United States
Department of
Agriculture

Forest Service

Pacific Northwest
Research Station

Recent Publications of the Pacific Northwest Research Station, Second Quarter 2002

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July 2002

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Pacific Northwest Research Station Publications

The following publications may be ordered by using the form on the inside back cover. Circle the code number for the publication.

Bibliographies

02-007

Pacific Northwest Research Station

2002. Recent publications of the Pacific Northwest Research Station, fourth quarter 2001. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 20 p.

Keywords: Bibliographies (forestry).

(This publication is available to download in pdf at *http://www.fs.fed.us/pnw/qlist.htm.)*

02-057

Pacific Northwest Research Station

2002. Recent publications of the Pacific Northwest Research Station, first quarter 2002. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 19 p.

Keywords: Bibliographies (forestry).

(This publication is available to download in pdf at http://www.fs.fed.us/pnw/qlist.htm.)

Chemicals

01-328

Holsten, E.H.; Webb, W.; Shea, P.J.; Werner, R.A.

2002. Release rates of methylcyclohexenone and verbenone from bubble cap and bead releasers under field conditions suitable for the management of bark beetles in California, Oregon, and Alaska. Res. Pap. PNW-RP-544. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 21 p.

Bubble caps and granular beads containing methylcyclohexenone (MCH) and verbenone were tested to determine their release rates. The hypothesis was that ambient air and soil temperatures were major determinants in the elution rates of the releaser devices. Elution rates of both bubble caps and beads varied greatly. Beads eluted MCH quickly and were rendered ineffective in less than 2 weeks. The fastest elution rate for bubble caps was at a warm, California pine site and was 15 times the rate at a cool Sitka spruce site in Alaska.

Keywords: Semiochemicals, release rates, antiaggregation pheromones, bark beetles, temperature, MCH, verberone.

(This publication is available to download in pdf at http://www.fs.fed.us/pnw/pubs.htm.)

Economics

02-044

Warren, D.D.

2002. Production, prices, employment, and trade in Northwest forest industries, all quarters 2000. Resour. Bull. PNW-RB-236. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 171 p.

Provides current information on lumber and plywood production and prices; employment in the forest industries; international trade in logs, lumber, and plywood and average prices of stumpage sold by public agencies; and other related items.

Keywords: Forestry business economics, lumber prices, plywood prices, timber volume, stumpage prices, employment (forest products industries), marketing (forest products), imports and exports (forest products).

(This publication is available to download in pdf at http://www.fs.fed.us/pnw/pubs.htm.)

Ecosystem Structure and Function

01-081

Goheen, E.M.; Goheen, D.J.; Marshall, K. [and others]

2002. The status of whitebark pine along the Pacific Crest National Scenic Trail on the Umpqua National Forest. Gen. Tech. Rep. PNW-GTR-530. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 21 p.

A survey was conducted to determine the distribution, stand conditions, and health of whitebark pine (*Pinus albicaulis* Engelm.) along the Pacific Crest National Scenic Trail in the Umpqua National Forest, Oregon. Whitebark pine occurred on 76 percent of the survey transects and, in general, was found in stands with lower overall densities and fewer late seral species. Eighty-seven percent of all whitebark pine measured were less than 15 feet tall. Across the entire survey area, 44 percent of all whitebark pine encountered were alive and healthy, 46 percent were alive but infected by *Cronartium ribicola* (J.C. Fisch) (cause of white pine blister rust), and 10 percent were dead. The results of this survey constitute a reference condition for whitebark pine that can be used to assess change in its status in this part of southwest Oregon. Measures to reduce the impacts of disease and bark beetles and to maintain whitebark pine populations are discussed.

Keywords: Whitebark pine, Pinus albicaulis*, white pine blister rust,* Cronartium ribicola*, mountain pine beetle,* Dendroctonus ponderosae*, Umpqua National Forest.*

(This publication is available to download in pdf at http://www.fs.fed.us/pnw/pubs.htm.)

Genetics

01-117

Lipow, S.R.; St. Clair, J.B.; Johnson, G.R.

2002. Ex situ gene conservation for conifers in the Pacific Northwest. Gen. Tech. Rep. PNW-GTR-528. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 53 p.

We summarized the ex situ genetic resources present in seed orchards, provenance and progeny tests, seed stores, and clone banks both in western Oregon and Washington and in other countries with germplasm that originated in western Oregon and Washington. Some species, such as ponderosa pine, noble fir, and western hemlock, had extensive genetic resources in ex situ forms, whereas the resources for western redcedar, for example, were more limited. Disease problems greatly influence the development of ex situ genetic resources for western white pine, sugar pine, and Sitka spruce. The summaries of genetic resources therefore are placed in the context of issues affecting each species.

Keywords: Ex situ gene conservation, seed orchard, progeny tests, seed storage, clone bank, breeding population, Pacific Northwest, gymnosperm.

(This publication is available to download in pdf at http://www.fs.fed.us/pnw/pubs.htm.)

Invertebrates

01-202

Holsten, E.H.; Hard, J.

2002. Dispersal flight and attack of the spruce beetle, *Dendroctonus rufipennis*, in south-central Alaska. Res. Pap. PNW-RP-536. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 13 p.

Field tests regarding the dispersal flight and initial attack of the spruce beetle, *Dendroctonus rufipennis* Kirby, were conducted on the Kenai Peninsula in stands of Lutz and Sitka spruce. Adult beetles dispersed more commonly in the area surrounding the upper clear bole of the tree and the lower live crown, although initial attacks were concentrated on the lower tree bole. Females outnumbered males, and twice as many adults were trapped during flight in unthinned versus thinned stands regardless of initial population levels. Most adult dispersal occurred when temperatures approached and exceeded 16 °C. The lower limit of dispersal flight was 12.8 °C.

Keywords: Bark beetles, Dendroctonus rufipennis*, dispersal, flight, attack patterns, white spruce,* Picea glauca*, Lutz spruce,* Pice*a X* lutzii*, Alaska (south-central).*

(This publication is available to download in pdf at http://www.fs.fed.us/pnw/pubs.htm.)

Natural Resource Policy

01-077

Mills, T.J.; Smyth, R.V.; Diaz-Soltero, H.

2002. Achieving science-based national forest management decisions while maintaining the capability of the research and development program. Portland, OR: U.S. Department of Agriculture, Forest Service Pacific Northwest Research Station. 20 p.

Although science information and knowledge are only one consideration in natural resource decisions, credible science information is increasingly necessary to gain public support and acceptability. Two issues must be addressed simultaneously. First, how can the Forest Service ensure that full use of science information is the norm in all national forest management decisions? Second, how can Forest Service Research and Development be a major science provider for national forest decisions without damaging the credibility and research capabilities of the research development program? A vision for science-based decisionmaking is articulated, and barriers to achieving that vision are discussed. Vital actions are proposed for overcoming the barriers and achieving the vision of science-based decisionmaking while maintaining the capability of the research and development program. These capabilities include providing adequate funding and staffing for the National Forest System and Forest Service Research and Development, new approaches for managing scientific staff, and new ways to transfer science information.

Keywords: Scientist role, land management, research organizations.

(This publication is available to download in pdf at http://www.fs.fed.us/pnw/pubs.htm.)

Recreation

01-159

Bowker, J.M.

Outdoor recreation by Alaskans: projections for 2000 through 2020. [Gen. Tech. Rep.] PNW-GTR-527. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 22 p.

Outdoor recreation participation and consumption by residents of Alaska are analyzed and projected to 2020. Both the rate of participation and the intensity of participation in nearly all outdoor recreation categories are higher among Alaskans than for residents of other states. Projections based on economic and demographic trends indicate that current patterns are likely to continue, and demand for outdoor recreation among Alaskans will keep pace with projected increases in population. The fastest growing

outdoor recreation activities in Alaska are "adventure" activities such as backpacking, biking, and tent camping; however, activities such as scenic driving, viewing wildlife, RV camping, and fishing will continue to grow.

Keywords: Alaska, recreation, recreation trends, Chugach National Forest.

(This publication is available to download in pdf at http://www.fs.fed.us/pnw/pubs.htm.)

Resource Inventory

01-113

Smith, W.P.; Stotts, M.J.; Andres, B.A. [and others]

2001. Bird, mammal, and vegetation community surveys of research natural areas in the Tongass National Forest. Res. Pap. PNW-RP-535. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 44 p.

In June 1997, we surveyed seven research natural areas (RNAs) in the Tongass National Forest, which involved establishing nine transects. Documenting the composition of biotic communities included rare plant and tidal community surveys, targeted searches for rare animals, and sampling permanent vegetation plots. Birds were sampled once along each transect with 10-minute point counts at each of 10 stations spaced at 250-meter intervals. A total of 84 point-count stations were classified to plant associations. Mammals were sampled for two nights along the initial 1.25-kilometer segment of each transect by establishing trap stations at 10-meter intervals. Each trap station had two traps for a total of 250 traps per transect; two snap traps; a snap trap and a Sherman live trap; or a snap trap and a cone pitfall trap. We documented 31 new vascular plant species. The breeding status and abundance of 65 bird species were recorded. A total of 331 small mammals representing six species were captured with an additional five species documented from visual observations or physical evidence. Coordinated, community surveys are efficient in documenting elements of biological diversity and should receive consideration as an inventory protocol or in efforts to monitor ecosystem integrity. Community surveys of RNAs provide an important benchmark.

Keywords: Biodiversity, birds, mammals, plant associations, research natural areas, southeast Alaska, temperate rain forest, Tongass National Forest.

(This publication is available to download in pdf at http://www.fs.fed.us/pnw/pubs.htm.)

Social Science

01-227

Butler, B.J.; Stanfield, B.J.

2002. Land ownership dynamics in the Big Elk Valley in Oregon during the 20th century. Gen. Tech. Rep. PNW-GTR-531. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 25 p.

Landownership is a key link between society and natural resources. The dynamics of landowner patterns are demonstrated by the examination of five landownership maps in the Big Elk Valley of the central Oregon Coast Range. These patterns are further illustrated in a land patents map of the Big Elk Valley. We selected this watershed because of its high diversity of ownership classes and the ability of the resulting dynamics to capture many aspects of ownership dynamics. Maps of landownership are presented for 1907, 1930, 1956, 1979, and 1998. We also provide brief, illustrative descriptions of processes underlying the changing ownership patterns.

Keywords: Landownership, Big Elk Valley, Oregon.

(This publication is available to download in pdf at http://www.fs.fed.us/pnw/pubs.htm.)

Publications Available Elsewhere

The following publications are available through interlibrary loan, by writing to the locations indicated, or by using the form indicated.

Aquatic and Riparian Systems

Burnett, K.M.

2001. Relationships among juvenile anadromous salmonids, their freshwater habitat, and landscape characteristics over multiple years and spatial scales in the Elk River, Oregon. Corvallis, OR: Oregon State University. 244 p. Ph.D. dissertation.

Relations among juvenile anadromous salmonids, their freshwater habitat, and landscape characteristics throughout the Elk River, Oregon, were examined over 7 years at multiple spatial scales. Unconstrained valleys in tributaries and pools in the mainstem were typically selected by Chinook salmon, coho salmon, and cutthroat trout but often were avoided by steelhead. Valley segment types did not differ routinely for characteristics assessed in stream surveys. Thus fish probably perceived other biotic or abiotic differences among valley segment types. Unconstrained valleys, nearby valley segments, and those containing larger, deeper pools with more wood were most often used by Chinook salmon. Density of wood in pools was positively related to the percentage of area in mature to old forests, with most variation explained when landscape characteristics were summarized at the subcatchment scale rather than at finer or coarser scales. Results may have differed had only 1 or 2 years been examined.

Keywords: Habitat selection, juvenile salmonids, long-term study, multiscale analysis, landscape influences on habitat.

(Available only through library or interlibrary loan.)

Clinton, S.M.

2001. Microbial metabolism, enzyme activity and production in the hyporheic zone of a floodplain river. Seattle, WA: University of Washington. 120 p. Ph.D. dissertation.

I investigated how variation in dissolved organic matter (DOM) and microbial activity was related to differences between the successional stage of overlying vegetation and position along flow paths in the hyporheic zone of a flood plain terrace of the Queets River, Washington. The study was designed to determine (1) seasonal subsurface flow structure and quantify changes in dissolved organic carbon, (2) use rates of exoenzyme activity to determine changes in terrace hyporheic DOM bioavailability, and (3) rates of hyporheic microbial production in the terrace hyporheic zone. Results suggested that DOM infiltrating from overlying riparian soils is an important component of the microbial community in flood plain hyporheic zones.

Keywords: Hyporheic zone, dissolved organic carbon, DOC, metabolism, exoenzymes, microbial community.

(Available only through library or interlibrary loan.)

Coe, H.J.

2001. Distribution patterns of hyporheic fauna in a riparian floodplain terrace, Queets River, Washington. Seattle, WA: University of Washington. 75 p. M.S. thesis.

The objectives of this study were to describe hyporheic invertebrate community structure in the flood plain hyporheic zone and to relate spatial and temporal patterns in community structure to hydrology, organic matter and microbial biomass, and physicochemical parameters. Piezometers in a flood plain riparian terrace of the Queets River were sampled during early summer 1999,

late summer 1999, fall 1999, winter 2000, spring 2000, and late summer 2000. Overall invertebrate distribution across the terrace was characterized by high spatial and low temporal heterogeneity. At the terrace scale, spatial heterogeneity was related to wood, with high-wood piezometers representing temporally stable hotspots of total invertebrate abundance. Within the terrace, along individual flow paths, spatial heterogeneity appeared to be driven by a mosaic of overlying vegetation patch types. Hyporheic invertebrate communities can provide unique insights to the link between rivers and their adjacent flood plains and may ultimately play an important role as indicators of water quality and ecosystem health.

Keywords: Rivers, hyporheic zone, invertebrates, community structure.

(Available only through library or interlibrary loan.)

Climatology

Dale, V.H.; Joyce, L.A.; McNulty, S. [and others]
2001. Climate change and forest disturbances. BioScience. 51(9): 723-734.

We examined how eight disturbances (fire, drought, introduced species, insect and pathogen outbreaks, hurricanes, windstorms, ice storms, and landslides) influence forest structure, composition, and function. We also examined how climate change may influence the severity, frequency, and magnitude of disturbances to U.S. forests. Options for coping with disturbance under changing climate were considered. This analysis points to specific research needs that should improve our understanding of how climate change affects forest disturbance. This paper is one in a series developed by the forest sector of the United States national climate change assessment. In examining how forests may be affected by climate change, the forest sector committee divided the topic into four areas (processes, diversity, disturbances, and socioeconomics) that are each a focus of papers in *BioScience*.

Keywords: Disturbance, climate change, forest structure, forest composition, fire, drought, introduced species, pests, storms, landslides.

(See Corvallis order form.)

Hansen, A.J.; Neilson, R.P.; Dale, V.H. [and others]
2001. Global change in forests: responses of species, communities, and biomes. BioScience. 51(9): 765-779.

Human activities have altered the atmosphere and climate, and most of the world's forests have been influenced by human use of the land as well. Thus climate and land use are two prongs of human-induced global change. The effect of these forces on forests is mediated by organisms within forests. Consideration of climate, land use, and biological diversity is key to understanding forest response to global change. This paper provides a primer on forest biodiversity as a key component of climate change. We explore what is currently known about interactions among climate, land use, and biodiversity, how biodiversity might respond to future global change, and how to cope with potential future global change effects on biodiversity.

Keywords: Global change, climate, land use, forests, biodiversity.

(See Corvallis order form.)

Hessburg, P.F.; Kuhlmann, E.E.; Swetnam, T.W.
2001. A novel approach to distinguishing regime-scale climate signals. In: 4th symposium on fire and forest. [Place of publication unknown]: American Meteorological Society: 195-201.

We adapted ecological methods to characterize climate signals for the Northwestern United States. For historical climate records, we used existing proxy reconstructions of the Palmer Drought Severity Index (PDSI, 1675-1978) developed from climate sensitive tree-ring chronologies. With nine time series to represent the Northwestern United States, we applied TWINSPAN analysis to group years that shared the most similar PDSI conditions. Our analysis yielded ten climate periods but only four signals. Five of the ten periods were marked by mild and equitable moisture conditions; two displayed a

mixed, high-amplitude, short-duration, severe-to-extreme drought and wetness signal; two were similar but with lower signal amplitude; and one period was marked by mild to moderate drought. Our method distinguished the pattern and boundaries of regime periods by minimizing high-frequency noise inherent in the original time series, and it revealed differences in regime attributes. The ability to distinguish the features and periods of climate regimes provides a plausible basis for stratifying recent climate history, thereby enabling researchers to explain regionally synchronous disturbance events or change in fire regimes and plant biogeography that is related to shifting climate.

Keywords: Climate signal, climate regime, temporal patterns, regime shifts, Pacific decadal oscillation, PDO, climate variability, regime-scale shifts, drought, decadal, interdecadal, moisture anomalies.

(See Wenatchee order form.)

Ecosystem Structure and Function

Aber, J.; Neilson, R.P.; McNulty, S. [and others]
2001. Forest processes and global environmental change: predicting the effects of individual and multiple stressors. BioScience. 51(9): 735-751.

We reviewed the current state of prediction of forest ecosystem response to envisioned changes in physical and chemical climate. This is one part of the forest sector analysis of a national environmental assessment. This paper includes (1) a brief review of the literature on the effects of environmental factors on forest ecosystem function, (2) a summary of results from the vegetation-ecosystem modeling and analysis project and an integrated effort to predict ecosystem response to climate change, and (3) a review of other regional modeling efforts that have addressed climate change by using tropospheric ozone and nitrogen deposition as examples.

Keywords: Climate change, forest ecosystems, VEMAP, model, simulation.

(See Corvallis order form.)

Franklin, J.F.; Spies, T.A.; Van Pelt, R. [and others]
2002. Disturbances and structural development of natural forest ecosystems with silvicultural implications, using Douglas-fir as an example. Forest Ecology and Management. 155: 399-423.

Forest managers need the most comprehensive scientific understanding of natural stand development processes, including disturbance and generation of biological legacies, in designing silvicultural systems that integrate ecological and economic objectives. Most forest models currently in use have not incorporated recent findings regarding the complexity of structures (including spatial patterns) and developmental processes, the duration of development in long-lived forests, the complex spatial patterns of stands that develop in later stages of seres, and particularly the role of disturbance in creating structural legacies that are essential elements of natural stands. These points are illustrated by using a natural stand development model for Douglas-fir–western hemlock seres in the Pacific Northwest. Using disturbance and natural stand development principles to create silvicultural approaches more aligned with natural processes is discussed.

Keywords: Ecosystem, disturbance, biological legacies, stand structure, structural retention, succession.

(See Corvallis order form.)

Reynolds, K.M.

2001. Using a logic framework to assess forest ecosystem sustainability. Journal of Forestry. 99(6): 26-30.

Bioregional assessments are increasingly viewed as essential components of ecosystem management by natural resource managers, scientists, and the public. Forestry professionals and others involved in these efforts since 1993 have identified several challenges posed by this new brand of regional-scale analysis. This article summarizes some of the key findings from these first attempts at regional scale assessment and discusses how logic-based knowledge representation might address some of these challenges, including logic frameworks for cross-discipline integration of knowledge and networks of knowledge bases that provide a formal specification for evaluating information across multiple scales.

Keywords: Bioregion, assessment, knowledge base, adaptive management, ecosystem management, ecosystem, fuzzy logic.

(See Corvallis order form.)

Tiedemann, A.R.; Klemmedson, J.O.

2000. Biomass and nutrient distribution and system nutrient budget for western juniper in central Oregon. Northwest Science. 74(1): 12-24.

We examined nutrient distribution in western juniper trees and open systems for five tree size classes averaging 36 to 160 years old and developed a system nutrient budget. In open systems (intercanopy and “no juniper” areas), soil contained 89.9 to 99.8 percent of the organic carbon (C_{org}), nitrogen (N), phosphorus (P), and sulfur (S) of the entire systems. For tree systems, C_{org}, N, and S in aboveground biomass increased with increasing tree maturity, while P did not change. For the most mature trees, proportions of total system N, S, and P allocated to the organic layer and trees was 30, 78, and 5 percent, respectively. Considering the N- and S-limited nature of these sites, a conservative harvest management approach emphasizing retention of organic layers and tree foliage seems prudent.

Keywords: Succession (plant), organic carbon, nitrogen, phosphorus, sulfur, chronosequence, organic layers, soil nutrients.

(See La Grande order form.)

Fire

Carvalho, J.A., Jr.; Costa, F.S.; Gurgel Veras, C.A. [and others]

2001. Biomass fire consumption and carbon release rates of rainforest-clearing experiments conducted in northern Mato Grosso, Brazil. Journal of Geophysical Research. 106(D16): 17,877-17,887.

Biomass consumption and carbon release rates by fires during the process of forest clearing by fire are presented and discussed. The experiments were conducted at the Caiabi Farm near the town of Alta Floresta, Mato Grosso, Brazil, in five square plots of 1 hectare each. Each plot was cut and burned at different times from 1997 to 2001 to compare biomass consumption. The effects of an extended curing period and of increasing the deforested area surrounding the plots could be clearly observed. The consumption, for areas cut and burned during the same year, tended to a value of nearly 50 percent when presented as a function of total area burned. Considering that the biomass that remains unburned keeps about the same average carbon content of fresh biomass and considering the value of 50 percent for consumption, the amount of carbon released to the atmosphere as gases was 69 Mg per hectare.

Keywords: Biomass burning, biomass consumption, carbon release, carbon budget, tropical biomass, tropical forest fires.

(See Corvallis order form.)

Fried, J.S.; Gilless, J.K.
1999. The California fire economics simulator version 2 user's guide. Pub. 21580. Berkeley, CA: University of California, Agriculture and Natural Resources. 92 p.

The California fire economics simulator version 2 (CFES2) is a computer program for stochastic simulation analysis of a wildland fire protection organization's initial attack system. Features added in CFES2 include stochastic treatment of fire occurrence, fire behavior, and fireline production; real-time display of the simulation process; an improved user interface; and the capacity to export both input data and simulation outputs to relational databases. The CFES2 can be used to play a variety of "what-if" games involving hypothetical changes to fuels, climate, firefighting strategies and tactics, dispatch criteria, fireline productivity, detection time, availability of firefighting resources, fire prevention, deployment rules, accessibility, and staffing schedules. Full use of CFES2 in this fashion requires postprocessing simulation outputs by using a relational database.

Keywords: Stochastic modeling, initial attack.

(See Portland order form.)

Forest Management

Graham, R.T.; Quigley, T.M.; Gravenmier, R.
2000. An integrated ecosystem assessment of the interior Columbia basin. Environmental Monitoring and Assessment. 64: 31-40.

Driven by the need to replace interim direction, address recent listings of species under the Endangered Species Act, and break the gridlock of implementing actions, the USDA Forest Service and USDI Bureau of Land Management initiated an effort to develop a scientifically sound, ecosystem-based strategy for lands they administer in the interior Columbia basin. The effort included an integrated assessment of 58.3 million hectares in seven states to describe the basin's current conditions and risks associated with different management strategies. The assessment provides the foundation for environmental impact statements outlining management direction for 31 million hectares of FS- and BLM-administered lands. The process produced a framework for ecosystem management, ecosystem component (social, economic, landscape, terrestrial, and aquatic) assessment, and estimates of ecological integrity and socioeconomic resiliency.

Keywords: Ecosystem management, ecological integrity, socioeconomic resiliency, resource use.

(See Headquarters order form.)

Hummel, S.
2001. Native species in plantation: *Cordia allidora*. ITTO Newsletter. 11(3): 18.

This article discusses the use of *Cordia alliodora*, a shade-intolerant, semideciduous, Neotropical tree, and its characteristics and limitations for plantations.

Keywords: Cordia allidora*, agroforestry, Central America, South America.*

(See Portland order form.)

Lehmkuhl, J.F.
2000. A conservation strategy for public land: the Northwest Forest Plan. In: Proceedings of the management of fire maintained ecosystems workshop. [Place of publication unknown]: [British Columbia Forest Service]: 17-20.

The implementation of the Northwest Forest Plan in 1994 for federal forests within the range of the northern spotted owl culminated more than a decade of evolution in forest conservation strategies. The plan integrates ecological, social, and economic aspects of forest management into an ecosystem management plan for an entire ecological region. It provides a coordinated management approach for several federal land management and regulatory agencies.

Keywords: Reserves, disturbance management, planning.

(See Wenatchee order form.)

Marshall, D.D.; Curtis, R.O.
1999. Thinning in the Pacific Northwest: results from the LOGS study. In: Conference proceedings: thinning in the Maine forest. [Orono, ME]: [University of Maine]: 61-67.

This presentation summarized the primary results to date of the Douglas-fir cooperative levels-of-growing-stock (LOGS) studies that were established between 1961 and 1970.

Keywords: Thinning, growing stock, growth and yield, stand density, Douglas-fir, Pseudotsuga menziesii*.*

(See Olympia order form.)

Mendez-Treneman, R.; Hummel, S.; Porterie, G.; Oliver, C.D.
2001. Developing desired future conditions with the landscape management system: a case study of the Gotchen Late Successional Reserve. In: Barras, S.J., ed. Proceedings: national silvicultural workshop; 1999 October 5-7; Kalispell, MT. Proc. RMRS-P-19. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 60-67.

Changing public values have led to federal land management direction like the Northwest Forest Plan with major land allocations for late-successional forest habitat. Restoration silviculture is a tool for maintaining optimum habitat despite risk of catastrophic disturbance owing to the combined impact of fire, insects, and disease. The Gotchen Late Successional Reserve (LSR) in the Gifford Pinchot National Forest provides an example of the issues of LSR management in the southern Washington Cascade Range. The landscape management system is a computer model applied to the planning for the Gotchen LSR area to assess alternative management actions, understand the effects of these actions on late-successional habitat and other values, and develop appropriate management.

Keywords: Landscape management, late-successional reserves, desired future conditions.

(See Portland order form. To order a copy of the complete proceedings, email rschneider @ fs.fed.us or write to Richard Schneider, Rocky Mountain Research Station, 240 W. Prospect, Fort Collins, CO 80526.)

Geomorphology and Hydrology

Pearch, J.M.
2000. Relationships between landscape stability, clay mineralogy, and stream turbidity in the South Santiam watershed, western Cascades, Oregon. Corvallis, OR: Oregon State University. 199 p. M.S. thesis.

The clay mineralogy of suspended sediments, recent sediments, and soils was studied to understand the relations between stream and reservoir turbidity and sediment delivery processes in the South Santiam watershed of the western Cascades. Smectite was the most abundant clay mineral in suspended sediments and the primary cause of persistent turbidity in municipal water treatment plants in the watershed. It was common in many unstable soils of the watershed and was the dominant clay component in (1) deep-seated earthflows, (2) low-elevation or poorly drained (older alluvium) soils, and (3) altered volcanic host rocks of the western Cascades.

Keywords: Water quality, watershed management, water pollution, hydrology, geomorphology.

(Available only through library or interlibrary loan.)

Invertebrates

Dodds, K.J.; Ross, D.W.; Daterman, G.E.
2000. A comparison of traps and trap trees for capturing Douglas-fir beetle, *Dendroctonus pseudotsugae* (Coleoptera: Scolytidae). Journal of the Entomological Society of British Columbia. 97: 33-38.

Pheromone-baited traps and trap trees were compared for managing Douglas-fir beetle (DFB) populations. The traps caught significantly more DFB than did trap trees. More male DFB were caught in pheromone-baited traps than in trap trees, whereas significantly more females were caught in the trap trees. Benefits of using pheromone-baited traps over trap trees include removal of more beetles from the population, not sacrificing healthy trees as is required in the trap tree method, easy deployment, less mortality of some beneficial insects, and low cost.

Keywords: Douglas-fir beetle, pheromones, trap trees, beetle trapping, insect control, forest insects.

(See Corvallis order form.)

Land Use Economics

Alig, R.; Adams, D.; Mills, J. [and others]
2001. Alternative projections of the impacts of private investment on Southern forests: a comparison of two large-scale forest sector models of the United States. Silva Fennica. 35(3): 265-276.

The TAMM/NAPA/ATLAS/AREACHANGE (TNAA) system and the forest and agriculture sector optimization model (FASOM) are two large-scale forestry sector modeling systems that have been employed to analyze the U.S. forest resource situation. This paper contrasts projections of private forest investment from the TNAA and FASOM models by focusing on the Southern United States. Comparison of the TNAA base case and an investment-restricted scenario from FASOM, both of which reflect a continuation of recent behavioral tendencies by nonindustrial private owners, suggests that Southern private timberlands have considerable biological and economic potential for intensified forest management. Unrestricted FASOM projections confirm that added investment could lead to substantially larger timber harvest volumes and lower prices than those projected in the base and restricted cases. But even under the more intensive investment scenarios, naturally regenerated forests would cover three-quarters of the future private timberland base, and hardwoods would continue to dominate the inventory structure.

Keywords: Timber supply, forest sector, forest resource assessment, modeling, plantation area, Southern U.S.

(See Corvallis order form.)

Garber-Yonts, B.
2000. A choice experiment analysis of public preference for conservation of biological diversity in the Oregon Coast Range. Corvallis, OR: Oregon State University. 111 p. Ph.D. dissertation.

This study used a choice experiment framework to produce utility theoretic estimates of the welfare effects of changes in the level of biodiversity protection under different conservation programs. Oregon households were sampled regarding four different conservation programs: aquatic habitat conservation, forest rotation management, endangered species protection, and large-scale conservation reserves. The study indicated substantial support for conservation programs with a bias toward the management status quo.

Keywords: Biodiversity, conservation economics, cost-effective strategies.

(Available only through library or interlibrary loan.)

Polasky, S.; Camm, J.D.; Garber-Yonts, B.
2001. Selecting biological reserves cost-effectively: an application to terrestrial vertebrate conservation in Oregon. Land Economics. 77(1): 68-78.

We studied reserve site selection for terrestrial vertebrates in Oregon by using data on species ranges and land values. We found cost-effective strategies that represented a maximum number of species for a given conservation budget. By varying the level of the budget, we could find the cost of obtaining various levels of representation. In general, effective conservation decisionmaking requires integrated analysis of both biological and economic data.

Keywords: Biodiversity, conservation economics, cost-effective strategies.

(See Corvallis order form.)

Mycorrhizae

Koo, C.; Molina, R.; Miller, S.L.
2000. Ectomycorrhizal effect on physiological activities of water-stressed nodulated *Alnus rubra* seedlings. Journal of the Korean Forest Society. 89(4): 513-521.

Red alder seedlings inoculated with pure cultures of *Frankia* were grown in a walk-in growth chamber for 16 weeks. Half were inoculated with the spores of the ectomycorrhizal fungus *Alpova diplophloeus*. The mycorrhizal seedlings were significantly larger than nonmycorrhizal plants in diameter and by 6 to 16 percent in nodule and shoot dry weight when their heights were similar. The mycorrhizal effects on water relations were explored in a 30-hour water stress experiment. Mycorrhizal and nonmycorrhizal seedlings did not differ significantly in leaf water potentials, carbon dioxide exchange rates, or nitrogen fixation rates during the drought. Our results suggest that *A. diplophloeus* mycorrhizae increased red alder seedling growth under well-watered conditions but did not affect water relations of the plant under water stress.

Keywords: Mycorrhiza, nitrogen fixation, red alder.

(See Corvallis order form.)

Pilz, D.; Molina, R.; Amaranthus, M.P.
2001. Productivity and sustainable harvest of edible forest mushrooms: current biological research and new directions in federal monitoring. Journal of Sustainable Forestry. 13(3/4): 83-94.

Research on the biology, ecology, and sustainable harvest of edible forest mushrooms in the Pacific Northwestern United States is summarized. Federal plans for regional monitoring of the edible mushroom resource are discussed.

Keywords: Edible mushrooms, commercial harvesting, nonwood forest products, research, monitoring, ecosystem management.

(See Corvallis order form.)

Smith, J.E.; Molina, R.; Huso, M.M.P. [and others]
2002. Species richness, abundance, and composition of hypogeous and epigeous ectomycorrhizal fungal sporocarps in young, rotation-age, and old-growth stands of Douglas-fir (*Pseudotsuga menziesii*) in the Cascade Range of Oregon, U.S.A. Canadian Journal of Botany. 80: 186-204.

Sporocarps of hypogeous and epigeous ectomycorrhizal fungi were collected from three replicate stands in each of three forest age classes (young, rotation age, and old growth) of stands dominated by Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) with mesic plant association groups. Over four fall and three spring seasons, 48 hypogeous and 215 epigeous species or species groups were collected from sample areas of 6300 square meters and 43 700 square meters, respectively. Cumulative richness of hypogeous and epigeous species was similar between age classes but differed between seasons.

Keywords: Ectomycorrhizal fungi, old-growth forest, species richness, sporocarp production, forest succession, Pseudotsuga menziesii*,* Tsuga heterophylla *zone, biodiversity.*

(See Corvallis order form.)

Range Management

McInnis, M.; McIver, J.
2000. Off-stream water and salt reduce stream bank damage in grazed riparian pastures. In: Range field day progress report 2000: sustainable livestock production in forested and intermountain rangelands. Sp. Rep. 1018. Corvallis, OR: Oregon State University, Agriculture Experiment Station: 25-35.

We tested the hypothesis that providing cattle with off-stream water and salt would lessen the impacts of grazing on streambank cover and stability. Three replications of three grazing treatments (no grazing, water and salt provided, water and salt not provided) were established in 1996, and impacts below the line of vegetation were measured during summer1997. Streambank effects were consistent with observations of cattle distribution, with 26 percent of the streambank in water-provided pastures affected, compared to 31 percent for no-water pastures.

Keywords: Grazing, vegetation line, water quality, streambanks.

(See La Grande order form.)

Remote Sensing

Fried, J.; Yliopisto, M.
1999. Why are forestry GIS problems so hard? Positio. 3: 12-14.

Foresters have contributed to the development of the discipline of GIS since its inception by adopting remote sensing to support forest inventory and land classification. As we end the third decade of GIS, the vast majority of forestry uses focus on automation of existing tasks and visualization of possible future states of forests with comparatively little use of the technology's analytical potential. Fields such as transportation, utilities management, and agriculture have rapidly integrated geospatial technologies into their operations, often spawning high-value commercial applications. What is so different about forestry that has slowed the implementation of GIS analyses as an integral part of the professional activity?

Keywords: GIS applications, forestry.

(See Portland order form.)

Oetter, D.R.; Cohen, W.B.; Berterretche, M. [and others]
2000. Land cover mapping in an agricultural setting using multiseasonal Thematic Mapper data. Remote Sensing of Environment. 76: 139-155.

A multiseasonal Landsat Thematic Mapper data set consisting of five image dates from a single year was used to characterize agricultural and related land cover in the Willamette River basin of western Oregon. A map of 20 land cover classes was developed. Classes include agricultural crops and orchards, forest and natural cover types, and urban building densities. An accuracy assessment indicated a final map error of only 26 percent.

Keywords: Remote sensing, classification, land cover, accuracy assessment.

(See Corvallis order form.)

Resource Inventory

Campbell, J.L.; Burrows, S.; Gower, S.T.; Cohen, W.B.
1999. BigFoot field manual. Version 2.1. Oak Ridge, TN: Oak Ridge National Laboratory. [Irregular pagination].

This is a field sampling manual for characterizing an eddy flux tower footprint. It includes sampling design and measurement protocols.

Keywords: Sampling methodology.

(This publication is available only in electronic format at `http://doe.gov/bridge`.)

Social Sciences

Cascade Center for Ecosystem Management
2001. Public perceptions of alternative forest management practices: testing alternative stand treatments. Corvallis, OR: Oregon State University; [U.S. Department of Agriculture, Forest Service], Pacific Northwest Research Station; [U.S. Department of Agriculture, Forest Service], Willamette National Forest, Blue River Ranger District. 2 p.

This study took advantage of three larger studies investigating social perceptions of alternative forest treatments to see how the activities and purposes of each treatment match peoples' expectations of "good" national forest management.

Keywords: Social acceptability, public values, silviculture.

(See Corvallis order form.)

Clark, R.N.; Stankey, G.H.; Shannon, M.A.
1999. The social component of the forest ecosystem management assessment team (FEMAT). In: Cordell, H.K.; Bergstrom, J.C., eds. Integrating social sciences with ecosystem management: human dimensions in assessment, policy, and management. Champaign, IL: Sagamore Publishing: 237-264. Chapter 15.

The purpose of the social assessment was to provide policymakers with an understanding of how potential policy options might affect constituents and stakeholders and an analysis of potential effects on important social values and activities. The social assessment focused on the values and activities currently found in the region; to the extent possible, we also attempted to provide a better understanding of the distribution of social costs and benefits associated with the options under analysis.

Keywords: Social assessment, forest policy, social values.

(Available in libraries and bookstores.)

Soil

Cromack, K., Jr.; Miller, R.E.; Helgerson, O.T. [and others]
1999. Soil carbon and nutrients in a coastal Oregon Douglas-fir plantation with red alder. Soil Science Society American Journal. 63: 232-239.

Carbon and nutrients in the forest floor and mineral soil were measured to determine amounts and variation among eighteen 0.081-hectare plots in a Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) plantation growing with volunteer red alder (*Alnus rubra* Bong.). Ten years earlier, a mature conifer stand was clearcut and nearly all logging slash and forest floor were consumed by slash fire. Forest floor mass in the 9-year-old plantation averaged 9.86 tonnes (t) per hectare with 3.71 t carbon (C), 98.0 kg nitrogen (N), 19.6 kg phosphorus (P), and 8.4 kg sulfur (S) per hectare. Mineral soil to 1-meter depth averaged 176 t C, 8330 kg N, 3340 kg P, and 605 kg S per hectare in the <2-mm fraction. The 2- to 6-mm soil fraction averaged an additional 100 t C, 4480 kg N, and 1700 kg P per hectare. Net mineralizable N as NH_4 totaled 99 kg N per hectare in the top 45 cm of the mineral soil and 62 kg N per hectare at the 45- to 100-cm depth. Density fractionation showed that the light fraction was only 13.4 percent of the fine soil mass of the 9- to 15-cm depth yet contained about 40 percent of the total C and N capital in the <2-mm size fraction. The substantial amounts of C and nutrients in this low-bulk density soil indicate a fertile soil despite large previous losses of organic matter and N from the site.

Keywords: Carbon, nutrients, soil, slash fire, clearcut.

(See Olympia order form.)

Klemmedson, J.O.; Tiedemann, A.R.
2000. Influence of western juniper development on distribution of soil and organic layer nutrients. Northwest Science. 74(1): 1-11.

The effect of western juniper invasion of big sagebrush/bluebunch wheatgrass ecosystems was studied to determine how spatial distribution of nutrients in the mineral soil and organic layer was affected. Mass of the organic layer and amounts of all organic layer nutrients increased with juniper size and were higher under canopies than in intercanopy and no juniper areas. Concentrations of organic layer nitrogen (N), phosphorus (P), and sulfur (S) declined with distance away from tree boles. Concentrations of soil N and S increased with tree size. Amounts of soil nutrients, except organic carbon, were not significantly influenced by tree size, but amounts of all soil nutrients, except S and exchangeable calcium, were greater under juniper trees than intercanopy areas.

Keywords: Spatial distribution, organic carbon, nitrogen, phosphorus, sulfur, potassium, calcium, magnesium.

(See La Grande order form.)

Threatened, Endangered, and Sensitive Species

Forsman, E.D.; Otto, I.A.; Sovern, S.G. [and others]
2001. Spatial and temporal variation in diets of spotted owls in Washington. Journal of Raptor Research. 35(2): 141-150.

We studied diets of northern spotted owls in three different regions of Washington state from 1983 through 1996. Northern flying squirrels were the most important prey in most areas, comprising 29 to 54 percent of prey numbers and 45 to 59 percent of prey biomass. Other important prey included snowshoe hares, bushy-tailed woodrats, boreal red-backed vole, and mice. Nonmammalian prey generally comprised less than 15 percent of prey numbers and biomass. Diets differed among territories, years, and seasons. Annual variation in diet was characterized by small changes in relative occurrence of different prey types rather than a complete restructuring of the diet. We suggest that differences in diet between years, seasons, and territories probably were the result of differences in prey abundance. There were other factors, however, that could have caused such differences, including individual variation in prey selection, timing of pellet collections, and prey accessibility in different cover types.

Keywords: Northern spotted owl, Strix occidentalis caurina*, diet, predation, prey selection, Washington.*

(See Corvallis order form.)

Haig, S.M.; Wagner, R.S.; Forsman, E.D.; Mullins, T.D.
2001. Geographic variation and genetic structure in spotted owls. Conservation Genetics. 2: 25-40.

To investigate potential effects of habitat fragmentation on population structure of spotted owls, we used random amplified polymorphic DNA to examine genetic variation hierarchically among local breeding areas, subregional groups, and subspecies via sampling of 21 breeding areas for the three subspecies. Data from 11 variable bands suggested a significant relation between geographic distance among local breeding groups and genetic distance, although multidimensional scaling of three significant axes did not identify significant grouping at any hierarchical level. Similarly, neighbor-joining clustering of Manhattan distances indicated geographic structure at all levels and identified Mexican spotted owls as a distinct clade. Merging nuclear data with recent mitochondrial data provided support for designating an evolutionary significant unit for Mexican spotted owls and two overlapping management units for northern and California spotted owls.

Keywords: Conservation unit, geographic variation, population structure, spotted owls, Strix occidentalis.

(See Corvallis order form.)

Wildlife

Boroski, B.B.; Barrett, R.H.; Kie, J.G.
1999. Movement patterns and survivorship of black-tailed deer migrating across Trinity Reservoir, California. California Fish and Game. 85(2): 63-69.

We assessed seasonal movement patterns and survival of black-tailed deer, *Odocoileus hemionus columbianus*, crossing Trinity Reservoir in northern California by monitoring two fall and two spring migrations, beginning in fall 1993. Black-tailed deer traversed the reservoir by using 43 routes located predominantly in the narrowest sections of the reservoir. A group of two to three black-tailed deer typically swam together. Adult males and females were segregated by sex, but not by date. We estimated that as many as 389 black-tailed deer swam across the reservoir during daylight in a single migration. Of the 302 black-tailed deer observed swimming, 292 crossed successfully. The fate of the remaining 10 was not determined. Trinity Reservoir does not appear to be a major mortality source for migrating black-tailed deer when it is ice free.

Keywords: Black-tailed deer, Odocoileus hemionus*, California, movement patterns.*

(See La Grande order form.)

Bull, E.L.; Torgersen, T.R.; Wertz, T.L.
2001. The importance of vegetation, insects, and neonate ungulates in black bear diet in northeastern Oregon. Northwest Science. 75(3): 244-253.

In northeastern Oregon, mean estimated volume of food items in 621 black bear (*Ursus americanus*) scats was 35 percent grasses, 24 percent insects, 16 percent fruit, 11 percent soil and wood, 10 percent animal remains, and 4 percent leaves and stems. During June, mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus*) neonates occurred in 44 percent of the scats in 1998 and 25 percent in 1999. A significantly higher volume of insects occurred in scats in 1999 compared to 1998, probably because berries were scarce in 1999. Of the 434 scats containing insects, 40 percent contained carpenter ants (*Camponotus* spp.), 45 percent other small ants (*Lasius* sp., *Tapinoma* sp., *Aphaenogaster* sp.), 36 percent forest ants (*Formica* spp.), and 23 percent yellowjackets (*Vespula* spp., *Dolichovespula*).

Keywords: Black bears, Ursus americanus*, scat, diet.*

(See La Grande order form.)

Garton, E.O.; Wisdom, M.J.; Leban, F.A.; Johnson, B.K.
2001. Experimental design for radiotelemetry studies. In: Millspaugh, J.; Marzluff, J., eds. Radio tracking and animal populations. New York: Academic Press: 15-42. Chapter 2.

Designing studies that use radiotelemetry requires careful consideration of the goals of the project and resources available to meet those goals. Success in meeting research goals depends on thoughtful planning of field methods and ancillary data collection, selection of telemetry equipment appropriate to the study animal and budget, careful execution of the field protocols, and creative analysis of the data. Some of the most important design factors include consideration of a study's purpose, degree of experimental manipulation, controls, and replication, selection of an efficient yet unbiased sampling scheme, definition of the sample unit, calculation of sample size requirements, identification and removal of sources of bias, and clear specification of biological significance. We address these issues and provide new estimates of sample size requirements and concepts for using radiotelemetry to assess demographic consequences of animal selection within their environments.

Keywords: Animal movements, home range, monitoring, radiotelemetry, resource selection, survival, wildlife, wildlife research.

(Available in libraries and bookstores.)

Hamer, T.E.; Hays, D.L.; Senger, C.M.; Forsman, E.D.
2001. Diets of northern barred owls and northern spotted owls in an area of sympatry. The Raptor Research Foundation, Inc. 35(3): 221-227.

We compared diets of barred owls and spotted owls in an area of sympatry in the northern Cascade Range of Washington during 1985-89. Nocturnal forest mammals dominated diets of both species, but diets of barred owls included a more diverse and even distribution of prey. Estimated dietary overlap between the two species was 76 percent, based on the Pianka Index. Barred owl diets included more terrestrial mammals, more birds, more diurnal prey, and more prey associated with riparian areas, including fish, amphibians, and snails. The snowshoe hare comprised 35 percent of the diet of the barred owl, whereas northern flying squirrels comprised 51 percent of prey numbers and 57 percent of prey biomass for spotted owls. We speculate that barred owls and spotted owls compete for food because their diets overlap considerably, their food appears to be limiting in at least some years, and barred owls often settle in territories historically occupied by spotted owls. Although some authors have speculated that the range expansion of the barred owl was caused or facilitated by human factors, it is possible that the expansion had nothing to do with human activities. We caution against jumping to unfounded conclusions regarding the reason(s) for barred owl range expansion.

Keywords: Barred owl, Strix varia varia*, spotted owl,* Strix occidentalis caurina*, competition, Washington, diet, predation.*

(See Corvallis order form.)

Kie, J.G.; Czech, B.
2000. Mule and black-tailed deer. In: Demarais, S.; Krausman, P.R. Ecology and management of large mammals in North America. Upper Saddle River, NJ: Prentice Hall: 629-657. Chapter 30.

This chapter discusses the value and roles of mule and black-tailed deer in ecosystems.

Keywords: Mule deer, black-tailed deer.

(Available in libraries and bookstores.)

Leban, F.A.; Wisdom, M.J.; Garton, E.O. [and others]
2001. Effect of sample size on the performance of resource selection analyses. In: Millspaugh, J.; Marzluff, J., eds. Radio tracking and animal populations. New York: Academic Press: 291-307. Chapter 11.

We evaluated the effect of sample size on results for two methods of evaluating resource selection. Accuracy increased with increasing numbers of animals and increasing observations per animal for all variables. Accuracy, however, was low (60 percent) for few animals (5 to 10) with only 10 observations. We recommend a minimum sample of 20 animals with 50 observations each to adequately determine resource selection for a population during a season at one time of day.

Keywords: Sample size, resource selection.

(Available in libraries and bookstores.)

Leslie, D.M., Jr.; Bowyer, R.T.; Kie, J.G.
1999. Life-history strategies of ungulates. Journal of Mammalogy. 80(4): 1067-1069.

This paper introduces four articles presented at the 78th annual meeting of the American Society of Mammalogists about ungulate life-history strategies. The articles include treatises on birth-site selection of moose (*Alces alces*), sex-ratio correlates with dimorphism and risk of predation, optimal foraging relative to risk predation, and the role of density dependence in shaping life-history traits of ungulates.

Keywords: Moose, Alces alces*, life-history strategies.*

(See La Grande order form.)

Mack, D.E.; Yong, W.
2000. Swainson's thrush (*Catharus ustulatus*) In: Poole, A.; Gill, F., eds. The birds of North America. No. 540. Philadelphia, PA: The Birds of North America, Inc. 32 p.

The Birds of North America series provides comprehensive, authoritative summaries of current knowledge of the breeding bird species of North America. Each of these accounts includes a major bibliography as well as unpublished information. Their purpose is to enable informed conservation management of our native birds and to define directions for future research. Accounts are published separately to ensure timely availability of their content.

Keywords: Swainson's thrush, Catharus ustulatus*, North America, Neotropical migrant.*

(See Olympia order form.)

Marzluff, J.M.; Raphael, M.G.; Sallabanks, R.
2000. Understanding the effects of forest management on avian species. Wildlife Society Bulletin. 28(4): 1132-1143.

We reiterate the general problems of small scale and lack of rigorous experimental design that reduce the ability of wildlife studies to be used for concrete recommendations for forest management. We emphasize the need to increase understanding of mechanisms during the translation of forest structure, composition, and function into avian population abundance, distribution, and viability. Mechanistic understanding increases the manager's likelihood of correctly predicting prescription outcomes and gives increased flexibility to balance competing demands of resource production and wildlife conservation. Researchers and managers should clearly articulate priorities. We urge scientific societies to cooperate to develop conservation priorities, encourage data collection to support prioritization, and assess progress toward meeting conservation goals. The Wildlife Society is in a unique position to take the lead in such an effort and objectively guide the future direction of wildlife conservation.

Keywords: Adaptive management, birds, conservation priorities, edge effects, experimental design, forestry, habitat, nest predation, policy, population viability, silviculture.

(See Olympia order form.)

Olson, D.H.
2001. Ecology and management of montane amphibians of the U.S. Pacific Northwest. Biota. 2(1): 51-74.

A synthesis of research and monitoring efforts on high-elevation amphibians in the Pacific Northwest demonstrated three emerging issues for species and land management: biodiversity assessments, including inventory and monitoring programs, are needed in montane landscapes; variable species autecology needs incorporation into conservation plans; and many stressors on populations are known that integrate the first two issues.

Keywords: Amphibians, high elevation, ecology, conservation.

(See Corvallis order form.)

Rachlow, J.L.; Kie, J.G.; Berger, J.
1999. Territoriality and spatial patterns of white rhinoceros in Matobo National Park, Zimbabwe. African Journal of Ecology. 37: 295-304.

Because of poaching threats, most African rhinos today persist within sanctuaries or reserves with fenced perimeters. We examined spatial patterns of adult white rhinos (*Ceratothenium simun*) in Matobo National Park, Zimbabwe. Matobo Park contains a high-density population of rhinos within a fenced area and a lower density group outside the fenced reserve. Adult females in the lower density group used

significantly larger home ranges than those in the high-density group. Overlap of female home ranges was high in both groups. Adult male white rhinos established territories exclusive of other males by performing scent-marking behaviors, and in Matobo Park, male territories were much larger than those observed in other populations of white rhinos. Additionally, in the high-density reserve a few adult males held territories that occupied most available space; two-thirds of adult males were excluded from developing territories and adopted a nonterritorial tactic. In the absence of dispersal opportunities, managers may need to regulate numbers of male white rhinos within smaller reserves.

Keywords: Rhinos, Ceratotherium*, ranges, scent marking, territories.*

(See La Grande order form.)

Sieving, K.E.; Willson, M.F.; De Santo, T.L.
2000. Defining corridor functions for endemic birds in fragmented south-temperate rainforest. Conservation Biology. 14(4): 1120-1132.

We distinguished between vegetated corridors functioning as living space from those suitable only for short distance movements for endemic understory birds inhabiting fragmented rain forest in south-central Chile. Corridor width determined species presence or absence, whereas the number of individuals increased with width and density of understory vegetation. Corridors 10 to 25 meters wide may be transitional between those too narrow for regular uses and those wide enough for territory establishment. Abundance decreased as the ratio of corridor length to width increased; few birds were detected in corridors with the ratio greater than 10, suggesting the existence of a threshold value for the influence of length to width on corridor use. Corridors for endemic understory birds in agricultural landscapes of southern Chile can be designed to fulfill distinct functions.

Keywords: Forest fragmentation, corridors, Rhinocryptidae, Furnarlidae, endemic, playback census.

(See Juneau order form.)

Stewart, K.M.; Bowyer, R.T.; Kie, J.G.; Gasaway, W.C.
2000. Antler size relative to body mass in moose: tradeoffs associated with reproduction. Alces. 36: 77-83.

Body size and age are highly correlated with antler size, fighting ability, and reproductive success in male cervids, including moose. Production of antlers requires energy above that for maintenance of basal functions and is especially demanding of minerals; young animals have the additional cost of completing body growth. Large-bodied males with large antlers invest more in antler development and reproduction at the expense of body condition than do young males. Young males invested less in antlers than older males that had reached a size sufficient to compete effectively for mates; consequently, there was a tradeoff between body growth and antler size. Delaying investment in mating until physically mature and able to compete for females with other large-antlered moose is the most successful strategy for maximizing reproductive success and achieving the greatest fitness in male moose.

Keywords: Age, moose, Alces alces*, body mass, cervids, mating success, reproduction.*

(See La Grande order form.)

Willson, M.F.; Morrison, J.L.; Sieving, K.E. [and others]

2001. Patterns of predation risk and survival of bird nests in a Chilean agricultural landscape. Conservation Biology. 15(2): 447-456.

We used experimental nests baited with eggs from California quail (*Callipipla californica*) or clay eggs to examine relative risks of nest predation in an agricultural landscape and in two large forest preserves in a south-temperate rain forest in Chile. The most common predators, as identified by marks on the clay eggs, were a caracara (*Milvago chimango*), a blackbird (*Curaeus curaeus*), and rodents. Nest losses from predation were similar in large and small forest patches and lower in patches than in extensive forest. In general, predation risk was higher (and nest survival therefore lower) on forest edges than in forest interior, in short-grass pasture than in tall-grass pasture, in narrow corridors than in wide corridors, and on visible nests than on concealed nests. High predation risks in pasture habitat tended to increase the risk of nest predation in adjacent forest edges. For open-cup nesters, the risk of nest predation was relatively high in the present agricultural landscape, indicating that much of the available wooded habitat (forest edges, narrow corridors) offers poor nesting habitat, although it may be suitable for foraging and travel. The numerous bird-plant mutualisms in this landscape may be at risk if nesting success of the principal mutualists is consistently low.

Keywords: Forest fragmentation, nest predation, edge effect, nest concealment.

(See Juneau order form.)

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