut stands did not differ within a given year, but numbers varied between years. In all mature stands and clearcuts, there were a few dominant bird species that provided about 80% of the observations, while many species were uncommonly recorded; however, the dominance order (rank) of the species in harvested stands differed from mature stands, reflecting songbird habitat preferences. Abundance of bird species after clearcutting followed established patterns: (1) no significant change in abundance of some species; (2) a lower abundance of species usually associated with older forests; (3) detections of mature-forest species in the clearcuts, primarily in leave-tree patches; (4) early successional bird species in clearcuts, and (5) significant annual changes in abundance of various species in clearcuts. Management recommendations stemming from this study include: (1) large, unfragmented mature stands must be distributed across the landscape and over time; (2) retention patches in clearcuts must be large (> 5 ha), connected to intact forest, representative of the intact forest, and include critical elements such as large-diameter live aspen with visible signs of heart rot to maintain nesting habitat for cavity-nesting wildlife; (3) long, large-diameter woody debris and small woody debris must be retained in slash piles and scattered throughout the harvested block where feasible; (4) longer harvest rotations should be scattered across the landscape. Additionally, managers must recognize that significant annual fluctuations in species abundance are normal and may result in misleading interpretation of short-term studies, and that the presence of an apparently breeding songbird does not imply successful breeding. Further study is required on the size and configuration of leave patches, particularly in reference to the role of patches in small mammal and songbird population dynamics and reproductive success. Stands 20 to 60 years old need to be studied to determine at what stand age forest-associated species re-colonize regenerating stands.
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1295. **Songbird response to group selection harvests and clearcuts in a New Hampshire northern hardwood forest.**
Costello, C. A.; Yamasaki, M.; Pekins, P. J.; Leak, W. B.; and Neefus, C. D.
Forest Ecology and Management 127(1-3): 41-54. (2000)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/S0378-1127(99)00131-0.
Descriptors: clearcut/ early successional/ forest birds/ group selection/ northern hardwood forest/ avifauna/ clearcutting/ community composition/ forest ecosystem/ habitat use/ song/ species richness/ United States
Abstract: Clearcutting creates habitat for many species of early successional songbirds; however, little information is available on bird use of small forest openings created by group selection harvests. Group selection harvests are increasing on the White Mountain National Forest due to negative public response to clearcutting. The objective of this study was to determine if avian species richness and composition differ between clearcut and group selection openings, and between mature stands and the uncut portions of group selection stands. Point count surveys were conducted during the 1992 and 1993 breeding seasons within six study blocks in the White Mountain National Forest, NH. Each block consisted of a clearcut stand, a group selection stand and a mature stand. Species richness per stand was significantly higher in clearcut openings (p = 0.010) than in group selection openings. Forested areas surrounding group selection openings were similar to mature stands in species richness (p = 0.848) and composition. Our data suggest that, relative to avian use, the group selection system does not provide habitat similar to that created by clearcutting in extensive northern hardwood stands. The group selection system appears to retain much of the mature forest bird community while providing for a limited number of early successional bird species. Gradual replacement of clearcutting with group selection harvests could result in reduced avian diversity across large forested tracts.
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1296. **Songbird use of regenerating forest, glade, and edge habitat types.**
Fink, A. D.; Thompson, F. R.; and Tudor, A. A.
Journal of Wildlife Management 70(1): 180-188. (2006)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: animal behavior/ habitat selection/ habitats/ models/ natural regeneration/ pastures/ population density/ reproduction/ stand characteristics/ stand structure/ wild birds/ wildlife conservation/ birds/ Passeriformes
Abstract: Population numbers of many bird species associated with early-successional or disturbance-dependent habitat types are declining. We used an information-theoretic approach to evaluate hypotheses concerning factors affecting breeding bird densities in different early-successional habitat types. We studied

shrubland bird communities in 3- to 5-year-old regenerating forest (n=3), glade (n=3), and forest-pasture edge (n=3) habitat types in the predominantly forested Missouri Ozarks in 1997-1999. We monitored 8 bird species using spot mapping and total mapping techniques, searched for and monitored nests, and measured vegetation structure within nested circular plots. In evaluating breeding densities in these habitat types, we compared support for a global model with year, habitat type, and a habitat type x year interaction to several reduced models and a null model with only an intercept, and we used model-averaged coefficients to evaluate effect size. We found support for the effects of habitat type on breeding densities of prairie warbler (Dendroica discolor) and yellow-breasted chat (Icteria virens); the effects of habitat type and year on densities of blue-winged warbler (Vermivora pinus), eastern towhee (Pipilo erythrophthalmus), and field sparrow (Spizella pusilla); the effect of year on densities of indigo bunting (Passerina cyanea) and northern cardinal (Cardinalis cardinalis); and no effects on densities of white-eyed vireo (Vireo griseus). The effect size of habitat type on breeding densities varied among species and indicated important species-specific differences in habitat use. Most shrubland bird species used both glades and regenerating forests more than forest-pasture edge sites, and breeding densities of some species were higher in regenerating forests than in glades. For some species, patterns in reproductive success (reported as interval nest success) mirrored observed patterns in breeding densities. However, substantial variation existed among species with respect to patterns in habitat use and nest success. Conservation planning for the persistence of birds requiring early-successional habitat types should consider the ephemeral nature of these areas and the potential contribution from young, regenerating forest.
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1297. **Soricid abundance in partial overstory removal harvests and riparian areas in an industrial forest landscape of the central Appalachians.**
Ford, W. Mark and Rodrigue, J. L.
Forest Ecology and Management 152(1-3): 159-168. (2001)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/S0378-1127(00)00597-1.
Descriptors: Appalachians/ BMP/ diameter-limit/ riparian areas/ shrews/ SMZ/ Soricids/ two-aged regeneration/ cutting/ life cycle/ rocks/ statistical methods/ timber/ shrews/ forestry/ abundance/ forest management/ harvesting/ insectivore/ riparian forest/ United States/ Blarina brevicauda/ Mammalia/ Riparia/ Sorex cinereus/ Sorex dispar/ Sorex fumeus/ Sorex hoyi/ Soricidae
Abstract: Within eastern North America, soricid (shrew) diversity reaches its peak in the central and southern Appalachians. Though shrews are an important component of Appalachian mammalian fauna, most species are small, cryptic, and little studied. The understanding of basic life history and habitat preferences is considered problematic. To assess the response of soricids to partial overstory timber harvest, and to investigate the importance of riparian areas to soricids, we conducted pitfall trapping surveys during the summers of 1996-1998 in the Westvaco Ecosystem Research Forest. Pitfall transect lines were established in uncut control forest stands in upland sites, along uncut forest stands in riparian areas, and in upland stands subjected to heavy diameter-limit cutting or two-aged regeneration methods. Diameter-limit and two-aged regeneration harvests occurred in 1996 following our initial pitfall survey effort. Riparian areas were surveyed within the area that would constitute a Streamside Management Zone under West Virginia's Best Management Practices guidelines. During 10,560 trapnights, we collected masked shrews (Sorex cinereus), rock shrews (S. dispar), smokey shrews (S. fumeus), pygmy shrews (S. hoyi), and northern short-tailed shrews (Blarina brevicauda). Of species collected in sufficient numbers to analyze statistically across treatments, the relative abundance of masked shrews, smokey shrews, and northern short-tailed shrews did not differ among harvest sites and control sites for any year, either pre-harvest or post-harvest. Uncut, control sites had higher relative abundances than did riparian sites of masked shrews in 1996 and of smokey shrews in 1997. Collections of all species were poorly correlated with most micro-habitat variables we collected. Rock shrews were restricted to uncut upland sites at higher elevations with large amounts of emergent rock.
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1298. **Southern California Mountains and Foothills Assessment: Habitat and species conservation issues.**
Stephenson, J. R. and Calcarone, G. M.
Albany, CA: U.S. Forest Service; GTR-PSW-172, 2000. 402 p.
Notes: produced by the Pacific Southwest Research Station.
http://www.treesearch.fs.fed.us/pubs/6778
Descriptors: Southern California/ ecosystem/ biodiversity/ land management
Abstract: The Southern California Mountains and Foothills Assessment: Habitat and Species Conservation Issues provides detailed information about current conditions and trends for ecological systems and species in the region. This information can be used by land managers to develop broad land management goals and priorities and provides the context for decisions specific to smaller geographic areas. The assessment area covers 6.1 million acres, of which 56 percent are national forest system lands. Over eighteen million people live in the coastal basin bordering the assessment area. As compared to historic conditions, mountain and foothill ecosystems in this region have undergone dramatic changes. Forested landscapes are more susceptible to stand-replacing fires. Invasive non-native species have become widely established, causing a decline in habitat capability for many native plants and animals. An extensive network of dams and diversions has altered aquatic systems. Some areas of high ecological integrity remain and can serve as building blocks for restoration. Biological diversity is not uniformly distributed across the landscape; rare species in particular tend to be concentrated in certain habitats. Key areas of high ecological integrity and rare species assemblages are identified in this report. This assessment provides a rich information base, including over eighty mapped themes with associated models and databases, from which future decisions can benefit.
This citation is from Treesearch.

1299. **Southern Forest Resource Assessment highlights: Terrestrial ecosystems and wildlife conservation.**
Trani, Margaret Katherine
Journal of Forestry 100(7): 35-40. (2002)
NAL Call #: 99.8 F768; ISSN: 0022-1201.
http://saf.publisher.ingentaconnect.com/content/saf/jof/2002/00000100/00000007/art00008
Descriptors: conservation measures/ land zones/ Vertebrata: disturbance by man/ habitat alteration/ habitat management/ land owners role/ endangered status/ species of concern/ conservation/ habitat alteration/ United States, southern region/ chordates/ vertebrates
Abstract: Southern population and economic growth are putting pressure on wildlife species and the communities that support them. Loss of habitat is the primary reason why 132 southern terrestrial vertebrate species are of conservation concern, but other factors include environmental contaminants, exploitation, development, stream modification, and wetland degradation. A high proportion of rare forest communities are imperiled to some degree; 14 have estimated losses of 98 percent since European settlement. In the midst of continued regional growth, biological diversity will become a critical conservation issue. Each southern landowner has an important role in the conservation of species and their habitats.
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1300. **Spatial and temporal patterns of beetles associated with coarse woody debris in managed bottomland hardwood forests.**
Ulyshen, M. D.; Hanula, J. L.; Horn, S.; Kilgo, J. C.; and Moorman, C. E.
Forest Ecology and Management 199(2-3): 259-272. (2004)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2004.05.046.
Descriptors: bark beetles/ Buprestidae/ Cerambycidae/ Cleridae/ coarse woody debris/ Saproxylic/ woodborers/ biodiversity/ hardwoods/ insect control/ artificial canopy/ temporal patterns/ forestry/ beetle/ canopy gap/ coarse woody debris/ community structure/ forest management/ saproxylic organism/ spatiotemporal analysis/ South Carolina/ Bostrichidae/ Brentidae/ Coleoptera/ Curculionidae/ Scolytinae
Abstract: Malaise traps were used to sample beetles in artificial canopy gaps of different size (0.13 ha, 0.26 ha, and 0.50 ha) and age in a South Carolina bottomland hardwood forest. Traps were placed at the center, edge, and in the surrounding forest of each gap. Young gaps (~1 year) had large amounts of coarse woody debris compared to the surrounding forest, while older gaps (~6 years) had virtually none. The total abundance and diversity of wood-dwelling beetles (Buprestidae, Cerambycidae, Brentidae, Bostrichidae, and Curculionidae (Scolytinae and Platypodinae)) was higher in the center of young gaps than in the center of old gaps. The abundance was higher in the center of young gaps than in the surrounding forest, while the forest surrounding old gaps and the edge of old gaps had a higher abundance and diversity of wood-dwelling beetles than did the center of old gaps. There was no difference in wood-dwelling beetle abundance between gaps of different size, but diversity was lower in 0.13 ha old gaps than in 0.26 ha or 0.50 ha old gaps. We suspect that gap size has more of an effect on woodborer abundance than indicated here because malaise traps sample a limited area. The predaceous beetle family Cleridae showed a very similar trend to that of the woodborers. Coarse woody debris is an important resource for many organisms, and our results lend further support to forest management practices that preserve coarse woody debris created during timber removal.
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1301. **Spatial and temporal patterns of use by moose of pre-commercially thinned, naturally-regenerating stands of balsam fir in central Newfoundland.**
McLaren, Brian E.; Porter, Truman S.; and Oosenbrug, Sebastian M.
Forest Ecology and Management 133(3): 179-196. (2000)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: conservation/ ecology/ terrestrial habitat/ land zones/ Canada/ Alces alces: conservation measures/ habitat management/ wildlife management/ habitat utilization/ forest and woodland/ precommercially thinned balsam fir stands/ Newfoundland, central region/ chordates/ mammals/ ungulates/ vertebrates
Abstract: A study of use and damage of pre-commercially thinned (PCT) forest stands containing balsam fir (Abies balsamea [L.] Mill.) by moose (Alces alces L.) in central Newfoundland was undertaken to determine how potentially conflicting resource management goals such as wood yield optimization and provision of stable moose populations could be achieved. Objectives were to measure spatial and temporal variability in damage to balsam fir due to moose habitat preferences for certain stand types and stem densities, and, secondly, to explore possibilities for manipulating PCT operations, within this context, to minimize damage. A stable moose population was achieved over 5 years of study, through the issue of licences for a management sub-area designed to coincide with on-going PCT. Good road access ensured high success for hunters in this sub-area, and this management option eventually allowed for declines in moose density and in browsing of crop trees in PCT stands. Aerial census techniques were the preferred means of determining areas of high use or high potential use; pellet group counts were only weakly correlated to measures of browsing in vegetation sample plots. Identification of localized areas of use, or of moose habitat preferences that were likely primary to the selection of PCT stands, may allow PCT operations to be planned to avoid winter moose `yards.' Consideration by management should be given to locating PCT in stands like those containing black spruce, which are less frequently occupied by moose. Management of hardwood also appears to be important for reducing potential moose damage to balsam fir stands when moose densities are high.
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1302. **Spatial and temporal variation in fruit use by wildlife in a forested landscape.**
McCarty, J. P.; Levey, D. J.; Greenberg, C. H.; and Sargent, S.
Forest Ecology and Management 164(1-3): 277-291. (2002)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/S0378-1127(01)00612-0.
Descriptors: Frugivory/ fruit consumption/ fruit phenology/ fruit production/ managed forests/ migratory birds/ Savannah River Site/ Climatology/ forestry/ Fruits/

managers/ plants (botany)/ wildlife/ ecology/ forest management/ frugivory/ plant-herbivore interaction/ spatial variation/ temporal variation/ United States/ Aves/ Hexapoda/ Insecta/ Morella cerifera/ Myrica/ Myricaceae/ Vertebrata

Abstract: We monitored production and removal rates of fruit from 22 common plant species over 2 years in five habitats of a managed landscape in South Carolina (USA). Our long-term goal is to determine the importance of fruit as a resource for vertebrates and to provide recommendations for management of key species and habitats. This study lays the foundation for that goal by documenting fruit production and availability, variation in use by wildlife, and how these factors vary by plant species, habitat, and season. Six species produced >1 kg dry mass of pulp per hectare per year. Vertebrates consumed ≥ 50% of fruits in 17 of the 22 plant species. Fruit loss to insects and microbes was generally small and varied significantly among seasons, being lowest in fall and winter. The length of time ripe fruit survived on plants varied among species from 3 to 165 days. Survival time of fruits did not vary significantly among habitats but was significantly shorter in the summer than in fall or winter. Approximately, half the species produced fruit in the fall and winter and these fruits were primarily consumed by over-wintering wildlife. This pattern is inconsistent with the general belief that fruit production in the eastern United States is timed to correspond with periods of high bird abundance during fall migration. Production and consumption of winter fruits deserves further attention from forest managers, as relatively little other food is available in winter, energy demands of overwintering birds are high, and current management practices often reduce fruit availability of key species (e.g., Myrica cerifera). We suggest that fruit is more important than generally realized in maintaining vertebrate diversity in temperate forests and that the focus of managers on hard mast production should be broadened to include fruiting plants.

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1303. **Spatial modeling of harvest constraints on wood supply versus wildlife habitat objectives.**

Rempel, Robert S. and Kaufmann, Cynthia K.

Environmental Management 32(5): 646-59. (2003)
NAL Call #: HC79.E5E5; ISSN: 0364-152X
Descriptors: Cervidae/ Artiodactyla/ Mustelidae/ Carnivora/ Alces alces/ Martes americana/ Rangifer tarandus/ Mammalia/ Rangifer tarandus [American term]/ Parulidae/ Passeriformes/ Seiurus aurocapillus/ Aves/ spatial harvest planning model/ Nakina Forest Management Unit/ Caribou/ moose wintering habitat supply/ annual harvest area/ caribou habitat supply/ habitat suitability modeling/ emergent habitat pattern/ marten habitat supply/ conservation of natural resources/ timber harvesting constraints/ timber harvest objectives/ harvest block size/ harvest block proximity/ boreal mixedwood forest/ green-up delay/ animals, wild/ models, theoretical/ wildlife-human relationships/ habitat management/ habitat alterations/ habitat evaluation/ habitat change/ habitat mosaic/ mesoscale stratification/ habitat supply/ hierarchical modeling/ population dynamics/ wildlife management/ regression analysis/ boreal forests/ timber harvesting/ ecological requirements/ commercial enterprises/ forestry practices/ models and simulations/ land zones/ study methods/ Canada/ carnivora/ management/ animals/ mammals/ disturbances/ conservation/ seasons/ Ontario/ birds/ conflicts/ techniques/ ecosystems/ silviculture/ deer/ wildlife/ environment/ trees/ forestry/ moose

Abstract: We studied the effects of spatial and temporal timber harvesting constraints on competing objectives of sustaining wildlife habitat supply and meeting timber harvest objectives in a boreal mixedwood forest. A hierarchical modeling approach was taken, where strategic and tactical level models were used to project blocking and scheduling of harvest blocks. Harvest block size and proximity, together with short- and long-term temporal constraints, were adjusted in a factorial manner to allow creation of response-surface models. A new measure of the habitat mosaic was defined to describe the emergent pattern of habitat across the landscape. These models, together with multiple linear regression, were used to provide insight on convergence or divergence between spatial objectives. For example, green-up delay (defined as time required before a harvest block adjacent to a previously logged block can be scheduled for harvest) had an adverse effect on the amount of annual harvest area that could be allocated and blocked spatially, and habitat supply responded in an opposite direction to that of wood supply, where caribou, moose wintering, and marten habitat supply increased when harvest blocks were further apart, maximum block size smaller, and both a green-up delay and mesoscale stratification were applied. Although there was no "solution space" free of conflicts, the analysis suggests that application of the mesoscale stratification, together with a diversity of harvest block sizes and a between-harvest block proximity of 250 m, will perform relatively well with respect to wood supply objectives, and at the same time create a less fragmented landscape that better reflects natural forest patterns.

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1304. **A spatially explicit decision support model for restoration of forest bird habitat.**

Twedt, Daniel J.; Uihlein, William B.; Elliott, A. Blaine; and Uihlein W. B.

Conservation Biology 20(1): 100-10. (2006)
NAL Call #: QH75.A1C5 ; ISSN: 0888-8892
Descriptors: Aves/ birds/ conservation of natural resources/ decision support techniques/ trees/ forestry methods/ decision making/ ecosystem/ Mississippi/ population dynamics/ models/ habitat/ forest/ Partners in Flight

Abstract: The historical area of bottomland hardwood forest in the Mississippi Alluvial Valley has been reduced by >75%. Agricultural production was the primary motivator for deforestation; hence, clearing deliberately targeted higher and drier sites. Remaining forests are highly fragmented and hydrologically altered, with larger forest fragments subject to greater inundation, which has negatively affected many forest bird populations. We developed a spatially explicit decision support model, based on a Partners in Flight plan for forest bird conservation, that prioritizes forest restoration to reduce forest fragmentation and increase the area of forest core (interior forest >1 km from "hostile" edge). Our primary objective was to increase the number of forest patches that harbor >2000 ha of forest core, but we also sought to increase the number and area of forest cores >5000 ha. Concurrently, we targeted restoration within local (320 km^2) landscapes to achieve > or =60% forest cover Finally, we emphasized restoration of higher-elevation bottomland hardwood forests in areas where restoration

would not increase forest fragmentation. Reforestation of 10% of restorable land in the Mississippi Alluvial Valley (approximately 880,000 ha) targeted at priorities established by this decision support model resulted in approximately 824,000 ha of new forest core. This is more than 32 times the amount of core forest added through reforestation of randomly located fields (approximately 25,000 ha). The total area of forest core (1.6 million ha) that resulted from targeted restoration exceeded habitat objectives identified in the Partners in Flight Bird Conservation Plan and approached the area of forest core present in the 1950s.
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1305. **Spatially explicit influences on northern goshawk nesting habitat in the interior Pacific Northwest.**
McGrath, Michael T.; DeStefano, Stephen; Riggs, Robert A.; Irwin, Larry L.; and Roloff, Gary J.
Wildlife Monographs(154): 1-63. (2003)
NAL Call #: 410 W64; ISSN: 0084-0173
Descriptors: Accipiter gentilis atricapillus/ Falconiformes/ Accipitridae/ Ciconiiformes/ Accipiter gentilis/ northern goshawk/ terrestrial ecology/ bootstrap technique/ forest structure/ habitat quality/ habitat selection/ habitat suitability/ nesting habitat/ spatial distribution/ species abundance/ stand development/ breeding grounds/ forests/ ecosystems/ forestry practices/ habitat alterations/ habitat use/ nest site/ nesting habitat selection/ Oregon/ Washington/ environmental factors/ wildlife-human relationships/ commercial enterprises/ disturbances/ land zones/ reproduction/ breeding/ dispersion/ disturbance/ ecological requirements/ fertility-recruitment/ habitat change/ habitat management/ silviculture/ simulation/ topography
Abstract: We compared northern goshawk (Accipiter gentilis atricapillus) nesting habitat within 1 ha of nest sites and at landscape scales of 10, 30, 60, 83, 120, 150, and 170 ha in 4 study areas east of the Cascade Mountains in Oregon and Washington. Our objective was to describe goshawk nesting habitat at biologically relevant scales and to develop models capable of assessing the effects of forest management alternatives on habitat suitability. We evaluated habitat at 82 active goshawk nests and 95 random sites. Productivity (young fledged per nest) was evaluated at 81 nests. We collected data on forest structure within 1 ha of nests and random points. At scales ranging from 10 to 170 ha, we recorded the abundance and spatial distribution of several forest stages of stand development (i.e., stand initiation, stem exclusion, understory reinitiation, old growth) on aerial photographs. We used logistic regression and classification and regression trees (cart) to (1) evaluate habitat selection, (2) construct models to calculate the probability of nesting, and (3) explore relationships between reproductive output and habitat conditions. We assessed model accuracy via bootstrap and jackknife cross-validation techniques. By examining goshawk habitat relationships at multiple spatial scales across several study areas, we detected unifying spatial patterns and structural conditions surrounding goshawk nesting habitat. Our ability to discriminate goshawk nest sites from available habitat decreased as landscape scale increased, and different factors influenced goshawks at different scales. The presence and arrangement of forest structural types interacted to influence site suitability for nesting. At the 1-ha scale, the stage of stand development (i.e., stand initiation, stem exclusion, understory reinitiation, old growth), low topographic position, and tree basal area reliably discriminated between nests and random sites. Low topographic position and basal area were more influential than stand structure. At the landscape scale, modeling indicated that conditions at different scales interact to influence selection of habitat for nesting. A core area exists surrounding goshawk nests in which stem exclusion and understory reinitiation stands with canopy closure ≥ 50% serve as apparent protection against potentially detrimental effects associated with more open forest (e.g., predators and micro-climate). Among several models tested, the model that best discriminated between nests and random sites encompassed 83 ha surrounding the nest and incorporated habitat characteristics from multiple scales nested within that range. This model had a cross-validated classification accuracy of 75%. Positive correlations were found between fledging rate and tree basal area within 1 ha of the nest ($F_{3,77}$ =2.89, P=0.0407), and between fledging rate and the percentage of landscape occupied by "stem exclusion" stands of low canopy closure (i.e., <50%) at landscape scales ≥ 60 ha ($F_{3,77}$) , 0.041≤P≤0.089). Spatial modeling also showed that timber harvest can be managed to maintain or enhance goshawk nest site suitability over time in the Interior Northwest, and that a non-harvest strategy can be just as detrimental to nesting habitat as can be aggressive, maximum-yield forestry. We conclude that (1) northern goshawk nesting habitat becomes less distinguishable from the landscape with increasing area, and (2) habitat management based on exclusionary buffers should be re-evaluated in light of the way different habitat factors interact across spatial scales. We present case studies illustrating how landscape scale modeling can be implemented to (1) predict the influences of alternative silvicultural prescriptions on the suitability of potential nesting habitat over time, and (2) characterize large landscapes with respect to abundance and distribution of suitable nesting habitat.
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1306. **Spatiotemporal responses of reptiles and amphibians to timber harvest treatments.**
Goldstein, Michael I.; Wilkins, R. Neal.; and Lacher, Thomas E.
Journal of Wildlife Management 69(2): 525-539. (2005)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: commercial activities/ ecology/ terrestrial habitat/ land zones/ Amphibia/ Reptilia: forestry/ clearcutting/ selective timber harvest treatments/ community structure/ forest and woodland/ bottomland hardwood forest/ Texas/ Tyler County/ amphibians/ chordates/ reptiles/ vertebrates
Abstract: We compared the influence of clearcut and selective timber harvest treatments on spatial and temporal variability of amphibians and reptiles in an east Texas bottomland hardwood forest. The dataset represented a time series of 5 years post-treatment. A total of 18,645 amphibians and reptiles was captured in 144 pitfall arrays. We used 9 plots Q clearcut, 3 select cut, and 3 untreated). Each plot had 16 arrays and was bisected by 1 of 3 streams. Pitfall captures represented 46 species (16 amphibians, 30 reptiles). When analyzed with a traditional ANOVA approach, these data suggested an increase in reptile species richness in response to clearcut treatments; amphibian species richness did not respond to treatment.

When analyzed as a time series, however, the data revealed fluctuations in site use by species and species groups, and these fluctuations were independent of treatment effects. Exploratory analyses of spatio-temporal dynamics showed that species richness and the relative abundance of common species displayed spatial patterns that remained consistent over time. In control and select cut treatments, spatial patterns of richness and abundance shifted over time and were not necessarily confined to areas adjacent to streams. In clearcuts, stationary habitat refugia were located within riparian management zones.
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1307. **Species richness and nesting success of migrant forest birds in natural river corridors and anthropogenic woodlands in southeastern South Dakota.**
Gentry, D. J.; Swanson, D. L.; and Carlisle, J. D.
Condor 108(1): 140-153. (2006)
NAL Call #: QL671.C6; ISSN: 00105422
Descriptors: Edge effects/ forest fragmentation/ neotropical migrant/ nesting success/ parasitism rates/ woodlots
Abstract: Forest fragmentation is thought to be partially responsible for declines in many Neotropical migrant birds due to the combined effects of higher rates of brood parasitism and increased predation near forest edges. A majority of the forested habitat in the northern prairie region is found in riparian corridors, but this native habitat has been much reduced from its historical extent. However, additional woodland nesting habitat has been established within the last century in the form of isolated woodlots on farms. We compared abundance, species richness, and nesting success of migrant forest birds breeding in native riparian corridors and anthropogenic woodlots. The two habitats had similar bird abundances but native riparian woodlands were more species-rich than woodlots. We located a total of 650 nests, with 320 nests of 15 species in woodlots and 331 nests of 25 species in riparian corridors. Nesting success was not significantly different between the two habitats for all species combined or for individual species with ≥ 15 nests in each habitat. Nests above 5 m were more successful than lower nests, but distance to woodland edge did not influence nesting success. Nests initiated in the middle and late portions of the nesting season were more successful than early season nests, significantly so in woodlots. Thus, anthropogenic woodlots were as suitable as natural habitats for successful nesting. However, many of the Neotropical migrants occurring in riparian habitats were absent from woodlots, which suggests that riparian corridors are especially important habitats for breeding birds in the northern prairie region.
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1308. **Species-specific edge effects on nest success and breeding bird density in a forested landscape.**
Flaspohler, David J.; Temple, Stanley A.; and Rosenfield, Robert N.
Ecological Applications 11(1): 32-46. (2001)
NAL Call #: QH540.E23; ISSN: 1051-0761
Descriptors: commercial activities/ conservation measures/ reproduction/ ecology/ population dynamics/ terrestrial habitat/ land and freshwater zones/ Aves: forestry/ clearcutting/ habitat management/ forest management practices/ long term viability plans/ reproductive productivity/ nesting success/ species-specific edge effects/ clearcut forested landscape/ population density/ nest density/ distribution within habitat/ forest and woodland/ northern hardwood forests/ Wisconsin/ Forest and Vilas Counties/ Nicolet National Forest/ birds/ chordates/ vertebrates
Abstract: Using natural nests of eight bird species, we provide one of the first multi-species tests for edge effects on reproductive success in a forested landscape. Our primary objective was to assess whether distance to the edge of recent clearcuts was related to nesting success in intact northern hardwood forests. Estimated nest success was generally lower for the two ground-nesting species than for the six canopy-nesting species. Brood parasitism was <3% for species which typically accept eggs of the Brown-headed Cowbird (Molothrus ater), and nest predation was the most common cause of nest failure. Probability of nest failure was influenced by distance to forest edge for the ground-nesting Hermit Thrust (Catharus guttatus) and Ovenbird (Seiurus aurocapillus), but not for six canopy-nesting species. For the Hermit Thrush and Ovenbird, nest success relative to decreasing distance to the edge was reduced during the nestling stage, but not the incubation stage. Nest density appeared to be higher in forest zones near the clearcut edge for ground-nesting and for several canopy-nesting species. Our data suggest that the effect of proximity to edge on nest success for ground-nesting species may penetrate 300 m into intact forest, while the effect of proximity to edge on nest density may penetrate farther. These data suggest that the creation of openings in forested landscapes reduces nest success and increases nest density for some species of migratory birds in a zone adjacent to the opening. This pattern supports the notion that "ecological traps" may exist for ground-nesting birds in areas near recently created forest openings. Because areas of contiguous forest (e.g., publicly owned forest) in the Upper Great Lakes remain relatively intact, they may serve as source habitat for regional songbird metapopulations.
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1309. **Spotted owl home-range and habitat use in young forests of western Oregon.**
Glenn, Elizabeth M.; Hansen, Michael C.; and Anthony, Robert G.
Journal of Wildlife Management 68(1): 33-50. (2004)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Strigiformes/ Strigidae/ northern spotted owl/ Strix occidentalis/ Elliott State Forest And Northern Coast Range/ Strix occidentalis Caurina/ Akaike's information criterion/ spatially explicit models/ Oregon Coast Range/ northern spotted owl/ home range-territory/ habitat management/ habitat use/ ecological requirements/ terrestrial ecology/ land zones/ home-range/ spotted owl/ forest fringe/ young forests/ brood-egg/ habitat/ management/ behavior/ conservation/ radiotelemetry/ season/ ecosystems/ wildlife/ dispersion/ telemetry/ Oregon
Abstract: To assess spotted owl use of young forests, we studied home-range sizes and habitat-use patterns of 24 adult northern spotted owls (Strix occidentalis caurina) on 2 sites in the Oregon Coast Range: the Elliott State Forest (ESF) and state forest lands in the Northern Coast Range (NCR). Conifer forests at ESF were characterized by a mixture of old, mature, and pole-sized conifer, similar to other areas occupied by spotted owls in western Oregon,

USA. In contrast, conifer forests at NCR were younger than most other sites occupied by spotted owls in western Oregon and consisted primarily of conifers <80 years old. Broadleaf forest also was abundant (approx 22%) at both ESF and NCR. We used an information-theoretic approach and Akaike's Information Criterion (AIC) to evaluate a priori hypotheses about spotted owl home-range sizes and habitat-use patterns on our study areas. Considering previous knowledge about habitat requirements of the species, we predicted that owls occupying sites with fewer old conifer stands would have larger home ranges and that owls would select the oldest and most structurally diverse forest available for foraging and roosting. Our top model for evaluating home-range sizes indicated that the proportion of older conifer forest within the home range best explained the variability in home-range sizes. Although we found considerable variation in home-range size among owls, home-range sizes at ESF generally were smaller than home-range sizes at NCR, and home ranges at both sites were smaller than those reported for other study areas in western Oregon. Habitat-use patterns also varied widely among owls both within and between sites. Models containing distance to the nest tree, proximity to nearest forest edge, and proximity to nearest broadleaf-forest edge were the most parsimonious models for distinguishing owl locations from random points. On average, owl locations at both study areas were closer to ecotones between broadleaf forest and other cover types and farther from forest-nonforest ecotones than random points. Overall, we did not observe strong selection or avoidance of any cover type, although owls at ESF showed greatest use of older conifer forest while owls at NCR showed greatest use of broadleaf forest. Use of these habitat configurations and cover types by spotted owls had not been well documented prior to our study. The predictive power of our models was not great, however, indicating that factors in addition to those we included in our analysis may have influenced owl habitat-use patterns at our study areas. Based on our results, we recommend that managers at these sites maintain existing old and mature conifer forest, broadleaf forest, broadleaf-forest edges, and forested riparian areas as owl habitat; avoid timber harvest in core use areas; and plan the size of areas managed for spotted owls to reflect actual home-range and core-area sizes for owls in those forests.
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1310. **Spotted owl turnover and reproduction in managed forests of north-coastal California.**
Thome, Darrin M.; Zabel, Cynthia J.; and Diller, Lowell V.
Journal of Field Ornithology 71(1): 140-146. (2000)
NAL Call #: 413.8 B534; ISSN: 0273-8570
Descriptors: Strigidae/ Strigiformes/ Strix occidentalis caurina/ birds/ ecosystems/ endangered-threatened species/ forestry practices/ forests, mixed/ habitat alterations/ habitat management/ management/ mortality/ movements/ productivity/ reproduction/ wildlife/ spotted owl/ brood-egg/ fertility-recruitment/ turnover/ northern spotted owl/ California: Humboldt County/
California: Del Norte County
Abstract: Northern spotted owl (Strix occidentalis caurina) reproduction and turnover (when an owl died or shifted territories, and was replaced by another owl) were monitored at 51 locations on Simpson Timber Company lands, northwestern California, from 1991-1995. The authors tested for differences in proportions of five stand age classes and reproductive success between spotted owl pair sites with (≥ or=1 turnover) and without turnovers. Owl pairs at sites without turnovers fledged more young, showed more consistent reproductive success, and were surrounded by a greater percentage of 21-to-40-yr-old stands than were owl pairs at sites with turnovers. The authors hypothesize that pairs with high mate fidelity and survival were more reproductively successful because those pairs had previous breeding experience together. By investigating turnover along with habitat features, they now have an indication of the relative quality of various habitats for spotted owls on managed, coastal forests of northern California.
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1311. **Spring bird migration in Mississippi Alluvial Valley forests.**
Wilson, R. Randy and Twedt, Daniel J.
American Midland Naturalist 149(1): 163-175. (2003)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: alluvial valley forests/ bottomland hardwood forest/ silvicultural management/ spring bird migration
Abstract: We surveyed forest songbirds during migration in bottomland hardwood forest stands and managed cottonwood (Populus deltoides) plantations in northeast Louisiana and west-central Mississippi between 24 March and 24 May 1996 and 1997. We detected more bird species in bottomlard hardwood stands than in cottonwood stands. Within hardwood stands, we detected more individuals in stands subjected to uneven-aged timber harvest than in unmanaged stands. Early in migration, avian species composition was similar in both forest types, being comprised mainly of short-distance migrants. Bird species composition in these forest types became increasingly disparate as long-distance neotropical-nearctic migrants arrived. Ten bird species were characteristic of bottomland hardwood forests, whereas eight different species were characteristic of managed cottonwood plantations. Because these two forest types supported different bird communities, both forest types provide important inland stopover habitat during migration. Silvicultural management of bottomland hardwood forests that increases their understory vegetation will provide forested habitat for a more species rich and abundant population of songbirds during migration.
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1312. **Stand age and habitat influences on salamanders in Appalachian cove hardwood forests.**
Ford, W. M.; Chapman, B. R.; Menzel, M. A.; and Odom, R. H.
Forest Ecology and Management 155(1-3): 131-141. (2002)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/S0378-1127(01)00553-9.
Descriptors: clearcutting/ Cove hardwoods/ habitat connectivity/ Salamanders/ Southern Appalachians/ biodiversity/ hardwoods/ landforms/ Drift-fence arrays/ forestry/ amphibians/ clearcutting/ species diversity/ species richness/ United States/ Amphibia/ Amphiuma means/ Caudata/ Desmognathus/ Desmognathus aeneus/ Desmognathus monticola/ Desmognathus ocoee/ Desmognathus quadramaculatus/ Eurycea/ Eurycea bislineata/ Gyrinophilus/ Gyrinophilus porphyriticus/ Monticola/ Notophthalmus/ Notophthalmus viridescens/

Plethodon/ Plethodon glutinosus/ Plethodon jordani/ Plethodon serratus/ Pseudotriton/ Pseudotriton ruber/ Reptilia/ Salamandridae
Abstract: We surveyed cove hardwood stands aged 15, 25, 50, and ≥ 85 years following clearcutting in the southern Appalachian Mountains of northern Georgia to assess the effects of stand age and stand habitat characteristics on salamander communities using drift-fence array and pitfall methodologies from May 1994 to April 1995. Over a 60,060 pitfall trapnight effort, we collected 3937 salamanders represented by Desmognathus aeneus, Desmognathus monticola, Desmognathus ocoee, Desmognathus quadramaculatus, Eurycea bislineata, Gyrinophilus porphyriticus, Pseudotriton ruber, Plethodon glutinosus, Plethodon serratus, and Notophthalmus viridescens. Analysis of covariance with pitfall array to stream distance as the covariate showed that salamander species richness and diversity measures and numbers of Desmognathus aeneus and Desmognathus ocoee were highest in stands ≥ 85 years. Eurycea bislineata and Plethodon glutinosus were more abundant in stands ≤50 years old than in stands ≥ 85 years. Within cove hardwood stands, species richness and diversity measures and relative abundances of Desmognathus spp. and Gyrinophilus porphyriticus were negatively correlated with distance to stream. Species richness and diversity were positively correlated to amounts of emergent rock. Species richness, diversity and relative abundances of Desmognathus spp. were correlated with basal area within stands and extent of connected mesic, cove hardwood habitat and amount of cove habitat within 1 km radius among stands. Eurycea bislineata was negatively correlated with landform index, a measure of surrounding landform sheltering, and Plethodon glutinosus was positively correlated with elevation in cove hardwood stands. Our research indicates stand age is an important factor in explaining the abundance and community composition of salamanders in southern Appalachian cove hardwood communities. Because southern Appalachian woodland salamander communities are slow to recover and are substantially changed following disturbances such as clearcutting, populations in small, isolated cove hardwood stands might be more vulnerable to extirpation or may require longer recovery times than those in larger coves. Managers may need to assess habitat features such as cove extent and habitat connectivity to minimize impacts on these taxa by forest management activities in southern Appalachian cove hardwood communities.
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1313. **Stand-level response of breeding forest songbirds to multiple levels of partial-cut harvest in four boreal forest types.**
Harrison, R. B.; Schmiegelow, F. K. A.; and Naidoo, R.
Canadian Journal of Forest Research 35(7): 1553-1567. (2005)
NAL Call #: SD13.C35; ISSN: 00455067.
Notes: doi: 10.1139/x05-076.
Descriptors: biodiversity/ combustion/ ecosystems/ harvesting/ boreal forests/ forest songbirds/ ground nesters/ retention levels/ forestry/ avifauna/ boreal forest/ clearcutting/ ecological impact/ harvesting/ songbirds/ species diversity/ biodiversity/ combustion/ ecosystems/ forests/ harvesting/ shrubs/ Alberta/ Canada/ North America/ Aves/ Passeri
Abstract: We investigated whether impacts on boreal forest songbird communities in northwestern Alberta could be mitigated through a harvesting system that attempts to emulate the local natural disturbance regime. The EMEND (Ecosystem Management by Emulating Natural Disturbance) project is a multidisciplinary experiment to compare clearcuts and partial-retention cuts in four upland cover types with uncut forest and with experimentally burned stands. We studied breeding birds at EMEND between 1998 (pretreatment) and 2000, focusing on their responses to partial harvesting. Partial cuts were generally intermediate (and varied in a linear fashion) between clearcuts and undisturbed forest for community and species measures. Species that declined in abundance in partial cuts were typically dependent on shrubs and trees, whereas species that benefited were typically ground nesters. While partial cutting offered some advantages over clear-cutting in conserving short-term avian diversity, we suggest that low retention levels (i.e., 10%, 20%) cannot be justified from this perspective. The benefits that accrued in these treatments were relatively small, and species that declined or disappeared were typically characteristic of mature forest habitats. Higher retention levels (i.e., 50%, 75%) may conserve some species of concern, but the extent to which these treatments offer productivity advantages over lower residuals requires further study.
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1314. **Stand structure and small mammals in young lodgepole pine forest: 10-year results after thinning.**
Sullivan, T. P.; Sullivan, D. S.; and Lindgren, P. M. F.
Ecological Applications 11(4): 1151-1173. (2001)
NAL Call #: QH540.E23; ISSN: 10510761
Descriptors: biodiversity/ crop trees/ old-growth forest/ Pinus contorta/ precommercial thinning/ silviculture/ small mammals/ species richness and diversity/ stand density/ stand structure/ tree growth/ wildlife habitat/ community composition/ forest management/ stand structure/ thinning/ Canada/ Clethrionomys gapperi/ Pinus contorta
Abstract: Management of forested landscapes for biological diversity is a major objective across North America. Perhaps the greatest potential to diversify future forests lies in the vast areas of young second-growth stands which may be managed silviculturally to accelerate ecosystem development. This study was designed to test the hypotheses that large-scale precommercial thinning, at ages 17-27 yr, to various stand densities would, over the 10-yr period since treatment, enhance: (1) productivity of lodgepole pine (Pinus contorta) crop trees, (2) stand structure attributes, and (3) species richness and diversity of forest floor small-mammal communities. Study areas were located near Penticton, Kamloops, and Prince George in south-central British Columbia, Canada, in three forest ecological zones. Each study area had three stands thinned to densities of ~500 (low), ~1000 (medium), and ~2000 (high) stems/ha, with an unthinned juvenile pine and old-growth pine stand for comparison. Understory vegetation was measured in all stands in 1990, 1993, and 1998, and coniferous tree layers were measured in 1998. Small-mammal populations were sampled intensively in 1990, 1991, and 1998. Mean diameter increments of trees in the low-density stands were significantly higher than those in the medium- and high-density stands at all study areas. Mean height increments of trees were similar in the medium- and high-density stands and significantly higher

than that in the low-density stands at Penticton and Prince George. Crown volume index (biomass) of herbs was highest in the thinned stands by 1998, but there was no difference among stands for shrubs and trees; volume of mosses was highest in the old-growth stands. Mean species richness and diversity of herbs, shrubs, and trees were similar among stands at 2, 5, and 10 yr after thinning. However, mean species diversity and structural diversity of coniferous trees were significantly higher in the low- and medium-density stands than in the high-density and unthinned stands 10 yr after thinning. Total structural diversity of all vegetation in the low-density stands was significantly greater than that of the medium-density, unthinned, and old-growth stands in 1998. Mean total abundance of all small mammals was similar among stands in 1990-1991, but the low-density and old-growth stands had the most mammals in 1998. Mean abundance of southern red-backed voles (Clethrionomys gapperi) was consistently higher (2.1-3.3 times) in the old-growth stands than in unthinned stands. In seven of nine cases, mean abundance of red-backed voles was similar among old-growth and thinned stands. Mean species richness and species diversity of small mammals were highest in the low-density and medium-density stands. Heavily thinned lodgepole pine stands developed structural attributes such as large diameter trees, large crowns, and structurally diverse vegetative understories. Forest floor small-mammal communities reflected the compositional and structural diversity of these managed stands.
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1315. **Stand structures used by northern spotted owls in managed forests.**
Irwin, Larry L.; Rock, Dennis F.; and Miller, Gregory P.
Journal of Raptor Research 34(3): 175-186. (2000)
NAL Call #: QL696.F3J682; ISSN: 0892-1016
Descriptors: Strix occidentalis/ foraging habitat/ managed forests/ nesting habitat/ northern spotted owl/ Oregon
Abstract: The authors compared vegetative structures in 4-16-ha patches in forest stands used by 12 pairs of northern spotted owls (Strix occidentalis caurina) for nesting (N = 44) and foraging (n = 38) with habitat structures in 50 stands located randomly throughout annual home ranges in a young and mid-successional forest landscape (25-79 year-old stands) in the foothills of the western Cascades in Oregon. Forest stand structures influenced selection for stands used for foraging and nesting by spotted owls, and abundance of these structures varied with successional development as represented by five age classes. Conifer saplings (10-19 cm in diameter at breast height [dbh]) and trees 50-79 cm dbh were more abundant in foraging areas than nest sites or random sites. Large snags (>40 cm dbh) tended to be more abundant, down woody debris was more abundant, and cover of herbs and low-growing shrubs (<0.5 m) was lower in stands in which owls hunted frequently than in randomly located stands of the same age classes. Owls nested in trees as young as 41 years old, although 65% of nest trees were older than 120 years of age. The authors found 22 (50%) nests in forest stands 46-79 years of age, whereas owls repeatedly foraged in stands as young as 27 years of age. Silviculturists should be able to create foraging habitat for northern spotted owls in managed forests by emphasizing control of tree densities and form, woody debris, and understory vegetation. Suitable nesting habitat might best be facilitated via retaining legacy trees. Future research should determine the relative contribution of managed forests to owl conservation.
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1316. **Status of American martens in coastal forests of the Pacific states.**
Zielinski, W. J.; Slauson, K. M.; Carroll, C. R.; Kent, C. J.; and Kudrna, D. G.
Journal of Mammalogy 82(2): 478-490. (2001)
NAL Call #: 410 J823; ISSN: 00222372.
Notes: doi: 10.1644/1545-1542(2001)082<0478:SOAMIC>2.0.CO;2.
Descriptors: conservation/ distribution/ marten/ Martes americana/ Pacific states/ coniferous forest/ conservation status/ historical record/ passerines/ population distribution/ United States/ Coniferophyta/ Martes americana/ Mustelinae/ Passeriformes
Abstract: American martens (Martes americana) are associated strongly with mature conifer forests and once occurred throughout the mountains of the coastal Pacific states. We sought to document the distribution of martens in this region using historical records and to understand recent change in their distribution. We described the distribution of martens from 1900 to 1949 using museum and trapping records and compared it to recent (1989-1998) detections at camera and track-plate stations. Martens were detected at only 12 of the 237 (5.1%) survey sample units in coastal California, Oregon, and Washington. Martens are absent from most of the historical range of the Humboldt marten (M. a. humboldtensis) in California and also may have declined on the Olympic Peninsula of Washington. Few data exist from northwestern Oregon and southwestern Washington, but the limited amount of protected public land and absence of reported road kills are reasons for concern for populations in this region. Martens still occur in the central and southern coastal mountains of Oregon. Our results suggest that conservation of martens in coastal forests will require new initiatives to protect existing populations and new efforts to document all populations of martens in this region. Conservation measures should include a reevaluation of timber harvest plans that affect habitat in coastal forests, interagency cooperation on a coastal marten conservation assessment, and the collection of new survey information, especially on private lands in southwestern Washington and northwestern Oregon.
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1317. **Structural characteristics of forest stands within home ranges of Mexican spotted owls in Arizona and New Mexico.**
Ganey, Joseph L.; Block, William M.; and Ackers, Steven H.
Western Journal of Applied Forestry 18(3): 189-198. (2003)
NAL Call #: SD388.W6; ISSN: 0885-6095
Descriptors: forestry/ terrestrial ecology: ecology, environmental sciences/ wildlife management: conservation/ forest habitat management/ applied and field techniques/ radio marking/ applied and field techniques
Abstract: As part of a set of studies evaluating home-range size and habitat use of radio-marked Mexican spotted owls (Strix occidentalis lucida), we sampled structural characteristics of forest stands within owl home ranges on two study areas in Arizona and New Mexico. Study areas

were dominated by ponderosa pine (Pinus ponderosa)-Gambel oak (Quercus gambelii) forest (Arizona) or mixed-conifer forest (New Mexico). We describe structural characteristics of forest stands used by spotted owls for both foraging and roosting, in terms of central tendencies and variability in structural characteristics among stands. Our results indicated that stands used for foraging were more variable than stands used for roosting. Observed distributions of structural variables were consistent with recommendations in the recovery plan governing management of owl habitat with a few potentially important exceptions. We also provide additional recommendations for application in forest management, based both on observed data and on extensive collective experience with the owl and its habitat.
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1318. **Structural characteristics of wet montane forests in east-central British Columbia.**
DeLong, S. C.; Arocena, J. M.; and Massicotte, H. B.
Forestry Chronicle 79(2): 342-351. (2003)
NAL Call #: 99.8 F7623; ISSN: 00157546
Descriptors: Abies lasiocarpa/ Picea engelmannii/ snags/ stand structure/ wildlife habitat/ woody debris/ ecosystems/ management/ supports/ wood/ wet montane forests/ forestry/ coarse woody debris/ forest management/ montane forest/ silviculture/ snag/ stand structure/ ecosystems/ forests/ management/ wood/ Canada
Abstract: Structural characteristics of forest stands were examined along a post-fire age chronosequence for wet montane sub-boreal and sub-alpine forests in the northern portion of the Rocky Mountains in British Columbia, Canada. The objective was to develop criteria that could be used to assess the extent to which managed stands approximate the structural characteristics of natural stands. Twelve and fifteen stands were sampled in wet montane sub-boreal and high-elevation subalpine forests, respectively. Tree density, variation in tree size, snag density by size class and coarse woody debris volume were examined for young (0-70 years), mature (71-140 years), and old (> 140 years) stands. Apart from a general increase in average tree size and a decrease in snag density, changes in other stand attributes over time since disturbance were limited, especially when compared to forests in drier climates at similar latitudes. The combination of low density and large variability in tree size of the young wet montane sub-boreal stands appear to be unusual for low elevation forests that originate from stand-replacing wildfire. In the study area, current management practices of salvage-logging fire-killed stands and planting relatively high densities of spruce on harvested sites should be examined in light of our data. This study illustrates the importance of developing area-specific ecosystem management guidelines relating to stand structure.
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1319. **Suggestions for a silvicultural prescription for cerulean warblers in the Lower Mississippi Alluvial Valley.**
Hamel, Paul B.
In: Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference, General Technical Report-PSW 191/ Ralph, C. J. and Rich, T. D.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2005. pp. 567-575.
Notes: 0196-2094 (ISSN).
Descriptors: conservation measures/ reproduction/ ecology/ terrestrial habitat/ land zones/ Dendroica cerulea: habitat management/ silvicultural prescription/ Arkansas/ Tennessee/ reproduction/ breeding biology/ management implications/ habitat utilization/ forest and woodland/ Arkansas/ Desha County/ Tennessee/ Lauderdale and Shelby Counties/ Aves, Passeriformes, Parulidae/ birds/ chordates/ vertebrates
Abstract: Conservation of species with high Partners in Flight concern scores may require active habitat management. Cerulean Warbler (Dendroica cerulea) occurs at low numbers in the Lower Mississippi Alluvial Valley in the western part of its breeding range. A study of the breeding ecology of the species was initiated in 1992 on three sites there. Characteristics of individual trees used by the birds have been measured in detail. Elements of the vegetation utilized by male Cerulean Warblers, by female Cerulean Warblers, and as nests have been identified. A silvicultural prescription designed to produce these elements is being prepared as an experimental manipulation of habitats for the birds. The development of this suggested silvicultural prescription offers an example for development of similar prescriptions for other forest canopy dwelling bird species. One difficulty may be in assessing the response of the birds to the treatments when the available habitat exceeds the amount needed to support the spatial needs of the local small population, whether the measured response is one of abundance or of productivity. This is because the response may be smaller than can be detected by the experimental design used to conduct the experiment; available birds may not be numerous enough to produce a detectable response.
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1320. **Summer and fall use of logging residue piles by female short-tailed weasels.**
Lisgo, Kimberly A.; Bunnell, Fred L.; and Harestad, Alton S.
In: Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests, General Technical Report-PSW 181/ Laudenslayer, W. F.; Shea, P. J.; Valentine, B. E.; Weatherspoon, C. P.; and Lisle, T. E.; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 319-329.
Notes: 0196-2094 (ISSN); Symposium held November 2-4, 1999 in Reno, NV.
http://www.fs.fed.us/psw/publications/documents/gtr-181/
Descriptors: conservation measures/ nutrition/ diet/ prey/ ecology/ population dynamics/ predators/ terrestrial habitat/ land zones/ North America/ Canada/ Mustela erminea: habitat management/ mammalian prey/ Rodentia/ food availability/ mammalian prey abundance/ habitat utilization/ logging residue pile use/ seasonal changes and influences/ conservation implications/ forest/ forest and woodland/ Alberta/ Edmonton/ Owl River/ Mammalia, Carnivora, Mustelidae/ carnivores/ chordates/ mammals/ rodents/ vertebrates
Abstract: Female short-tailed weasels (Mustela erminea) used piles of logging residue more than expected and used areas without logging residue less than expected when they were in 3-year- old regenerating aspen (Populus tremuloides) cutblocks during summer and fall (P < 0.001). Female weasels may prefer piles of logging residue because they offer greater amounts of food, larger numbers

of rest sites, and greater availability of travel corridors. Our data indicate that food abundance, specifically the southern red-backed vole (Clethrionomys gapperi), best explains the preferential use of logging residue piles by female weasels. Recommendations for the management of logging residue piles are discussed,
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1321. **Summer habitat use and home-range analysis of the endangered Indiana bat.**
Menzel, J. M.; Ford, W. M.; Menzel, M. A.; Carter, T. C.; Gardner, J. E.; Garner, J. D.; and Hofmann, J. E.
Journal of Wildlife Management 69(1): 430-436. (2005)
NAL Call #: 410 J827; ISSN: 0022541X.
http://www.fs.fed.us/ne/newtown_square/publications/other_publishers/OCR/ne_2005_Menzel001.pdf
Descriptors: corridors/ Euclidean distance analysis/ habitat use/ riparian habitat/ bats/ endangered species/ habitat use/ riparian zone/ summer/ Myotis sodalis/ Riparia
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1322. **Survey of amphibians and reptiles in two types of managed forests in central Pennsylvania.**
Yahner, Richard H.; Piergallini, Nell H.; and Ross, Bradley D.
Journal of the Pennsylvania Academy of Science 74(2-3): 48-51. (2001)
NAL Call #: Q11.J682; ISSN: 1044-6753
Descriptors: commercial activities/ ecology/ population dynamics/ land and freshwater zones/ Amphibia/ Reptilia: forestry/ management practices/ fauna and abundance relationships/ survey study/ community structure/ population density/ comparison of different types of managed forests/ Pennsylvania/ Centre County/ Faunal survey/ managed forest habitat/ amphibians/ chordates/ reptiles/ vertebrates
Abstract: Amphibian and reptile populations were surveyed at two study sites in central Pennsylvania for a 5-year period (1994-98). The Barrens Grouse Habitat Management Area (GHMA) site was managed by an even-aged system of timber harvesting, and the Toftrees site was irrigated with treated effluent (irrigated wastewater). Eleven species (190 individuals) of amphibians and reptiles were recorded at the Barrens GHMA and Toftrees study sites combined. At both study sites, fewer species and individuals were found in the reference sectors (e.g., undisturbed) than in the managed (disturbed) sectors, which to some extent was a function of a greater sampling effort in the managed sector of each study site. A major difference between the two sites was in the common species observed, with salamanders predominating at the Barrens GHMA site and frogs at the Toftrees site. This study suggests that both timber-harvesting practices and wastewater irrigation may negatively affect the distribution and abundance of amphibian and reptile populations in central Pennsylvania.
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1323. **Survival and nest success of female wild turkeys in a Louisiana bottomland hardwood forest.**
Wilson, Walker B.; Chamberlain, Michael J.; and Kimmel, Frederick G.
Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies 59: 126-134. (2005)
NAL Call #: SK1.S6; ISSN: 0276-7929
Descriptors: conservation measures/ reproduction/ ecology/ population dynamics/ terrestrial habitat/ land zones/ Meleagris galloparvo: habitat management/ reproductive productivity/ survival/ forest and woodland/ bottomland hardwood forest/ survival and nest success of females/ management implications/ Louisiana/ Iberville/ Point Coupee and St. Martin parishes/ Aves, Galliformes, Phasianidae/ birds/ chordates/ vertebrates
Abstract: Survival of female wild turkeys (Meleagris gallopavo) influences turkey productivity. Although patterns of survival and productivity have been extensively researched in most forested landscapes, little information is available for female turkeys in bottomland hardwood systems, although importance of these systems is widely recognized. Therefore, we captured and radiomarked 39 female wild turkeys in a bottom-land hardwood forest in south-central Louisiana during 2001-2004. Mean annual survival was 0.67. Survival was greatest during preincubation (1.00) potentially because of increased habitat sampling and movement during this period. Fall-winter survival was high (0.93), likely attributable to stable foraging resources and a lack of illegal and legal harvest during this period. Lowest survival occurred during incubation (0.75) and brood-rearing (0.83), primarily as a result of increased risks of predation associated with nesting and brood rearing. Nest initiation rates (33%) were among the lowest reported, likely attributable to high nest loss from predation and flooding prior to completion of laying. Nest success of females reaching onset of incubation was 38%. Our findings suggest that the wild turkey population on our study site balances exceptionally low productivity with relatively high adult female survival. To ensure sustainable populations of wild turkeys, managers should monitor relationships between survival and productivity. Specific to our study site, improvements in nesting habitat may be needed to increase nest success and recruitment.
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1324. **Swainson's warbler habitat selection in a managed bottomland hardwood forest.**
Peters, K. A.; Lancia, R. A.; and Gerwin, J. A.
Journal of Wildlife Management 69(1): 409-417. (2005)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2005)069<0409:SWHSIA>2.0.CO;2.
Descriptors: bottomland hardwoods/ even-aged/ habitat selection/ Limnothlypis swainsonii/ productivity/ riparian/ shearing/ South Carolina/ Swainson's warbler/ deciduous forest/ habitat selection/ passerines/ Limnothlypis swainsonii/ Riparia
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1325. **Synthesis of large-scale bird conservation plans in Canada: A resource for forest managers.**
Cooper, J. M. and Manning, E. T.
NCASI Special Report (06-05): 1-53. (2006)
Descriptors: bird conservation regions/ Canadian federal bird management plans/ Canadian Species at Risk Act/ North American Landbird Conservation Plan
Abstract: There are four major bird management plans in effect in Canada: the North American Landbird Management Plan, the North American Waterfowl Management Plan, the Canadian Shorebird Conservation Plan, and Wings Over Water (the Canadian waterbird conservation plan). These plans cover almost all native bird species that occur regularly in Canada. All of these plans operate under the North American Bird Conservation Initiative (NABCI). The intent of this report is to increase awareness of the four major Federal bird plans among the forest industry, to provide forest managers a common reference point relative to the Federal government's perspective on managing various types of birds in Canada, and to synthesize information on birds that is most relevant to forest management planning. About 634 species of birds occur in Canada. We reviewed all of those bird species and identified species which may be affected by forestry operations. Effects of forestry on birds may be positive, negative, or mixed depending on the species, specific management practices, spatial scale, and time scale. We also reviewed the Bird Conservation Region (BCR) concept, a tool developed for the North American Bird Conservation Initiative. BCRs are ecologically defined units that share similar avifaunas and provide a consistent spatial framework for bird conservation across North American landscapes. The BCR concept is very relevant to the forest industry because most of the forest bird conservation planning processes currently underway in Canada are related to BCRs and the priority forest bird species within each. The plan most relevant to the forest industry is the Partners in Flight North American Landbird Conservation Plan (NALCP). It provides a continental synthesis of priorities and objectives to guide conservation actions for landbirds, many of which are forest-dwelling species. The primary objective of the NALCP is to maintain a representative diversity of avifauna in all ecoregions of Canada and the U.S. Many of the 448 species covered by the NALCP breed in forested landscapes and may be directly or indirectly affected by forestry operations in positive and negative ways over various temporal and spatial scales, depending on the species and practice in question. We estimate that 48 of those species, which are all on Watch or Stewardship Lists, are of interest to the forest industry, as special management may be required to conserve populations. Other species that may be affected by forestry operations are thought to be secure under current conditions. The North American Waterfowl Management Plan (NAWMP) is an international (Canada, U.S., Mexico) action plan to conserve migratory waterfowl (ducks, geese, and swans) throughout the continent. The NAWMP was initiated in 1986, updated in 1998, and is a partnership of federal, provincial/state and municipal governments, non-governmental organizations, industry and many individuals. The primary objective of the NAWMP is to restore North American waterfowl populations to levels recorded during the 1970s, a period of relative abundance for waterfowl populations. Notably, there are several species that have already exceeded these objectives. Of the 39 waterfowl species that occur in Canada and that are covered by the NAWMP, only 8 species are thought to be potentially affected by forestry operations; most of these species are cavity-nesting ducks. The Canadian Shorebird Conservation Plan (CSCP) is a national plan designed to promote the conservation of shorebirds in Canada. The plan is intended to cooperate with other bird conservation initiatives including the U.S. Shorebird Conservation Plan, the Western Hemispheric Shorebird Reserve Network, the North American Waterfowl Management Plan, and Wings Over Water. The CSCP's stated vision is to ensure that healthy populations of shorebirds are distributed across their range and diversity of habitats in Canada and throughout their global range. Of the 47 shorebird species covered by the CSCP, we suggest only 4 species (listed as Not at Risk in Canada by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) are potentially impacted by forestry operations: lesser yellowlegs, greater yellowlegs, solitary sandpiper, and American woodcock. Wings Over Water (WOW), Canada's Waterbird Conservation Plan is the Canadian component of North American Waterbird Conservation Plan. The purpose of the plan is to sustain or restore, throughout the lands and waters of North America, Central America, and the Caribbean, the distribution, diversity, and abundance of populations and habitats of waterbirds. We suggest that only 5 of the 93 species covered by WOW are potentially impacted by forestry operations in Canada: Bonaparte's Gull, Green Heron, and Sandhill Crane ('Not at Risk'), and Great Blue Heron fannini subspecies ('Special Concern') and Marbled Murrelet ('Threatened'). We briefly reviewed linkages between Canada's Species At Risk Act and the 4 bird conservation plans, mainly as they may lead to future bird species conservation priorities at federal and provincial levels. Finally, we provide concluding remarks on the plans' similarities, differences, and relevance to the forest industry. The four bird conservation plans reviewed in this report have clear, but mainly indirect, relevance to forest management in Canada. The plans provide strategic-level guidance on goals and objectives for national and international conservation of birds, and on issues and threats for birds, but provide only high-level commentary on management actions or strategies. Specific management recommendations are lacking. The forest industry will need to rely on provincial and corporate guidelines, biodiversity management policy, effective operational-level actions, and formation of partnerships with other stakeholders to help attain the goals and objectives of the four federal bird conservation plans discussed herein. © 2006 by the National Council for Air and Stream Improvement, Inc.
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1326. **Tassel-eared squirrel population, habitat condition, and dietary relationships in north-central Arizona.**
Dodd, N. L.; States, J. S.; and Rosenstock, S. S.
Journal of Wildlife Management 67(3): 622-633. (2003)
NAL Call #: 410 J827; ISSN: 0022541X
Descriptors: Arizona/ diets/ forest management/ fungi/ habitat relationships/ Pinus ponderosa/ ponderosa pine/ Sciurus aberti/ tassel-eared squirrels/ diet/ forest management/ fungus/ habitat structure/ mark-recapture method/ population dynamics/ rodent/ United States
Abstract: We examined the seasonal population dynamics of tassel-eared squirrels (Sciurus aberti) in north-central Arizona, USA, during 1996-1997 to assess relationships

with forest structural habitat condition and dietary fungi use. Our 8 study sites averaged 66 ha and exhibited considerable variation in ponderosa pine (Pinus ponderosa) habitat structure. We conducted capture-recapture trapping during 3 seasons each year, for a total of 56,016 trap days and 2,542 captures of 450 squirrels. We attained population estimates with mean standard error ±10%. Density across periods ranged from 0.05 to 1.03 squirrels/ha, and fluctuated widely at hall our study sites, particularly between April and August trapping periods. Indices of recruitment averaged 0.14 juveniles/female. Survival rates averaged 0.78, with winter survival (0.63) significantly lower than other periods. We analyzed 382 fecal samples for seasonal hypogeous and epigeous fungi, of which 21 taxa were detected. Mean fecal fungal content was significantly higher in August (70.8% relative frequency) than in January (28.2%) and April (9.4%). Recruitment was strongly and positively related to both the number of interlocking canopy trees and August fungal content in fecal samples. August fecal fungal content was positively related to basal area for all tree species. Across all periods, squirrel density was positively related to fecal fungal diversity. Winter squirrel survival was inversely related to snow cover duration and positively related to dietary fungal diversity. Squirrel density fluctuations between April and August were positively tied to pine quadratic mean diameter. Forest management and restoration practices emphasizing intensive, widespread thinning may adversely impact tassel-eared squirrels and the fungi that provide food. Integrating squirrel habitat needs of interlocking canopies and other structural attributes in forest management will benefit squirrel populations.
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1327. **Temporal and spatial use of even-aged reproduction stands by bird communities in central Pennsylvania.**
Talbott, S. C. and Yahner, R. H.
Northern Journal of Applied Forestry 20(3): 117-123. (2003)
NAL Call #: SD143.N6; ISSN: 07426348
Descriptors: bird communities/ even-aged reproduction stands/ Pennsylvania/ residual trees/ biodiversity/ ecosystems/ plants (botany)/ rain/ vegetation/ wind/ bird communities/ even-aged reproduction stands/ forestlands/ residual trees/ forestry/ biodiversity/ birds/ breeding/ ecosystems/ forestry/ Pennsylvania/ plants/ rain/ reproduction/ wind/ Aves/ Dendroica pensylvanica/ Mniotilta varia
Abstract: In 1992, the Pennsylvania Bureau of Forestry adopted a new forest management practice known as even-aged reproduction with reservation (EAR), which replaces clearcutting on state forestlands. The EAR guidelines mandate the retention of at least 12 trees/ha and 24-36 m^2/ha of basal area, representing a diversity of overstory and understory species. During summer 1998, we compared the temporal (breeding season vs. midsummer) and spatial (edge versus interior) use of EAR stands by birds. In addition, we compared observed vs. expected use of overstory trees in EAR stands. In each often representative EAR stands, we sampled birds twice per season along two-edge and two-interior transects. Total species richness and abundance (all species combined), species richness and abundance of ground-shrub foragers, and species richness of canopy-sallier foragers were significantly (P < 0.05) higher in the breeding season than in mid-summer. Eight of 20 common bird species analyzed also were significantly (P < 0.05) more abundant during the breeding season (e.g., black-and-white warbler and chestnut-sided warbler), and one species was significantly (P < 0.05) more abundant during mid-summer. Total species richness, total abundance, and abundance of ground-shrub foragers were significantly higher (P < 0.05) in interiors compared to edges of EAR stands. Five species also were significantly (P < 0.05) more abundant in interiors of EAR stands, whereas no species was more common in edges. All species combined and three foraging guilds showed differential use (P < 0.05) of overstory tree species; eight species also differed significantly in their use of abundant tree species. Based on our findings, we believe that EAR stands are excellent substitutes for clearcuts on state forestlands, although we caution that our findings were based only on one yr of data. We recommend the continued retention of a diversity of overstory trees, especially snags and rough-barked trees, in both edges and interiors of EAR stands for use by a variety of bird species during both the breeding season and mid-summer.
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1328. **Temporal patterns in aquatic and avian communities following selective logging in the Upper Great Lakes region.**
Flaspohler, D. J.; Huckins, C. J. F.; Bub, B. R.; and Van Dusen, P. J.
Forest Science 48(2): 339-349. (2002)
NAL Call #: 99.8 F7632; ISSN: 0015749X
Descriptors: brook char/ forest songbirds/ macroinvertebrates/ riparian/ stream communities/ biodiversity/ ecosystems/ hardwoods/ lakes/ population statistics/ watersheds/ habitat quality/ forestry/ community structure/ organismal community/ Salvelinus fontinalis
Abstract: We surveyed populations of birds, fish, and aquatic macroinvertebrates in and along riparian systems within northern and mixed-hardwood forests that varied in time since last selection logging. Thirteen headwater stream sites from the Otter Riverwatershed in Michigan's Upper Peninsula were included in the study. We detected a significant negative correlation between a standard index of habitat quality for coldwater streams (Great Lakes Environmental Assessment Section [GLEAS]) and time since last selective logging. Brook char (Salvelinus fontinalis Mitch.) abundance was also negatively correlated with year of forest cut as was the abundance of selected aquatic macroinvertebrate orders (Ephemeroptera, Plecoptera, and Trichoptera) that are sensitive to anthropogenic disturbance. Thus, relative to more recently logged stands, stands with older cuts had higher indices of habitat quality, more brook char, and the dominant aquatic macroinvertebrates tended to be those generally associated with higher quality coldwater streams. In contrast, bird species richness was positively related to year of last selective logging. As expected, basal area was lower and ground cover was greater in more recently logged stands. Thus, bird species richness was higher in stands with less basal area (recent cuts) than in stands with more basal area (older cuts). Percent ground cover showed a strong positive correlation with bird species richness. Twelve bird species were detected only in recently logged (since 1990) stands. The results of this multitaxa study suggest that selective logging of riparian forests is

associated with changes in local animal abundance and diversity, and these effects appear to persist for approximately 30 yr postharvest.
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1329. **Temporal patterns of northern goshawk nest area occupancy and habitat: A retrospective analysis.**
Desimone, S. M. and DeStefano, S.
Journal of Raptor Research 39(3): 310-323. (2005)
NAL Call #: QL696.F3J682; ISSN: 08921016
Descriptors: Accipiter gentilis/ habitat/ historical nest areas/ landscape change/ northern goshawk/ Oregon/ habitat selection/ landscape change/ nest site/ raptors/ temporal analysis
Abstract: We studied occupancy and habitat associations of Northern Goshawks (Accipiter gentilis) at nest areas in south-central Oregon in 1992-94. We surveyed 51 pre-1992 nest areas (i.e., historical breeding areas first discovered during 1973-91) for goshawks and used aerial-photograph interpretation to document forest cover conditions and changes over time between areas that were occupied by goshawks and those where we did not detect goshawks (no-response sites). We also surveyed for new nests during 1992-94. Of 38 occupied nests first found in 1992-94 (i.e., post-1992 nest areas), 86% (33/38) were in mid-aged (mean stand DBH 23-53 cm, <15 trees/ha >53 cm DBH) or late (≥ 15 trees/ha >53 cm DBH; mean stand DBH >53 cm) closed (>50% canopy closure) structural-stage forest. Occupancy of historical (pre-1992) nest areas by goshawks was 29% (15/51). Of 46 pre-1992 nest areas that we examined for habitat change, 15 were occupied by goshawks in 1994 and had more mid-aged closed and late closed forest in 12-, 24-, 52-, 120-, and 170-ha circular areas centered on nest locations than did 31 no-response areas. There was no difference in the amount of late closed and mid-aged closed forest in pre-1992 nest areas compared with occupied pre-1992 nest areas. A logistic regression model for all occupied nest areas confirmed that late closed and mid-aged closed forest variables were important indicators of forest conditions that supported breeding pairs. Goshawks were more likely to persist in the historical nest areas that had about 50% of mature and older closed-canopy forest within the 52ha scale. We recommend retaining existing late closed, late open, and mid closed structure within 52ha scale of the nest site. Moreover, late closed and mid closed structure combined should not fall below 50% within the 52-ha scale and should exceed 40% within the 170-ha scale surrounding the nest site. To optimize conditions for breeding goshawks, we recommend retaining large trees (>53 cm DBH) to help preserve stand integrity, maintain closed canopies, and provide connectivity to alternative nest sites within nest areas. © 2005 The Raptor Research Foundation, Inc.
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1330. **Terrestrial activity, abundance and species richness of amphibians in managed forests in South Carolina.**
Hanlin, Hugh G. and Martin, F. Douglas
American Midland Naturalist 143(1): 70-83. (2000)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: bufo terrestris/ loblolly pine/ pinus taeda/ slash pine/ southern toad/ Carya spp./ Pinus elliotii/ Pinus spp./ Pinus taeda/ Quercus spp./ South Carolina/ United States
Abstract: We determined the relative abundance, days of surface activity and indices of species diversity, evenness and richness for amphibians inhabiting three differently managed forests surrounding a Carolina bay in South Carolina following restoration. We collected animals daily for 3 y (Oct. 1993-Sept. 1996) using drift fences with pitfall traps in three forest types: loblolly pine (Pinus taeda), slash pine (P. elliotti) and mixed hardwoods (predominantly oak, Quercus spp. and hickory, Carya spp.). Captured animals were marked and recaptures were recorded but not included in statistical analyses, except in our evaluation of activity. We compared results to those of a more limited study conducted before restoration. Amphibians were significantly more numerous and more active in the mixed hardwood forest than in the pine forest types. However, the hardwood forest had the lowest species diversity in 2 of the 3 y of the study. The slash pine habitat had the highest diversity in all 3 y and for the 3 y combined. Because the evenness index (J') values differ in step with the species diversity index (H') it appears that the evenness component of diversity, rather than the richness component, is what is determining H' variation. A summer subset of these data and summer data from an earlier study of 1977-1978 is in marked contrast with yearlong patterns. For our summer data each forest type had the highest H' value in one of the years of the study and again the J' values parallel the differences in H'. Large numbers of southern toads (Bufo terrestris) reduced evenness, and therefore species diversity, for all three habitats particularly the mixed hardwoods where this species was especially abundant. Proportionally lower numbers of B. terrestris in the summer samples increased J' and H' indices. Overall lower abundance and H' values in the summers of 1994-1996 compared with 1977-1978 may be the result of habitat alteration during the restoration of the Carolina bay.
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1331. **Territory occupancy, reproductive success, and nest site characteristics of goshawks on managed timberlands in central and northern California 1993-2000.**
Richter, David J.
California Fish and Game 91(2): 100-118. (2005)
NAL Call #: 410 C12; ISSN: 0008-1078
Descriptors: Accipitridae/ Falconiformes/ Accipiter gentilis/ wildlife-human relationships/ behavior/ biogeography/ breeding grounds/ breeding success/ California/ California Forest Practice Rules/ commercial enterprises/ conservation/ wildlife management/ disturbances/ forests/ ecosystems/ forestry practices/ habitat alterations/ fragmented habitat/ habitat management/ land zones/ managed timberlands/ nest abandonment/ nest site characteristics/ premature dispersal/ reproduction/ productivity/ reproductive success/ territorial defense/ home range-territory/ territory occupancy
Abstract: In the eight years of this study (1993-2000), 106 goshawk territories were surveyed (71 on private timberlands, 35 on public timberlands) from 14 California counties. The uncorrected mean territory occupancy rate was 46% and the corrected mean territory occupancy rate was 55%. This study indicates that reliance only on two to 8-ha buffers is producing territory occupancy rates that are comparable to those found for fragmented habitats. Territories monitored of > or = 4 years showed that 46-54% (based on search protocol used) of these territories no longer meet the California forest Practice Rules (CFPR)

definition of having an active nest site. Productivity at successful nests (1.7) and productivity at active nests (1.4) were at the lower end of the recorded ranges in the Northern Goshawk Status Review; although the active nest value was nearly at the mean. It is unknown whether the values found represent the normal range for California goshawk nests or if the values are reflective of environmental constraints. Monitoring of non-altered nest sites as controls for comparison to sites that have experienced habitat alteration would provide useful insight into the issue of the potential impact of habitat alteration/fragmentation on goshawk productivity. I provide management recommendations designed to increase territory viability, territory occupancy, and protect against nest abandonment and premature dispersal of fledglings.
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1332. **Timber harvest and calving site fidelity of moose in northwestern Ontario.**
Welch, Ian D.; Rodgers, Arthur R.; and McKinley, R. S.
Alces 36: 93-103. (2000); ISSN: 0835-5851
Descriptors: commercial activities/ conservation measures/ reproduction/ reproductive behavior/ habitat utilization/ land and freshwater zones/ Canada/ Alces alces (Cervidae): forestry/ habitat management/ birth/ breeding site/ habitat preference/ calving site fidelity/ timber harvesting/ Ontario/ Artiodactyla, Mammalia/ chordates/ mammals/ vertebrates
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1333. **Tools for blending economic and ecological objectives on private forestlands.**
Wigley, T. Bently; Mitchell, Michael S.;
Van Deusen, Paul C.; and Lancia, Richard A.
Transactions of the North American Wildlife and Natural Resource Conference 66: 68-83. (2001)
NAL Call #: 412.9 N814; ISSN: 0078-1355
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ land and freshwater zones/ Aves: forestry/ habitat management/ forest and woodland/ South Carolina/ private forestlands/ economics/ ecology/ birds/ chordates/ vertebrates
Abstract: In this paper, we describe the harvest-scheduling program (Habplan), predictive wildlife models that we developed, and the benefits and challenges associated with incorporating predictive wildlife models into harvest scheduling programs.
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1334. **Tree diseases, canopy structure, and bird distributions in ponderosa pine forests.**
Lundquist, J. E. and Reich, R. M.
Journal of Sustainable Forestry 23(2): 17-45. (2006); ISSN: 10549811.
Notes: doi: 10.1300/J091v23n02_02.
Descriptors: diversity/ forest health/ Insect pests/ pathogens/ spatial models/ sustainability
Abstract: We examined how canopy patterns at the landscape scale can influence bird community composition, abundance, or distribution. Our long-term goal is to determine how diseases and other small-scale disturbances that change canopy patterns influence bird distribution. Little is known about these relationships, partly because most measures of disturbance are based on timber production metrics. We developed a spatially dependent metric referred to as canopy closure roughness, which was significantly correlated to bird diversity on 4 ha sample plots, and used it to generate a spatial model showing the distribution of bird diversity at a resolution of 30mover an area of 1 million acres (the entire Black Hills National Forest). Number of bird species per stand varied between 2 and 16. Number of species and bird diversity were positively related to intensity of tree cutting. Most common bird species were yellow-rumped warbler, dark-eyed junco, Townsend's solitaire, blackcapped chickadee and red-breasted nuthatch. The spatial model of bird diversity showed clusters of high diversity at different locations within the forest. These methods may help lead to better tools for managing the linkages between specific disturbances and bird usage and enable more effective disturbance management by offering a platform for spatial planning. © by The Haworth Press, Inc. All rights reserved.
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1335. **Use and selection of bridge and tree roosts by Rafinesque's big-eared bats in an intensively managed landscape.**
Loeb, S. C.: 21-22. (2007).
Notes: Conference: 17th Colloquium on Conservation of Mammals in the Southeastern United States, Destin, Florida, February 15-16, 2007.
Descriptors: bats/ habitat use/ roosting/ behavior/ Rafinesque's big-eared bat/ Corynorhinus rafinesquii/ South Carolina
Abstract: Rafinesque's big-eared bat (Corynorhinus rafinesquii) is listed as a species of special concern by every state within in its range. Thus, information on its habitat requirements, particularly roosting requirements, is critical to its conservation. Rafinesque's big-eared bats commonly roost in bridges and buildings, particularly during summer. Even when anthropogenic structures are used as the primary roost, tree roosts are also used. The objectives of this study were to determine: 1) seasonal use of bridges and trees, and 2) use and selection of tree roosts by Rafinesque's big-eared bats on the Savannah River Site in the Upper Coastal Plain of South Carolina. Bridges, a barn, and most roost trees were checked at least once per week from May through October 2005 and 2006 and 1-2 times per month from November 2005 through April 2006. Rafinesque's big-eared bats were captured in bridges and roost trees, radio-tagged, and followed 1-24 days from May through October 2005 (n=12) and 2006 (n=15). Characteristics of tree roosts and randomly selected trees were measured and compared. Bridge/barn occupancy was high throughout summer, declined through the fall, and was lowest from December through February. Tree roost occupancy followed a similar pattern but was generally lower than bridge/barn occupancy. Eighteen roost trees were located; the majority (55.6%) were in basal cavities of black tupelo (Nyssa sylvatica). Other species used were oaks, sweetgum, American beech, and river birch with tupelo being selected over other species. Height, percent bark, and distance to nearest tree did not differ between roost and random trees. However, DBH and number of cavities of roost trees were significantly greater than random trees. These results suggest that conservation of large tupelo and other large cavity trees in bottomland hardwoods are important for providing Rafinesque's big-eared bats with alternate roosting sites in highly managed habitats.
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1336. **Use by bats of patches of residual trees in logged areas of the boreal forest.**
Hogberg, Laureen K.; Patriquin, Krista J.; and Barclay, Robert M. R.
American Midland Naturalist 148(2): 282-288. (2002)
NAL Call #: 410 M58; ISSN: 0003-0031
Descriptors: Lasionycteris noctivagans/ Myotis lucifugus/ Myotis septentrionalis/ Vespertilionidae/ Chiroptera/ Microchiroptera/ terrestrial ecology/ bat activity monitoring/ Alberta/ boreal forest/ foods-feeding/ forests/ ecosystems/ forestry practices/ habitat alterations/ habitat management/ habitat use/ Peace River vicinity/ wildlife-human relationships/ Canada/ commercial enterprises/ conservation/ wildlife management/ disturbances/ land zones/ nutrition/ Microchiroptera/ silviculture/ boundary/ habitat/ activity/
Abstract: Previous studies have shown that bat activity is greater along forest-clearcut edges than in the center of clearcuts or in the forest interior. Residual patches of trees in logged areas may also provide habitat for bats. To investigate this, we monitored bat activity at three locations within cutblocks: along the outside edge of the forest cutblock, in the center of the clearcut portion of the cutblock and along the outside edge of the residual patches of trees, at the EMEND (Ecosystem Management by Emulating Natural Disturbance) study site in northern Alberta, during the summer of 2000. Our results indicate that small maneuverable species such as Myotis lucifugus and M. septentrionalis were equally active along the edge of residual patches and the forest edge of cutblocks and least active in the center of cutblocks. Larger species, such as Lasionycteris noctivagans, showed no preference. Thus, patches of residual trees provide commuting habitat, and potentially foraging habitat, for bats.
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1337. **Use of farmland riparian strips by declining and crop damaging birds.**
Deschenes, M.; Belanger, L.; and Giroux, J. F.
Agriculture, Ecosystems and Environment 95(2-3): 567-577. (2003)
NAL Call #: S601.A34; ISSN: 01678809
Descriptors: bird conservation/ crop damage/ farmland/ Quebec/ riparian habitats/ agricultural land/ behavioral ecology/ birds/ crop damage/ riparian vegetation/ species conservation/ Canada
Abstract: Riparian strips prevent river bank erosion, help to maintain water quality, and contribute to the maintenance of biodiversity in agro-ecosystems. These areas are often perceived by farmers as potential breeding habitats of animals and plants that are harmful to crops. Consequently, the vegetation in riparian strips is periodically subjected to grazing, mowing, burning and/or herbicide spraying. Bird use was compared among six types of farmland riparian strips (grazed, grassy herbaceous, non-grassy herbaceous, low shrubby, tall shrubby, and wooded) in the agricultural landscape of southern Quebec (Canada). These strip types constituted a gradient with respect to plant diversity, vegetal structure, and plant cover control or disturbance. The objectives of this study were to document the avian communities of these riparian strip habitats to determine (1) their respective contribution to bird conservation and (2) their role as potential breeding habitats for crop damaging bird species. Bird abundance and species richness were greater in the wooded and tall shrubby strips than in the other riparian strips. Abundance of crop damaging species was significantly greater in wooded strips than in any other type; however, Red-winged Blackbirds, the most abundant bird species recorded and the species most likely to damage crops in the study area, did not differ in abundance among the six strip types, nor in adjacent crop fields. Diversified riparian strip habitats that include trees and tall shrubs can contribute to the preservation of avian diversity in agricultural landscapes, without providing significant breeding habitats for birds harmful to agriculture.
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1338. **Use of group-selection and seed-tree cuts by three early-successional migratory species in Arkansas.**
Alterman, Lynn E.; Bednarz, James C.; and Thill, Ronald E.
Wildlife Biology 117(4): 353-363. (2005)
NAL Call #: SK351.W663; ISSN: 0043-5643
Descriptors: commercial activities/ conservation measures/ reproduction/ ecology/ terrestrial habitat/ land zones/ Dendroica discolor/ Icteria virens/ Passerina cyanea: forestry/ Practices/ abundance/ habitat use and nesting success relations/ management implications/ habitat management/ reproductive productivity/ nesting success/ population dynamics/ habitat utilization/ forest and woodland/ mixed forest habitat/ Arkansas/ Ouachita National Forest/ Aves, Passeriformes, Emberizidae/ birds/ chordates/ vertebrates
Abstract: Silviculture in the Ouachita National Forest in Arkansas and Oklahoma has shifted in recent years from mostly even-aged management to a mix of even- and uneven-aged regeneration systems, including group-selection. Researchers have described presence/absence of early-successional bird species in forest openings created by even- and uneven-aged silviculture, but few have examined nest success. We examined occupancy and nest success of three early-successional species- Indigo Bunting (Passerina cyanea), Yellow-breasted Chat (Icteria virens), and Prairie Warbler (Dendroica discolor)- within 6- and 7-year-old openings created by group-selection (uneven-aged, =0.8 ha) and seed-tree (even-aged, 11-16 ha) cuts in Arkansas. We found 54 Indigo Bunting nests in openings created by seed-tree cuts and 28 in openings created by group-selection cuts (hereafter "seed-tree stands" and "group-selection stands," respectively). We found 50 Yellow-breasted Chat nests in seed-tree stands, but only 2 were found in group-selection stands. We found 14 Prairie Warbler nests in seed-tree and none in group-selection stands. Mayfield nest success for Indigo Bunting was 30.9% in seed-tree stands and 41.9% in group-selection openings, but there was no difference in daily nest survival (0.952 +/- 0.009 and 0.964 +/- 0.010, respectively; [chi]2 = 0.792, P = 0.37). Our data suggest that Indigo Buntings can nest successfully in both regenerating seed-tree and group-selection stands; however, group-selection openings may be too small to support nesting Yellow-breasted Chats and Prairie Warblers. Public concerns about clear-cutting have resulted in increased use of uneven-aged management by the USDA Forest Service. However, before widespread implementation of group-selection cutting, additional research should be conducted to evaluate the effects of this management strategy on Neotropical migratory bird communities.
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1339. **Use of mixedwood stands by wintering white-tailed deer in southern New Brunswick.**
Sabine, D. L.; Ballard, W. B.; Forbes, G.; Bowman, J.; and Whitlaw, H.
Forestry Chronicle 77(1): 97-103. (2001)
NAL Call #: 99.8 F7623; ISSN: 0015-7546
Descriptors: availability/ browse/ forest plantations/ forests/ habitat selection/ mixed forests/ seasonal variation/ wild animals/ wildlife management/ winter/
Odocoileus virginianus
Abstract: On the northern edge of their range, white-tailed deer (Odocoileus virginianus) congregate during winter to cope with severe climate conditions. The winter habitat use of deer was documented in southern New Brunswick, Canada, during December 1993-April 1997, where winters are of moderate severity, and tested predictions concerning the influence of food and cover availability on habitat use by deer under different snow depth regimes. Sixty-three radio-collared deer were monitored during the winters of 1995-97. Within wintering areas, deer showed a preference for mixedwoods. Mixedwood stands provided only moderate amounts of food and cover relative to some other cover types, but were the only type to provide both simultaneously. Current habitat management guidelines in parts of northeastern North America consider critical habitat for wintering deer to be softwood-dominated stands. These guidelines may not provide adequate habitat in this region, since deer appear to use mixedwood stands under some conditions.
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1340. **The use of sheep in forest vegetation management.**
Newsome, T.
FRDA Report 251: 67-74. (Sept. 1996)
NAL Call #: SD14.B7F7; ISSN: 0835-0752.
Notes: Literature review.
Descriptors: forests/ sheep/ predation/ plant communities/ weeds/ grasses/ weed control/ Epilobium angustifolium/ Poaceae/ Populus tremuloides/ Salix/ Valeriana/ seedlings/ wildlife/ plant competition/ feeding preferences/ grazing/ diameter/ British Columbia
This citation is from AGRICOLA.

1341. **Using a GIS model to assess terrestrial salamander response to alternative forest management plans.**
Gustafson, Eric J.; Murphy, Nathan L.; and Crow, Thomas R.
Journal of Environmental Management 63(3): 281-292. (2001)
NAL Call #: HC75.E5J6 ; ISSN: 0301-4797.
http://nrs.fs.fed.us/pubs/jrnl/2001/nc_2001_Gustafson_001.pdf
Descriptors: spatial models/ GIS/ forest management/ risk assessment/ terrestrial salamanders/ timber
Abstract: A GIS model predicting the spatial distribution of terrestrial salamander abundance based on topography and forest age was developed using parameters derived from the literature. The model was tested by sampling salamander abundance across the full range of site conditions used in the model. A regression of the predictions of our GIS model against these sample data showed that the model has a modest but significant ability to predict both salamander abundance and mass per unit area. The model was used to assess the impacts of alternative management plans for the Hoosier National Forest (Indiana, USA) on salamanders. These plans differed in the spatial delineation of management areas where timber harvest was permitted, and the intensity of timber harvest within those management areas. The spatial pattern of forest openings produced by alternative forest management scenarios based on these plans was projected over 150 years using a timber-harvest simulator (HARVEST). We generated a predictive map of salamander abundance for each scenario over time, and summarized each map by calculating mean salamander abundance and the mean colonization distance (average distance from map cells with low predicted abundance to those with relatively high abundance). Projected salamander abundance was affected more by harvest rate (area harvested each decade) than by the management area boundaries. The alternatives had a varying effect on the mean distance salamanders would have to travel to colonize regenerating stands. Our GIS modeling approach is an example of a spatial analytical tool that could help resource management planners to evaluate the potential ecological impact of management alternatives.
This citation is from Treesearch.

1342. **Using conservation plans and bird monitoring to evaluate ecological effects of management: An example with fuels reduction activities in southwest Oregon.**
Alexander, John D.; Seavy, Nathaniel E.; and Hosten, Paul E.
Forest Ecology and Management 238(1-3): 375-383. (2007)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ Aves: forestry/ ecological impact assessment/ conservation measures/ conservation plans/ forest management activities/ habitat management/ community structure/ environmental indicators/ forest and woodland/ management activities ecological impact assessment/ birds/ chordates/ vertebrates
Abstract: Increasingly, regional conservation plans are using information about how animals respond to changes in habitat characteristics to provide guidelines for management. However, the ability of these plans to effectively guide management remains largely untested. To test a regional bird conservation plan developed by Partners in Flight, we compared bird abundance in untreated stands to that of stands where shrub cover had been reduced to lower the risk of fire. We used these data to evaluate whether birds identified as focal species in the conservation plan increased or decreased in abundance as a result of the treatments. Over a two-year period, two of 12 Partners in Flight oak woodland and chaparral focal species were more abundant at treated units in both years; no species were consistently less abundant at treated units in both years. These results suggest small-scale (7-42 ha) treatments are consistent with the objectives identified in the Partners in Flight regional conservation plan because they benefited species associated with edges, but did not have negative effects on shrub-associated species. We suggest that this is a result of the small size of treatments and the retention of shrub patches in treated areas. An alternative explanation is that the bird/habitat relationships used to develop the conservation plans do not apply in this study area. We tested this hypothesis by comparing the

correlations between habitat characteristics and bird abundance with the information in the conservation plans. In all but one case, the direction of the correlation agreed with information in the conservation plan. This project illustrates that even though the ability of conservation plans to predict the ecological effects of management activities may be limited, they can play an important role in interpreting the results of ecological monitoring.
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1343. **Using ground foraging ant (Hymenoptera: Formicidae) functional groups as bioindicators of forest health in northern Arizona ponderosa pine forests.**
Stephens, S. S. and Wagner, M. R.
Environmental Entomology 35(4): 937-949. (2006)
NAL Call #: QL461.E532; ISSN: 0046225X
Descriptors: bioindicators/ forest health/ Formicidae/ functional groups
Abstract: Reintroduction of fire and thinning have been suggested as the main practices to regain forest health in ponderosa pine forests of northern Arizona. Recent silvicultural programs and the occurrence of catastrophic wildfires have created a range of disturbance severities and a mosaic of forest conditions. Sixteen stands were randomly selected to create a completely randomized experimental design with four treatments, (1) unmanaged, (2) thinned, (3) thinned and burned, and (4) wildfire, with four replicates of each treatment. We assessed changes occurring in ground foraging ant functional groups at the stand scale as related to these treatments. A pitfall trapping scheme was implemented during the summer months of 2002 and 2003. A total of 18,009 specimens were collected representing 20 species from 10 genera. We found that traditional biodiversity measures, such as species richness, diversity, and dominance were a less satisfactory measure of treatment impact on ants than functional group analysis, which allowed us to consider the ecosystem role of each species. We found that different functional groups were dominant under different levels of disturbance severity and suppressed or excluded other functional groups that were less suited to the disturbance intensity. Maintaining a diversity of habitat types is suggested for supporting ecologically diverse ant functional groups and improve forest health. © 2006 Entomological Society of America.
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1344. **Using individual tree selection silviculture to restore northern goshawk habitat: Lessons from a southwestern study.**
Shepperd, Wayne D.; Asherin, Lance A.; and Edminster, Carlton B.
In: Beyond 2001: A silvicultural odyssey to sustaining terrestrial and aquatic ecosystems? Proceedings of the 2001 National Silvicultural Workshop, General Technical Report-PNW 546; Portland, OR: Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture, 2002. pp. 1-9.
Notes: 0363-6224 (ISSN); Workshop held May 6-10, 2002 at Hood River, OR.
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ land zones/ Accipiter gentilis atricapillus: forestry/ Individual tree selection silviculture/ habitat management/ habitat restoration/ use of individual tree selection silviculture evaluation/ forest and woodland/ Arizona/ Kaibab Plateau/ Aves, Falconiformes, Accipitridae/ birds/ chordates/ vertebrates
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1345. **Using objective function penalties to elicit owl and late seral capabilities.**
Fletcher, L. Russell
In: Seventh Symposium on Systems Anaylsis in Forest Resources, General Technical Report-NC 205; St. Paul, MN: North Central Forest Experiment Station, Forest Service, U.S. Department of Agriculture, 2000. pp. 122-129.
Notes: ISSN: 0363-616X.
http://www.ncrs.fs.fed.us/pubs/gtr/other/gtr-nc205/pdffiles/p46.PDF
Descriptors: commercial activities/ conservation measures/ techniques/ terrestrial habitat/ land and freshwater zones/ Strix occidentalis caurina (Strigidae): forestry/ habitat management/ ecological techniques/ forest and woodland/ California/ forest habitat conditions/ modeling/ long term forest management plan/ Strigidae/ Strigiformes, Aves/ birds/ chordates/ vertebrates
Abstract: This paper addresses the issues of modeling northern spotted owl (Strix occidentalis caurina) habitat and late seral conditions within the long-term forest ecosystem management plan. The results presented here are from management plans constructed for several large northern California management units using the ecosystem planning express, or Ep(x) analysis process developed by VESTRA Resources. Before incorporation of the owl and seral policy constraints into the final preferred alternative linear program run, we first developed a set of strategies and objective function formulations designed to elicit owl and late seral acres for various periods in the planning horizon, primarily to see what the model was capable of producing in those periods or groups of periods. Final policy constraints were then revised based on this knowledge. The results of this strategy were that the landowner and wildlife policy analysts were able to more efficiently converge on the objectives of timber harvest and wildlife protection, and to save countless hours of linear programming run time.
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1346. **Variability in vegetation effects on density and nesting success of grassland birds.**
Winter, M.; Johnson, D. H.; and Shaffer, J. A.
Journal of Wildlife Management 69(1): 185-197. (2005)
NAL Call #: 410 J827; ISSN: 0022541X.
Notes: doi: 10.2193/0022-541X(2005)069<0185:VIVEOD>2.0.CO;2.
Descriptors: bobolink/ clay-colored sparrow/ density/ Dolichonyx oryzivorus/ nesting success/ Passerculus sandwichensis/ Savannah sparrow/ Spizella pallida/ tallgrass prairie/ variability/ vegetation structure/ grassland/ habitat management/ nesting success/ population density/ vegetation dynamics/ vegetation structure/ Aves/ Dolichonyx oryzivorus/ Galliformes/ Passerculus sandwichensis/ Spizella pallida
Abstract: The structure of vegetation in grassland systems, unlike that in forest systems, varies dramatically among years on the same sites, and among regions with similar vegetation. The role of this variation in vegetation structure on bird density and nesting success of grassland birds is poorly understood, primarily because few studies have

included sufficiently large temporal and spatial scales to capture the variation in vegetation structure, bird density, or nesting success. To date, no large-scale study on grassland birds has been conducted to investigate whether grassland bird density and nesting success respond similarly to changes in vegetation structure. However, reliable management recommendations require investigations into the distribution and nesting success of grassland birds over larger temporal and spatial scales. In addition, studies need to examine whether bird density and nesting success respond similarly to changing environmental conditions. We investigated the effect of vegetation structure on the density and nesting success of 3 grassland-nesting birds: clay-colored sparrow (Spizella pallida), Savannah sparrow (Passerculus sandwichensis), and bobolink (Dolichonyx oryzivorus) in 3 regions of the northern tallgrass prairie in 1998-2001. Few vegetation features influenced the densities of our study species, and each species responded differently to those vegetation variables. We could identify only 1 variable that clearly influenced nesting success of 1 species: clay-colored sparrow nesting success increased with increasing percentage of nest cover from the surrounding vegetation. Because responses of avian density and nesting success to vegetation measures varied among regions, years, and species, land managers at all times need to provide grasslands with different types of vegetation structure. Management guidelines developed from small-scale, short-term studies may lead to misrepresentations of the needs of grassland-nesting birds.
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1347. **Variation in fire regimes of the Rocky Mountains: Implications for avian communities and fire management.**
Saab, Victoria A.; Powell, Hugh D.; Kotliar, Natasha B.; and Newlon, Karen R.
Studies in Avian Biology 30: 76-96. (2005)
NAL Call #: QL671.S8; ISSN: 0197-9922.
Notes: Literature review.
Descriptors: conservation measures/ ecology/ terrestrial habitat/ abiotic factors/ physical factors/ land zones/ habitat management/ fire management/ forest and woodland/ mountain forests/ United States/ Rocky Mountains/ Aves/ birds/ chordates/ vertebrates
Abstract: Information about avian responses to fire in the U.S. Rocky Mountains is based solely on studies of crown fires. However, fire management in this region is based primarily on studies of low-elevation ponderosa pine (Pinus ponderosa) forests maintained largely by frequent understory fires. In contrast to both of these trends, most Rocky Mountain forests are subject to mixed severity fire regimes. As a result, our knowledge of bird responses to fire in the region is incomplete and skewed toward ponderosa pine forests. Research in recent large wildfires across the Rocky Mountains indicates that large burns support diverse avifauna. In the absence of controlled studies of bird responses to fire, we compared reproductive success for six cavity-nesting species using results from studies in burned and unburned habitats. Birds in ponderosa pine forests burned by stand-replacement fire tended to have higher nest success than individuals of the same species in unburned habitats, but unburned areas are needed to serve species dependent upon live woody vegetation, especially foliage gleaners. Over the last century, fire suppression, livestock grazing, and logging altered the structure and composition of many low-elevation forests, leading to larger and more severe burns. In higher elevation forests, changes have been less marked. Traditional low-severity prescribed fire is not likely to replicate historical conditions in these mixed or high-severity fire regimes, which include many mixed coniferous forests and all lodgepole pine (Pinus contorta) and spruce-fir (Picea-Abies) forests. We suggest four research priorities: (1) the effects of fire severity and patch size on species' responses to fire, (2) the possibility that postfire forests are ephemeral sources for some bird species, (3) the effect of salvage logging prescriptions on bird communities, and (4) experiments that illustrate bird responses to prescribed fire and other forest restoration methods. This research is urgent if we are to develop fire management strategies that reduce fire risk and maintain habitat for avifauna and other wildlife of the Rocky Mountains.
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1348. **Viability of Bell's sage sparrow (Amphispiza belli ssp. belli): Altered fire regimes.**
Akcakaya, H. R.; Franklin, J.; Syphard, A. D.; and Stephenson, J. R.
Ecological Applications 15(2): 521-531. (2005)
NAL Call #: QH540.E23; ISSN: 10510761
Descriptors: Amphispiza belli ssp. belli/ coastal subshrub vegetation/ dynamic spatial structure/ fire rotation interval/ habitat model/ landscape model/ metapopulation/ sage sparrow/ San Diego County, California/ Viability/ fire history/ habitat management/ passerines/ population modeling/ population viability analysis/ California
Abstract: We modeled the viability of a Bell's Sage Sparrow (Amphispiza belli ssp. belli) metapopulation under different fire regimes in the foothills and mountains of San Diego County, California, USA. The approach integrates a landscape model, which predicts the vegetation composition and age under three fire regimes, a habitat model, which interprets the resulting landscape in terms of its suitability for the Sage Sparrow, and a metapopulation model, which predicts the viability of the species based on a dynamic spatial structure as determined by the landscape and the habitat models. Bell's Sage Sparrow depends on early-successional shrubland (chaparral) habitat, especially when the availability of preferred open coastal subshrub vegetation is limited. The three fire rotation intervals (FRI) used in the landscape model were "current" (30-yr), representing the effect of increased human ignitions; "natural" (90-yr), representing the historic shrubland fire regime at higher elevations without the effect of human ignitions; and "long" (150-yr), representing a hypothetical endpoint (very low fire frequency for southern California shrublands). The results indicated that the viability of the Sage Sparrow was highest under the "current" fire regime scenario, slightly lower (especially when population growth rate was low) under the "natural" scenario, and lowest under the "long" fire regime scenario. © 2005 by the Ecological Society of America.
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1349. **Vole use of coarse woody debris and implications for habitat and fuel management.**
Ucitel, Dalit; Christian, Donald P.; and Graham, Jonathan M.
Journal of Wildlife Management 67(1): 65-72. (2003)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: conservation measures/ ecology/ terrestrial habitat/ land zones/ Clethrionomys gapperi: habitat management/ habitat utilization/ coarse woody debris in forest/ management significance/ forest and woodland/ Coniferous forest/ Montana/ Missoula County/ Mammalia, Rodentia, Muridae/ chordates/ mammals/ rodents/ vertebrates
Abstract: Woody debris is an increasing management focus in forests, representing multiple and sometimes conflicting values. Fuel management may prioritize removal of coarse woody debris (CWD) to minimize wildfire occurrence, intensity, or both. Conversely, management for wildlife habitat or other ecological values often focuses on retention of CWD. We modeled and quantified CWD use by red-backed voles (Clethrionomys gapperi), tested whether voles move selectively in portions of forest stands with greater CWD, and correlated stand-level measures of CWD as habitat to fuel loads, providing a basis of comparison for CWD quantitative guidelines. Voles used CWD at a greater rate than expected based on availability and traveled in portions of stands with greater CWD coverage (21-27 trails made by individual voles in each of 5 forest stands). A strong correlation between stand-measure CWD coverage and fuel-load measure (r = +0.96) provides a basis for comparing CWD guidelines. We concluded that current guidelines from different research fields disagree. Only 2 of the 5 stands we sampled fit with guidelines for fuel management and ectomycorrhizae in the northern Rocky Mountains. Coarse woody debris coverage in all of our stands was well below recommendations for small mammals in coastal forests.
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1350. **Why are Black Hills whitetails declining?**
DePerno, Christopher S.; Jenks, Jonathan; Griffin, Steven L.; and Rice, Leslie A.
South Dakota Conservation Digest 67(1): 13-15. (2000); ISSN: 0038-3279
Descriptors: Odocoileus virginianus/ agricultural practices/ aspen/ behavior/ diurnal rhythm/ ecosystems/ food supply/ forestry practices/ forests, coniferous/ forests, mixed/ habitat alterations/ habitat management/ habitat surveys/ habitat use/ mammals/ microhabitat/ mortality/ nutrition/ overwintering/ ponderosa pine/ roads/ seasonal activities/ starvation/ telemetry/ urbanization/ white spruce/ wildlife/ livestock/ white-tailed deer/ South Dakota: Pennington and Lawrence Counties/ Wyoming: Crook and Weston Counties
Abstract: The decline of white-tailed deer herds in the Black Hills of South Dakota and far eastern Wyoming are due to habitat deterioration. Researchers have gathered information that will: aid the understanding of microhabitats used by deer; provide necessary insight into the quantity of forage biomass present on the landscape; help identify reasons for the decline of the white-tailed deer population; and aid in identifying forest management practices that could improve habitat quality and stabilize or increase the white-tailed deer herd in the study area.
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1351. **Wildlife and invertebrate response to fuel reduction treatments in dry coniferous forests of the western United States: A synthesis.**
Pilliod, D. S.; Bull, E. L.; Hayes, J. L.; and Wales, B. C.
Provo, UT: Rocky Mountain Research Station, Forest Service, U.S. Department of Agriculture; General Technical Report-RMRS 173, 2006. 34 p.
Notes: 02775786 (ISSN).
Descriptors: dry coniferous forests/ fuel reduction/ habitat/ invertebrates/ prescribed fire/ thinning/ United States, western region/ wildlife
Abstract: This paper synthesizes available information on the effects of hazardous fuel reduction treatments on terrestrial wildlife and invertebrates in dry coniferous forest types in the West. We focused on thinning and/or prescribed fire studies in ponderosa pine (Pinus ponderosa) and dry-type Douglas-fir (Pseudotsuga menziesii), lodgepole pine (Pinus contorta), and mixed coniferous forests. Overall, there are tremendous gaps in information needed to evaluate the effects of fuel reduction on the majority of species found in our focal area. Differences among studies in location, fuel treatment type and size, and pre- and post-treatment habitat conditions resulted in variability in species responses. In other words, a species may respond positively to fuel reduction in one situation and negatively in another. Despite these issues, a few patterns did emerge from this synthesis. In general, fire-dependent species, species preferring open habitats, and species that are associated with early successional vegetation or that consume seeds and fruit appear to benefit from fuel reduction activities. In contrast, species that prefer closed-canopy forests or dense understory, and species that are closely associated with those habitat elements that may be removed or consumed by fuel reductions, will likely be negatively affected by fuel reductions. Some habitat loss may persist for only a few months or a few years, such as understory vegetation and litter that recover quickly. The loss of large-diameter snags and down wood, which are important habitat elements for many wildlife and invertebrate species, may take decades to recover and thus represent some of the most important habitat elements to conserve during fuel reduction treatments. Management activities that consider the retention of habitat structures (such as snags, down wood, and refugia of untreated stands) may increase habitat heterogeneity and may benefit the greatest number of species in the long run.
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1352. **Wildlife conservation in agroforestry buffer zones: Opportunities and conflict.**
Naughton Treves, Lisa and Salafsky, Nick
In: Agroforestry and biodiversity conservation in tropical landscapes/ Schroth, G.; Fonseca, G. A.; Harvey, C. A.; Gascon, C.; Vasconcelos, H. L.; and Izac, A. M., 2004.
Notes: 1559633565 (ISBN).
Descriptors: commercial activities/ conservation measures/ terrestrial habitat/ comprehensive zoology: farming and agriculture/ wildlife conservation/ agroforestry buffer zones/ forestry/ habitat management/ forest and woodland
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1353. **Wildlife habitat management: Concepts and applications in forestry.**
McComb, Brenda C.
Boca Raton, FL: CRC Press; 319 pp. (2007).
Notes: Chapters include: Silviculture and Habitat Management: Uneven-Aged Systems; Silviculture and Habitat Management: Even-Aged Systems; Riparian Area Management; Dead Wood Management
NAL Call #: QL82.M33 2007; ISBN: 9780849374890.
Descriptors: wildlife habitat improvement/ forest management/ wildlife management
Abstract: Emphasizes increased communication between disciplines and cooperative approaches to management; demonstrates the Landscape Management Systems Model for illustrating habitat change under alternative management approaches; presents case studies using real data from varying forest types from across the United States and Canada; includes more than 150 figures and examples from forests across North America; discusses adaptive management and dynamic forest planning to meet habitat objectives.
This citation is from AGRICOLA.

1354. **Wildlife habitat management practices on private non-industrial forestlands.**
Bottorff, J.
In: Managing for wildlife habitat in westside production forests, General Technical Report-PNW 695/ Harrington, T. B. and Nicholas, G. E.; Portland, OR: Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture, 2007. pp. 61-64.
Notes: 08874840 (ISSN).
Descriptors: coarse woody debris/ habitat management practices/ non-industrial private forestlands/ wildlife trees
Abstract: Non-industrial private forestlands (NIPF), also known as family-owned forests or family forests, represent one of the bigger challenges facing forestland managers (including timber harvesters, foresters, and forest wildlife biologists) in Washington State and probably beyond. Those practicing traditional forestry (timber harvest based revenue production) may be particularly challenged, and professionally rewarded, when working with NIPF landowners due to the combination of diverse past site management and highly variable landowner objectives. Many of these objectives may or may not be related to forest management and income production (Gootee 2004). One of the biggest impediments to effective wildlife habitat management is getting the practicing forestland managers to understand the objectives and recognize opportunities to protect, enhance, and create wildlife habitat. There may be a professional/personal conflict with accepting and implementing landowner wildlife objectives as co-equal with timber management and especially as a primary objective. Perkey (1989) stated it succinctly: "those of us involved with management of the private non-industrial forest must learn to use our silvicultural knowledge effectively to accomplish non-silvicultural landowner objectives, including wildlife habitat management." These challenges are continuing to be met through the Forest Stewardship Program (FSP) now within the Small Forest Landowner Office (SFLO) of the Washington State Department of Natural Resources (DNR). The wildlife goal of the FSP has been to implement practices that protect, enhance, and even create wildlife habitat in conjunction with standard timber management activities and done in such a way that is cost effective for the landowner and easily learned by the onsite forest worker. Most of the techniques are based on well-documented long-term observations and emerging science. For effective development and implementation of wildlife habitat practices it is essential to understand the background and motivation of these forestland owners and the relationship of these forested parcels within the forested landscape.
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1355. **Wildlife management.**
Palmer, Bruce
In: Forest management for Missouri landowners/ Palmer, Bruce.
Jefferson City, MO: Missouri Department of Conservation, 2003; pp. 43-49.
http://mdc.mo.gov/documents/forest/private/forest_manag.pdf
Descriptors: wildlife/ forest management/ silvicultural practices/ Missouri

1356. **Wildlife management issues and opportunities in slash pine forests.**
Mengak, Michael T. and Castleberry, Steven B.
In: Slash Pine: Still Growing and Growing! Proceedings of the Slash Pine Symposium, General Technical Report-SRS 76/ Dickens, E. D.; Barnett, J. P.; Hubbard, W. G.; and Jokela, E. J.; Asheville, NC: Southern Research Station, Forest Service, U.S. Department of Agriculture, 2004. pp. 79-83.
Notes: Symposium held at Jekyll Island, Georgia.
http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs076.pdf
Descriptors: commercial activities/ ecology/ terrestrial habitat/ land zones/ comprehensive zoology: forestry/ slash pine timber production/ wildlife management/ conservation measures/ slash pine forests/ habitat utilization/ forest and woodland/ United States, southeastern region
Abstract: The slash pine (Pinus elliottii)-longleaf pine (P. palustris) cover type currently occupies over 13 million acres (8.7 percent of total forested acres) in the southeastern United States. Despite the large acreage and numerous studies in longleaf forests, only a limited number of studies have examined wildlife utilization and management of slash pine stands. Natural slash pine sites are low in soil phosphorous and have low potential as white-tailed deer (Odocoileus virginianus) habitat. Regular prescribed fire improves the palatability and nutritional content of forage for deer. Similarly, thinning and burning slash pine plantations improves habitat for turkey (Meleagris galapavo) and quail (Colinus virginianus). The gopher tortoise (Gopherus polyphemus) is a keystone species found in the slash pine ecosystem. Burrows dug by gopher tortoises are used by over 50 other species of vertebrates and invertebrates. The flatwoods salamander (Ambystoma cingulatum), a federally threatened species, has experienced a rangewide population decline that is thought to be related to habitat conversion and fragmentation as longleaf pine stands are converted to slash and loblolly pine. Management for slash pine and wildlife are compatible but managers and landowners should manipulate vegetation to mimic natural conditions. Unfortunately, few studies examine the financial trade-offs between timber production and wildlife.
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1357. **Wildlife response to salmon habitat enhancements on the Bear River, southwest Washington.**
MacCracken, James G.
Northwestern Naturalist 81(2): 82. (2000)
NAL Call #: QL671.M8; ISSN: 1051-1733
Descriptors: Castor canadensis/ habits-behavior/ ecosystems/ forestry practices/ forests, coniferous/ habitat alterations/ habitat use/ mammals/ management/ red alder/ wildlife/ wildlife-habitat relationships/ beavers/ Alnus oregona/ Alnus spp./ Washington, southwestern area
Abstract: In 1997, large wood was added to 13 sites in the Bear River of southwest Washington and four kilometes of riparian red alder (Alnus rubra) forest were thinned and planted to conifer. Small mammal and amphibian abundance was similar (P=0.45) between thinned and control red alder stands from 1997-99. Beaver (Castor canadensis) activity increased and dam construction was often associated with an introduced large wood structure.
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1358. **Wildlife species associated with non-coniferous vegetation in Pacific Northwest conifer forests: A review.**
Hagar, J. C.
Forest Ecology and Management 246(1 SPEC. ISS.): 108-122. (2007)
NAL Call #: SD1.F73; ISSN: 03781127.
Notes: doi: 10.1016/j.foreco.2007.03.054.
Descriptors: biodiversity/ broad-leaved trees/ forest management/ forest understory/ wildlife habitat
Abstract: Non-coniferous vegetation, including herbs, shrubs, and broad-leaved trees, makes a vital contribution to ecosystem function and diversity in Pacific Northwest conifer forests. However, forest management has largely been indifferent or detrimental to shrubs and trees that have low commercial value, in spite of a paradigm shift towards more holistic management in recent decades. Forest management practices that are detrimental to broad-leaved trees and shrubs are likely to decrease habitat diversity for wildlife, but the number of species that may be affected has not previously been enumerated. I reviewed life history accounts for forest-dwelling vertebrate wildlife species and derived a list of 78 species in Oregon and Washington that are associated with non-coniferous vegetation. The diversity of direct and indirect food resources provided was the primary functional basis for associations of most species with non-coniferous vegetation. Thus, a diversity of herbs and broad-leaved trees and shrubs provides the foundation for food webs that contribute to diversity at multiple trophic levels in Pacific Northwest conifer forests. Given the number of species associated with non-coniferous vegetation in conifer-dominated forests, maintaining habitats that support diverse plant communities, particularly broad-leaved trees and shrubs, will be an important component of management strategies intended to foster biodiversity. Silvicultural practices such as modified planting densities, and pre-commercial and commercial thinning, can be used to control stand density in order to favor the development of understory herbs, shrubs, and a diversity of tree species within managed stands. Allowing shrubs and hardwood trees to develop and persist in early seral stands by curtailing vegetation control also would benefit many species associated with non-coniferous vegetation.
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1359. **Winter bird community differences among methods of bottomland hardwood forest restoration: Results after seven growing seasons.**
Hamel, P. B.
Forestry 76(2): 189-197. (2003); ISSN: 0015-752X.
http://www.srs.fs.usda.gov/pubs/ja/ja_hamel005.pdf
Descriptors: Aves/ birds/ winter/ season/ biocenosis/ forest/ abundance/ diversity/ experiment/ vegetation/ succession/ Mississippi
Abstract: Forest community restoration in the primarily agricultural landscape of the Lower Mississippi Alluvial Valley (LMAV), USA, has been initiated for recreational, economic and biological objectives, including provision of habitat for migratory birds of late successional stands. A long-term demonstration experiment of succession under several afforestation treatments was established at the beginning of the 1995 growing season. Winter bird communities of these plots were sampled using area-search techniques. Abundance and distribution among treatments were compared for a total of 62 bird species observed in winters 1998/1999 to 2001/2002. Four to seven growing seasons after establishment, bird communities in stands of fast-growing trees (Populus deltoides) contained twice as many species as those in treatments involving slower-growing trees. The differences resulted from the addition of generalist forest-canopy-dwelling species to that suite of avian species of early successional habitats. These results confirmed accepted theory that considers vegetation structure to be a primary determinant of bird species occurrence and community composition. [from paper]
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1360. **Winter habitat ecology of mountain caribou in relation to forest management.**
Terry, Eliot L.; Mclellan, Bruce N.; and Watts, Glen S.
Journal of Applied Ecology 37(4): 589-602. (2000)
NAL Call #: 410 J828; ISSN: 0021-8901
Descriptors: Rangifer tarandus caribou/ Rangifer tarandus/ behavior/ ecosystems/ fir/ foods-feeding/ forestry practices/ forests, coniferous/ forests, old-growth/ habitat management/ habitat use/ mammals/ montane habitat/ overwintering/ succession/ wildlife-habitat relationships/ Caribou/ dispersion/ desert habitat/ winter/ silviculture/ mountain caribou/ subalpine fir/ Canada/ British Columbia
Abstract: 1. During winter, mountain caribou live in late successional and old-growth coniferous forests, where they feed almost exclusively on arboreal lichens. Because some of these forests are also valuable to the forest industry, caribou ecology and forest management remains a central conservation issue in British Columbia. To improve the understanding of caribou habitat use in relation sto forest management, the authors investigated the winter habitat selection patterns of mountain caribou at a range of spatial scales between 1988 and 1993 in the northern Cariboo Mountains, British Columbia. 2. Within winter ranges, caribou selected forest stands dominated by subalpine fir (>80% Abies lasiocarpa) and with moderate slopes 16-

30%) during early winter (November and December). Although stands with moderately high timber volumes were used the most during early winter, caribou used these stands in proportion to their availability. Caribou primarily used open-canopy sub-alpine fir stands (i.e. parkland) later in the winter (January-March), where low stocking and inoperable time volumes reduced direct conflicts with forest harvesting. 3. Characteristics of subalpine forests at early winter caribou foraging areas did not differ significantly from random sites for most variables measured. However, a multivariate analysis indicated that sites used by caribou had slightly less total basal area, more moderate slopes and slightly heavier lichen loads than unused sites. 4. Within early winter foraging areas, caribou chose foraging paths with more trees and greater accessible lichen biomass per standing tree compared with random paths. Although windthrown trees and lichen litterfall were encountered infrequently, caribou rarely rejected these sources of lichen when encounterd. 5. The relatively low basal area and minor component of economically valuable Engelmann spruce Picea engelmannii (<20%) at early winter caribou foraging areas suggests less conflicts with forestry compared with other caribou populations in southern British Columbia and Idaho. 6. Selection silvicultural systems may provide solutions to caribou-forestry conflicts, particularly in mid-elevation subalpine fir stands 1325-1525 m) that may have both operable timber volumes and high caribou numbers.
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1361. **Winter habitat selection by Canada lynx in Maine: Prey abundance or accessibility?**
Fuller, Angela K.; Harrison, Daniel J.; and Vashon, Jennifer H.
Journal of Wildlife Management 71(6): 1980-1986. (2007)
NAL Call #: 410 J827; ISSN: 0022-541X
Descriptors: Carnivora/ Felidae/ Lagomorpha/ Leporidae/ Lepus americanus/ Lynx canadensis/ food supply/ forests/ ecosystems/ forest harvest treatment/ forestry practices/ habitat alterations/ habitat management/ habitat use/ harvest treatment/ Lepus americanus/ Lynx canadensis/ Maine/ predators/ mammals/ foods-feeding/ mammalian prey density and accessibility/ density/ winter habitat preference/ wildlife-human relationships/ commercial enterprises/ conservation/ wildlife management/ diets/ disturbances/ land zones/ nutrition/ population ecology/ predation
Abstract: We. related winter habitat selection by Canada lynx (Lynx canadensis), relative abundance of snowshoe hares (Lepus americanus), and understory stem densities to evaluate whether lynx select stands with the greatest snowshoe hare densities or the greatest prey accessibility. Lynx (3 F, 3 M) selected tall (4.4-7.3 m) regenerating clear-cuts (11-26 yr postharvest) and established partially harvested stands (11-21 yr postharvest) and selected against short (3.4-4.3 m) regenerating clear-cuts, recent partially harvested stands (1-10 yr), mature second-growth stands (>40 yr), and roads and their edges (30 in on either side of roads). Lynx selected stands that provided intermediate to high hare density and intermediate cover for hares (i.e., prey access) but exhibited lower relative preference for stand types with highest hare densities where coniferous saplings exceeded 14,000 stems/ha.
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1362. **Winter habitat selection patterns of Merriam's turkeys in the southern Black Hills, South Dakota.**
Lehman, C. P.; Rumble, M. A.; and Flake, L. D.
Western North American Naturalist 67(2): 278-291. (2007)
NAL Call #: QH1.G7; ISSN: 15270904
Descriptors: Black Hills/ Farmstead/ habitat/ Meleagris gallopavo merriami/ Merriam's turkey/ ponderosa pine/ selection/ South Dakota/ wild turkey
Abstract: In northern areas of their expanded range, information on Merriam's turkeys (Meleagris gallopavo merriami) is lacking, specifically pertaining to wintering behavior and factors associated with winter habitat selection. Forest managers need detailed quantification of the effects of logging and other management practices on wintering habitats needed by Wild Turkeys and other wildlife. Therefore, we examined winter habitat selection patterns within ponderosa pine (Pinus ponderosa) forests and determined factors associated with use of farmsteads by Merriam's turkeys in the southern Black Hills, South Dakota. We radio-marked 86 female Merriam's turkeys (70 adults and 16 yearlings) and monitored them during winter (1 December-31 March), 2001-2004. Female Wild Turkeys used recently burned pine forest less than expected but selected farmsteads and stands of mature ponderosa pine (<70% overstory canopy cover, >22.9 cm diameter at breast height [DBH] trees) for foraging sites. Within forests, female Wild Turkeys selected foraging sites with less understory vegetation and visual obstruction, and larger-diameter ponderosa pine. Ponderosa pine seed abundance varied among years, and pine seeds were most abundant in stands of 30-35 cm DBH with basal area of 22-28 $m^2 \cdot ha^{-1}$. Abundance of pine seeds may have influenced use of farmsteads by Wild Turkeys, more so than ambient temperatures or snow depth. In the southern Black Hills, management should emphasize open- to mid-canopy and mature-structural-stage pine stands, where seed production was greatest. During winters when mast from pine is unavailable, farmsteads likely provide nutritional supplementation and may be important for maintaining Merriam's turkey populations.
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1363. **Winter habitat use by American marten, Martes americana, in western Alberta boreal forests.**
Proulx, Gilbert
Canadian Field Naturalist 120(1): 100-105. (2006)
NAL Call #: 410.9 Ot8; ISSN: 0008-3550
Descriptors: commercial activities/ conservation measures/ ecology/ terrestrial habitat/ land zones/ North America/ Canada/ Martes americana: forestry/ winter habitat use implications/ habitat management/ forestry management/ habitat utilization/ winter/ forest habitats/ forestry management implications/ forest and woodland/ winter habitat use/ Alberta/ Weyerhauser's Grande Prairie Forest Management Area/ Mammalia, Carnivora, Mustelidae/ carnivores/ chordates/ mammals/ vertebrates
Abstract: Although the American Marten (Martes americana) is found in most forest regions of Alberta, little is known about its choice of winter habitats. This study investigated winter habitat use by American Marten in Weyerhaeuser's Grande Prairie Forest Management Area (FMA) using snowtracking along 128.2 km of seismic lines inventoried in winters 1999, 2002, and 2005 with snowmobiles. American Marten tracks (n = 44) occurred significantly less frequently than expected (P 0.001) in

immature/young pole stands, but more frequently than expected (P 0.02) in mature/old growth mixedwood stands. American Martens apparently used young forests, and mature/old coniferous and deciduous stands, according to their availability. Forest development plans should be developed locally to retain late successional forests that meet the winter habitat requirements of American Marten.
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1364. **Wood thrush (Hylocichla mustelina) nesting ecology in relation to prescribed burning of mixed-oak forest in Ohio.**
Artman, V. L. and Downhower, J. F.
Auk 120(3): 874-882. (2003)
NAL Call #: 413.8 AU4 ; ISSN: 00048038
Descriptors: conservation status/ forest ecosystem/ passerines/ population decline/ prescribed burning/ restoration ecology/ United States/ Hylochichla mustelina/ Quercus
Abstract: Prescribed burning is increasingly being used to restore and maintain oak-dominated (Quercus spp.) forests in the eastern United States. We assessed effects of prescribed burning on the nesting ecology of the Wood Thrush (Hylocichla mustelina). Recent declines in Wood Thrush populations have prompted concern about their conservation status. Low-intensity surface fires in mixed-oak forests resulted in reductions in midstory vegetation, a documented habitat requirement for Wood Thrushes, but local population levels of Wood Thrushes did not differ between burned and unburned areas. Wood Thrushes inhabiting recently burned areas selected nest sites where leaf litter cover, fern cover, densities of shrubs and saplings, and moisture levels were higher and where fire intensity was lower in comparison to random sites. Wood Thrushes also placed their nests higher off the ground, and in taller and larger-diameter trees and shrubs, in burned than in unburned areas. Reproductive success did not differ between burned and unburned areas. However, successful nests were placed higher off the ground and in areas with lower densities of shrubs and saplings than unsuccessful nests in both burned and unburned areas. Prescribed burning appeared to have minimal effects on nesting ecology of Wood Thrushes, given their flexibility in nest placement, with no adverse consequences in terms of reproductive success. Local variation in fire intensity and moisture levels also maintained availability of suitable nesting habitat within burned areas. Continued monitoring would be appropriate to further assess the response of Wood Thrushes to prescribed burning, particularly in consideration of their conservation status and the uncertainty associated with potential long-term effects of habitat change.
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1365. **Wood thrush movements and habitat use: Effects of forest management for red-cockaded woodpeckers.**
Lang, J. D.; Powell, L. A.; Krementz, D. G.; and Conroy, M. J.
Auk 119(1): 109-124. (2002)
NAL Call #: 413.8 AU4 ; ISSN: 00048038
Descriptors: habitat management/ habitat use/ movement/ prescribed burning/ silviculture/ thinning/ United States/ Hylochichla mustelina/ Picoides borealis/ Pinus taeda
Abstract: We monitored adult and juvenile breeding-season movements and habitat use of radio-tagged Wood Thrushes (Hylocichla mustelina) at the Piedmont National Wildlife Refuge, central Georgia, USA. We investigated the effects that management for Red-cockaded Woodpeckers (Picoides borealis), thinning and burning >30 year old loblolly pine (Pinus taeda) habitat, had on Wood Thrushes, a ground-foraging and midstory-nesting species. Adult Wood Thrush pairs regularly moved long distances between nesting attempts (range 1 to 17,388 m). The only experimental effect we found on adult movements was a decrease in weekly emigration rates (Ψ) from thinned and burned compartments after silvicultural management. Adult males preferred riparian hardwoods with sparse to moderate cover and those preferences increased following management. Juveniles remained near their nest site ($\bar{x}$ = 177 m, SE = 113) for an average 24 days (SE = 6.3), and then dispersed a mean 2,189 m (SE = 342). Before dispersal, juveniles preferred upland hardwood - pine mixed habitat (P < 0.05) with moderate overstory cover (P < 0.05). We found no management effects on dispersal distances or predispersal habitat use. However, juveniles from thinned and burned compartments dispersed to hardwood habitats with dense cover, whereas birds from control compartments dispersed to pine-dominated habitats with sparse cover. All juveniles dispersed to areas with habitat similar to what they used before dispersal. Small-scale thinning and burning for Red-cockaded Woodpeckers may have had little effect on Wood Thrush habitat use and movements because typical movements were often larger than the scale (stand or compartment) targeted for management.
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1366. **Woodpecker abundance and tree use in uneven-aged managed, and unmanaged, forest in northern Maine.**
Gunn, John S. and Hagan, John M.
Forest Ecology and Management 126(1): 1-12. (2000)
NAL Call #: SD1.F73; ISSN: 0378-1127
Descriptors: Piciformes/ Picidae/ habits-behavior/ birds/ distribution/ ecosystems/ forestry practices/ forests, deciduous/ forests, old-growth/ habitat alterations/ habitat management/ habitat use/ management/ status/ wildlife/ woodpeckers/ abundance/ silviculture
Abstract: We studied abundance and tree use (foraging and drumming) of the cavity-nesting woodpecker guild (seven species) in northern Maine to assess effects of uneven-aged forest management (an irregular shelterwood system) on woodpecker populations. Woodpecker abundance in managed and unmanaged hardwood stands showed no difference. Abundance in managed softwood stands was greater than in unmanaged softwood stands. Woodpeckers preferred (use greater than availability) to forage and drum on large-diameter (>30 cm) living trees (hardwood and softwood). Living trees used by woodpeckers, however, were commonly in a state of decline, with characteristics such as fungal conks, broken limbs, and broken tops. When dead trees were used, woodpeckers preferred large-diameter, recently-dead trees. Although we identified tree types preferred by woodpeckers, the abundance of preferred trees in a stand was a poor predictor of woodpecker abundance. The uneven-aged management we studied did not reduce the number of preferred trees or snags to a level that affected woodpecker abundance.
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1367. **Woodpecker nest tree characteristics in upper Midwestern oak forests.**
Adkins Giese, Collette L. and Cuthbert, Francesca J.
Canadian Field Naturalist 119(3): 367-376. (2005)
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Descriptors: conservation measures/ reproduction/ reproductive behavior/ ecology/ habitat utilization/ terrestrial habitat/ land zones/ Picidae: habitat management/ forest management/ breeding site/ nest trees/ characteristics and selection/ forest management implications/ Minnesota and Wisconsin/ habitat preference/ nest site selection/ forest and woodland/ oak forests/ Minnesota/ Houston and Fillmore counties/ Wisconsin/ La Crosse County/ Aves, Piciformes/ birds/ chordates/ vertebrates
Abstract: Characteristics of woodpecker nest trees have been widely studied in some regions of North America. However, there is little research from the Upper Midwest. Forest managers need information on woodpecker nest tree characteristics so they can recommend leaving during harvest trees that meet the needs of cavity-dwelling wildlife. Information specific to the Upper Midwest is especially important given that declines in several species of cavity nesting birds have been predicted by an environmental analysis of timber harvest in Minnesota. Our purpose was to identify attributes of nest trees used by primary cavity-nesting birds. We compared nest trees to unused trees and examined differences in nest trees among woodpecker species. We found 166 active woodpecker nests in upper midwestern oak forests in 1997 and 1998. For each nest tree, we recorded height, diameter, status, and aspects of tree decay. We also measured four potential nest trees (non-nest trees, within size requirements of cavity-nesting birds. with ≥2 indicators of heartwood decay) closest to each active nest tree. Additionally, we recorded these measurements for 137 randomly selected potential nest trees. Using paired t-tests and chi-square analysis, we found each woodpecker species had a unique set of characteristics that separated nest trees from potential nest trees. Using an extension of the McNemar test for related samples, we found woodpeckers as a group used trees that were larger, both in diameter and height, more often elm (Ulmus americana, U. rubra) or aspen (Populus tremuloides, P. grandidentata), more likely to have old cavities present, and with more decay indicators than adjacent potential nest trees. The Yellow-bellied Sapsucker (Sphyrapicus varius) differed from the other woodpecker species by nesting in living Trembling Aspens (Populus tremuloides) with intact tops, complete bark cover, and heartwood fungus. Diameters of nest trees differed significantly among woodpecker species, but unlike findings from other studies, the height of nest hole and nest tree did not. Woodpecker nest entrances faced south or southeast significantly more often than by chance alone, even when excluding leaning trees. This study suggests that generic forest management for all woodpecker species may not be adequate because individual species have specific nest tree requirements. Management recommendations for cavity-nesting birds need to be tailored to meet the needs of a diversity of species.
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1368. **Woodpecker-snag interactions: An overview of current knowledge in ponderosa pine systems.**
Farris, Kerry L. and Zack, Steve
In: Proceedings of the Symposium on Ponderosa Pine: Issues, Trends and Management, General Technical Report-PSW 198; Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2005. pp. 183-195.
Notes: 0196-2094 (ISSN); Literature review; Symposium held October 18-21, 2004 at Klamath Falls, Oregon.
Descriptors: conservation measures/ nutrition/ feeding behavior/ reproductive behavior/ ecology/ terrestrial habitat/ land zones/ Picidae: habitat management/ foraging/ breeding site/ nesting habitat/ habitat utilization/ snags/ forest management/ forest and woodland/ ponderosa pine forests/ United States/ Aves, Piciformes/ birds/ chordates/ vertebrates
Abstract: Standing dead trees (snags) with cavities are a critical ecological component of western coniferous forests. These structures provide foraging, roosting, and nesting habitat for numerous species of invertebrates, amphibians, reptiles, birds, and mammals. Snags may be created through a variety of interrelated processes including wildfire, drought, insects and disease. However, dead trees containing excavated cavities are primarily the result of nest excavation by woodpeckers. While the specific factors leading to cavity generation in certain snags is not well understood, the manner in which a tree dies likely plays a significant role. We provide an overview of woodpecker-snag interactions in relation to the major modes of tree mortality in ponderosa pine. Of particular interest is the effect of mortality agent on the temporal patterns of snag decomposition, woodpecker foraging use, and woodpecker cavity excavation. Generally, snags created by bark beetles, and/or fire decay fastest, and experience the greatest foraging and nesting use by woodpeckers. Consideration of these interrelationships may aid in snag management.
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