United States
Department of
Agriculture

Forest Service

Pacific Northwest
Research Station

Recent Publications of the Pacific Northwest Research Station, First Quarter 2000

A list of recent publications and other products, such as videos and software, of the Pacific Northwest (PNW) Research Station is published four times a year. This list announces completion and availability of scientific and technical publications and products supported by the PNW Research Station.

Publications are arranged in two sections. The first section lists items published by the PNW Research Station and available through our distribution system. The second section lists publications available elsewhere. Within each section, items are grouped by general subject categories and alphabetically by author within categories.

Ordering From PNW Research Station

Station Publications

Station publications have a five-digit code number at the beginning of the citation. These code numbers are printed again on the inside back cover of this list.

To order one of these publications, circle its number on the inside back cover, cut out the order card, place it in an envelope, and mail. Please do not remove the label that contains your name and address. It will be used on the envelope in which we send your publications. If there is no label, please fill in your name and address.

NOTE: Supplies of these publications are limited. We will not be able to fill your order after our current supply is exhausted. Copies may be purchased, however, from the U.S. Department of Commerce, National Technical Information Services, Springfield, VA 22161 (www.ntis.gov).

Journal, Proceedings, and Other Reprints

Many of the items listed here are not published by the PNW Research Station, although the work has been supported by the Station. For these items, the Station laboratory originating the publication may have copies. To request a copy, use the order form for the laboratory indicated in parentheses at the end of the entry. If another organization has copies, its address will be given in parentheses at the end of the entry.

April 2000

PNW Research Station Laboratories

Anchorage
Forestry Sciences Laboratory
3301 C Street, Suite 200
Anchorage, AK 99503-3954

Corvallis
Forestry Sciences Laboratory
3200 S.W. Jefferson Way
Corvallis, OR 97331

Juneau
Forestry Sciences Laboratory
2770 Sherwood Lane Suite 2A
Juneau, AK 99801-8545

La Grande
Forestry and Range Sciences Laboratory
1401 Gekeler Lane
La Grande, OR 97850-3368

Olympia
Forestry Sciences Laboratory
3625-93d Ave., S.W.
Olympia, WA 98512-9193

Portland
Forestry Sciences Laboratory
P.O. Box 3890
Portland, OR 97208-3890

Seattle
Forestry Sciences Laboratory
4043 Roosevelt Way, N.E.
Seattle, WA 98105-6497

Sitka
Wood Utilization Center
204 Saginaka Way
Sitka, AK 99835-7316

Wenatchee
Forestry Sciences Laboratory
1133 N. Western Ave.
Wenatchee, WA 98801

Ordering From Libraries

Libraries on our mailing list automatically receive copies of papers published by the Pacific Northwest Research Station but not reprints from journals or proceedings. Forestry libraries in the Northwest receive proceedings volumes and subscribe to the journals in which PNW authors publish. Those wanting to read articles listed here may visit the nearest research library or request the article from the library directly or through interlibrary loan; libraries charge a fee for copying and mailing these materials. Some forestry libraries in the Northwest are:

Valley Library
Oregon State University
Corvallis, OR 97331
(Visit or request article from the Interlibrary Loan section)

Interlibrary Borrowing Service
Suzzallo Library, FM 25
University of Washington
Seattle, WA 98195
(To request article only)

Forestry Resources Library, AQ15
60 Bloedel Hall
University of Washington
Seattle, WA 98195
(To visit only)

University of Alaska Library
3211 Providence Drive
Anchorage, AK 99508
(Visit or request article from the Interlibrary Loan section)

Internet Access

Many of our publications are now available online in Portable Document Format (pdf). A free, downloadable Adobe Acrobat Reader is required to view these documents. For instructions about downloading the reader and to view the publications, navigate to: http://www.fs.fed.us/ pnw/ pubs.htm.

Our most recent quarterly lists of publications also are available on our web site. Some order forms include email addresses to direct your requests to the appropriate office.

VISIT OUR WEBSITE:
http://www.fs.fed.us/pnw

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.

Economics

98-376

Fight, Roger D.; Gicqueau, Alex; Hartsough, Bruce R.

1999. Harvesting costs for management planning for ponderosa pine plantations. Gen. Tech. Rep. PNW-GTR-467. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 8 p.

The PPHARVST computer application is Windows-based, public-domain software used to estimate harvesting costs for management planning for ponderosa pine (*Pinus ponderosa* Dougl. ex Laws.) plantations. The equipment production rates were developed from existing studies. Equipment cost rates were based on 1996 prices for new equipment. Harvesting systems include a cut-to-length harvester-forwarder system, a whole-tree/log-length skidder system, and a skyline cable system. Harvesting costs can be estimated for both clearcutting and partial cutting for trees ranging from 3 to 250 cubic feet. Cost estimates are in U.S. dollars per 100 cubic feet.

Keywords: Costs (logging), logging economics, timber management planning, young-growth stands, ponderosa pine.

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

99-053

Raettig, Terry L.

1999. Trends in key economic and social indicators for Pacific Northwest states and counties. Gen. Tech. Rep. PNW-GTR-474. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 30 p.

Local (county) variations in key social and economic indicators are important in Oregon and Washington. Covered employment, wage and salary, unemployment, and population data for 1987 through 1997 showed regional trends in these indicators, which are compared with national trends. Future updates will be published in the "Production, Prices, Employment, and Trade in Northwest Forest Industries" series from the Pacific Northwest Research Station.

Keywords: Social and economic indicators, covered employment, wage and salary, unemployment, population, Oregon, Washington.

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

Fire

98-364

Graham, Russell T.; Harvey, Alan E.; Jain, Theresa B.; Tonn, Jonalea R.

1999. The effects of thinning and similar stand treatments on fire behavior in western forests. Gen. Tech. Rep. PNW-GTR-463. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 27 p.

In the West, thinning and partial cuttings are being considered for treating millions of forested acres that are overstocked and prone to wildfire. The objectives of these treatments can include tree growth redistribution, tree species regulation, timber harvest, wildlife habitat improvement, or wildfire hazard reduction to name a few.

Thinning can have both positive and negative impacts on crown fire potential, and unless the surface fuels created by using these treatments are themselves treated, intense surface wildfire may result, likely negating the positive effects of reducing crown fire potential. The best general approach for managing wildfire damage appears to be managing tree density and species composition with well-designed silvicultural systems at a landscape scale that include a mix of thinning, surface fuel treatments, and prescribed fire with proactive treatment in areas with high risk to wildlife.

Keywords: Silviculture, forest management, prescribed fire, selection, forest fuels, crown fire.

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

99-244

McIver, James D.; Starr, Lynn, tech. eds.
2000. Environmental effects of postfire logging: literature review and annotated bibliography. Gen. Tech. Rep. PNW-GTR-486. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 72 p.

The scientific literature on logging after wildfire is reviewed with a focus on environmental effects of logging and removal of large woody structure. Rehabilitation, the practice of planting or seeding after logging, is not reviewed here. Several publications are cited that can be described as "commentaries," intended to help frame the public debate. Twenty-one postfire logging studies are reviewed and interpreted in the context of how wildfire itself affects stands and watersheds.

Keywords: Postfire logging, salvage harvest, fuel, down wood, wildlife habitat, recovery, hydrology, wildfire, habitat structure, literature review.

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

Fish

97-176

Halupka, Karl C.; Bryant, Mason D.; Willson, Mary F.; Everest, Fred H.
2000. Biological characteristics and population status of anadromous salmon in southeast Alaska. Gen. Tech. Rep. PNW-GTR-468. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 255 p.

Populations of Pacific salmon (*Oncorhynchus* spp.) in southeast Alaska and adjacent areas of British Columbia and the Yukon Territory show great variation in biological characteristics. An introduction presents goals and methods common to the series of reviews of regional salmon diversity presented in the five subsequent chapters. The primary goals were to (1) describe patterns of intraspecific variation and identify specific populations that were outliers from prevailing patterns, and (2) evaluate escapement trends and identify potential risk factors confronting salmon populations. Stock-specific information was compiled primarily from management research conducted by the Alaska Department of Fish and Game. These reviews provide insight into the ecological and evolutionary ramifications of intraspecific variation for managing diversity and sustaining productivity of salmon resources.

Keywords: Pacific salmon, Oncorhynchus*, southeast Alaska, intraspecific diversity, population status, variation.*

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

98-024

Pacific Northwest Research Station

[2000]. Fish and forest: ecological links between water and land [Brochure]. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. [Not paged].

This full color poster-brochure describes the role of salmon in the ecosystem. Illustrations depict the ecological links between the ocean, fresh water, and land.

Keywords: Estuary, fresh water, salmon, ecosystem function.

99-007

Robards, Martin D.; Willson, Mary F.; Armstrong, Robert J.; Piatt, John F.

1999. Sand lance: a review of biology and predator relations and annotated bibliography. Res. Pap. PNW-RP-521. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 327 p.

Sand lance (*Ammodytes*) constitute a major prey for at least some populations of over 100 species of consumer, including 40 species of birds, 12 species of marine mammals, 45 species of fishes, and some invertebrates. Variation in the availability of sand lance (and other forage fishes) can have major effects on the breeding success and survival of their predators. Commercial fishing and other pressures on sand lance populations potentially have ramifying effects on many species of wildlife.

Keywords: Sand lance, Ammodytes*, predator/prey, seabirds, marine mammals, forage fish, predatory fish, Alaska.*

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

Plant Ecology

98-365

Gedney, Donald R.; Azuma, David L.; Bolsinger, Charles L.; McKay, Neil

1999. Western juniper in eastern Oregon. Gen. Tech. Rep. PNW-GTR-464. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 53 p.

A 1988 inventory of western juniper in eastern Oregon was intensified to meet the increased need for information beyond that available in previous inventories. A primary sample, using aerial photos, recorded crown cover and ownership for all juniper forest and savanna lands in eastern Oregon. A secondary sample of field plots was established in juniper forests. Maps and statistics of change during the last half of the 20th century are shown and were based on past inventories and historical records. Large-scale maps of the past and present range of juniper and their occurrence in relation to ownership, elevation, precipitation, and soils are included.

Keywords: Western juniper, Oregon (eastern), statistics (forest), forest surveys.

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

Silviculture

In 1999, the Northwest Scientific Association (NSA) published a special issue of *Northwest Science* dealing with retention harvests in Northwestern forest ecosystems, the demonstration of ecosystem management options (DEMO) study. Three articles were authored by scientists from the Pacific Northwest (PNW) Research Station and are described below. Funding for other articles was provided by PNW. The NSA has provided PNW with a very limited number of copies of the entire publication. To order, circle **"Northwest Science No. 73"** on the back order form. Because of our limited supply, we encourage you to obtain this publication from a library. For additional information about the DEMO study, visit the web site at www.fs.fed.us/pnw/demo.

Aubry, Keith B.; Amaranthus, Michael P.; Halpern, Charles B. [and others]

1999. Evaluating the effects of varying levels and patterns of green-tree retention: experimental design of the DEMO study. Northwest Science. 73: 12-27.

In western Oregon and Washington, recent changes in federal forest management policy contained in the Northwest Forest Plan have led to new harvest prescriptions for millions of acres of public lands. On upland sites, for example, standards and guidelines now require that live (green) trees are retained in at least 15 percent of the area within each harvest unit and recommend that at least 70 percent of this retention be in patches of moderate to larger size (0.2 to 1.0 hectare or more). These prescriptions were based on the professional judgment and collective knowledge of many who have studied the organisms and ecological processes characterizing these forests, but they have not been rigorously tested or implemented on a broad geographic scale. Several prescriptions for green-tree retention are being evaluated experimentally in the DEMO study. Recent changes in forest management policy and existing information gaps that led to the establishment of the DEMO study are reviewed, and an overview of the study is provided.

Keywords: Green-tree retention, DEMO study.

Cazares, Efren; Luoma, Daniel L.; Amaranthus, Michael P. [and others]

1999. Interaction of fungal sporocarp production with small mammal abundance and diet in Douglas-fir stands of the southern Cascade Range. Northwest Science. 73: 64-76.

Small mammal population densities are highly variable across forest stands and landscapes. The species composition and abundance of ectomycorrhizal fungi (EMF) may influence the ability of forests to provide suitable habitat for small mammals. Identification and interpretation of changes in the abundance of these organisms, or in their interrelations due to experimental harvest, require that the patterns and potential causes of natural variability in the preharvest communities first be identified. Pretreatment data were gathered from the Watson Falls block of a green-tree retention experiment to establish baseline conditions. The six experimental treatments that comprise the block lie in two spatially distinct areas that differ in environment and forest composition. The initial variability in EMF, small mammals, and their relationships was documented. Three primary questions were addressed: (1) Are the abundance and species composition of EMF sporocarps similar between the two areas of the Watson Falls block? (2) Does sporocarp consumption differ among small mammal species and by area? (3) For common truffle genera, is sporocarp biomass correlated with the spore frequency of those genera in small mammal diets? The Watson Falls had spatial and temporal variation in EMF production, small

mammal mycophagy, and small mammal abundance. However, truffles were consistently the primary food item in the diet of all three small mammal species in this study. Small mammals are potentially important agents of truffle dispersal into disturbed areas where EMF are locally extirpated.

Keywords: Small mammals, ectomycorrhizal fungi, mycorrhizae, habitat.

Lehmkuhl, John F.; West, Stephen D.; Chambers, Carol L. [and others]

1999. Assessing wildlife response to varying levels and patterns of green-tree retention: an overview of a long-term experiment. Northwest Science. 73: 45-63.

Forest management in the Pacific Northwest has recently shifted from a timber orientation to an ecosystem management orientation. Some new standards and guidelines emphasize the retention of horizontal and vertical stand structure to reduce logging impacts on ecosystem structure and function, enrich reestablished stands with structural features, and enhance connectivity across the landscapes. Little is known, however, about the effects on wildlife of varying the level and spatial distribution of retained structures in forests of western Oregon and Washington. Replicated and controlled experimental studies in the DEMO study are beginning to quantify the effects of varying the level and spatial aggregation of green-tree retention during forest harvest on vertebrates, vegetation, other ecosystem components, and socioeconomic values. Eight replicate blocks of six experimental treatments have been established in the Umpqua National Forest in Oregon and the Gifford Pinchot National Forest and Capitol State Forest in Washington. Patterns of species richness, evenness, and relative abundance of birds, small mammals, bats, and amphibians before and after harvest were quantified to examine short-term treatment responses. Pretreatment sampling has been completed on all sites, harvest treatments are in progress, and posttreatment sampling began on some sites during summer 1998. An overview of hypotheses, methods, and pretreatment species occurrence and abundance within the study blocks is presented. Long-term studies of vertebrate response, habitat associations, and trophic interactions are planned.

Keywords: DEMO study, green-tree retention, spatial distribution, vertebrate response, species richness, species abundance.

Publications Available Elsewhere

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

Botany

Gerson, Elizabeth A.; Kelsey, Rick G.
1999. Piperidine alkaloids in nitrogen fertilized *Pinus ponderosa*. Journal of Chemical Ecology. 25(9): 2027-2039.

Pole-sized ponderosa pine trees were fertilized at two low-quality sites and pine saplings at a relatively high-quality site with NH_4NO_3. Six to 12 months later, the percentage of nitrogen and piperidine alkaloid concentrations in foliage was measured. The nitrogen additions raised the percentage of foliar nitrogen above deficiency levels at the low-quality sites but did not elevate it in saplings at the high-quality site. The nitrogen additions increased mean concentrations of predominant alkaloid, pinidine, in foliage at all three sites. In trees with foliar nitrogen below a threshold of 1.1 percent, no more than trace levels of alkaloids were detected, indicating that alkaloid production is dependent on nutrient sufficiency. These findings demonstrate that foliar alkaloids can be increased by nitrogen fertilization of forest trees growing on both low and high quality sites. Fertilizing for the purpose of inhibiting potential herbivory may be more successful at higher quality sites where alkaloid levels are enhanced relative to food quality.

Keywords: 2,6-disubstituted piperidine alkaloids, ponderosa pine, fertilization, foliar nitrogen, Pinaceae.

(See Corvallis order form.)

Economics

Adams, Darius M.; Haynes, Richard W.
1998. Forest sector modeling: current state and promise for the future. In: Yoshimoto, Atsushi; Yukutake, Kiyoshi, eds. Proceedings of international symposium on global concerns for forest resource utilization–sustainable use and management; 1998 October 4-8; Miyazaki, Japan. [Place of publication unknown]: [Publisher unknown]: 13-27. Vol. I.

This paper reviews forest sector models classified by number of endogenous market levels, treatment of spatial market relations, and assumptions about producer and consumer knowledge of the market and the future. Models are considered in terms of their characteristics, decisions in developing their structure, how the structure affects the things that can be made endogenous, and the implications of these features for conducting policy studies. Future efforts should (a) develop spatial, intertemporal optimization models with multiple market levels; (b) examine constraints on adjustment flexibility in the intertemporal welfare maximization format; (c) develop methods that allow joint stimulation of market and resource models but retain their respective detail; (d) directly embrace the messiness of real world market-resource conditions; and (e) be explicit about the uncertainty inherent in policy scenarios and projections.

Keywords: Supply-demand relations, forest sector modeling, forest economics.

(See Portland order form.)

Alig, Ralph J.; Adams, Darius M.; Chmelik, John T.; Pete Bettinger
1999. Private forest investment and long-run sustainable harvest volumes. New Forests. 17: 307-327.

This study examines the dynamics of investment in private forest management according to a model of timber markets and timber supply in which intertemporal levels of private investment, harvest, and timber prices are all endogenous.

The results of this model are used to examine the extent and types of possible future private management investments and how these will affect timber supply.

Keywords: Nonindustrial forests, planted forests, projection models, timber markets, timber supply.

(See Corvallis order form.)

Alig, Ralph J.; Adams, Darius M.; McCarl, Bruce A.

1998. Impacts of incorporating land exchanges between forestry and agriculture in sector models. Journal of Agricultural and Applied Economics. 20(2): 389-401.

The U.S. forestry and agricultural sectors are linked in that parts of their land bases are suitable for use in either sector. The influence of specific federal conservation and farm support policies on land exchanges between forestry and agriculture was examined, including changes in the Conservation Reserve Program. Reallocation of land is a significant part of the responses to these policies, along with intensification of timber management on existing forests.

Keywords: Land exchange, sector models, conservation reserve program.

(See Corvallis order form.)

Fight, Roger D.; Chmelik, John T.

1998. Analysts guide to FEEMA for financial analysis of ecosystem management activities. Gen. Tech. Rep. FPL-GTR-111. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 5 p.

Strategies for using the financial evaluation of ecosystem management activities (FEEMA) software are described. The program was developed as a tool to assess the financial viability of management activities for removing small trees for manufacture into wood products. Combinations of tree stands, management activities, and contractual requirements can be ranked along a continuum ranging from actions unlikely to pay for themselves under any economic conditions to those likely to cover their implementation costs. The program can be used early in the planning process to obtain information on the potential net value of alternative strategies or later to assess the financial feasibility of a tentative plan. This report includes information on data input files, validation and interpretation of analysis results, and flexibility of the program.

Keywords: Ecosystem management, economic evaluation, stand management.

(A limited number of free copies of this publication are available from the Forest Products Laboratory, One Gifford Pinchot Drive, Madison, WI 53705-2398. It also may be downloaded from http://www.fpl.fs.fed.us/documnts/fplgtr/fplgtr111.pdf.)

Haynes, Richard W.; Adams, Darius M.

1998. Have forest sector models changed forest policy in the United States? In: Yoshimoto, Atsushi; Yukutake, Kiyoshi, eds. Proceedings of international symposium on global concerns for forest resource utilization–sustainable use and management; 1998 October 4-8; Miyazaki, Japan. [Place of publication unknown]: [Publisher unknown]: 533-537. Vol. II.

The United States has a 100-year history of broad-scale assessments of forest conditions and timber trend types of studies. What has changed over that period has been both new types and amounts of data and the ability to develop more explicit information from the available data. How have forest sector models developed in the last 120 years changed forest policy in the United States? The answer is threefold: they shifted the discussions from quantities to prices, they have allowed the use of scenario planning to discuss different views of the future, and they have changed the perceptions of decisionmakers through collaborative learning in the sense that we have been able to demonstrate how various projections are based on the underlying assumptions.

Keywords: Models, policy analysis, price effects.

(See Portland order form.)

Lyons, Charles Kevin

1998. Helicopter logging productivity in dispersed and aggregate partial retention systems. Vancouver, BC: University of British Columbia. 64 p. M.F. thesis.

Factors affecting helicopter logging productivity in partial cutting operations were evaluated. The harvest treatments included 75 percent aggregated retention, 40 percent dispersed retention, 40 percent aggregrated retention, and 15 percent dispersed retention. Regression equations were developed to estimate total return time and turn volume. The equations demonstrate that productivity increases with reduced horizontal distance to the unit, increased log size, and increased volume of merchantable wood per unit mass. The treatments did not appear to have a dramatic effect on helicopter productivity.

Keywords: Logging (helicopter), logging productivity, partial cutting, case study, timber harvest.

(Available only through library or interlibrary loan.)

Wagner, Francis G.; Keegan, Charles E.; Fight, Roger D.; Willits, Susan

1998. Potential for small-diameter sawtimber utilization by the current sawmill industry in western North America. Forest Products Journal. 48(9): 30-34.

New silvicultural prescriptions for ecosystem management on both public and private timberlands in western North America likely will result in an influx of relatively small-diameter sawtimber for processing. Because sawmills currently process a majority of sawtimber harvested in western North America, this study concentrated on determining the value of small-diameter sawtimber delivered to sawmills. The value of sawtimber delivered to a sawmill was based on a 25-percent and a 10-percent return on invested capital and on covering only the variable costs of manufacturing. Results indicate that small-diameter sawtimber may have to be subsidized for processing by the current sawmill industry.

Keywords: Sawtimber manufacture, small timber, manufacturing cost (lumber), lumber industry, return on investment.

(See Portland order form.)

Ecosystem Structure and Function

Beardsley, Debby; Bolsinger, Charles; Warbington, Ralph

1998. Keynote talk I: old growth in California's conifer forests–definition and area. In: Jones, Stephen M.; Adams, David H.; Rios, Jesse E., eds. Symposium: forest health, hazard trees, and other legal issues of mature and overmature forests: Proceedings of the 47th annual meeting; 1998 November 19-20; Sacramento. Sacramento, CA: California Department of Forestry and Fire Protection; California Forest Pest Council: 2-10.

In 1993, old-growth coniferous forests in the Sierra Nevada and Klamath regions of California covered about 2.2 million acres, 12 percent of the total area of coniferous forests. Most of the old growth was in high-elevation forest types, the forests generally least affected by logging, mining, development, and fire. Almost all the old growth was in federal ownership, mostly National Forests and National Parks. Surprisingly, most of the old growth in National Forests was outside designated wilderness areas. Less than 1 percent of the 7.7 million acres of privately owned coniferous forests in the two regions was old growth.

Keywords: Old growth, forest inventory, forest inventory and analysis, California, old stands, mature stands.

(See Portland order form.)

Bisson, Peter A.; Bilby, Robert E.

1998. Organic matter and trophic dynamics. In: Naiman, Robert J.; Bilby, Robert E., eds. River ecology and management: lessons from the Pacific coastal ecoregions. [New York City]: [Springer-Verlag]: 373-398. Chapter 15.

The relative abundance of different types of aquatic producers and consumers changes from headwater streams to large flood-plain rivers in response to the availability and character of organic matter inputs. With salmonid fishes as an example, differences in productivity between streams often can be explained through trophic relationships. For populations of anadromous

salmonids in the Pacific Northwest, productivity may be strongly influenced by autotrophic processes in spring and summer and heterotrophic processes in autumn and winter.

Keywords: Stream ecology, nutrient dynamics, salmonid production.

(Available in libraries and bookstores.)

Fenn, Mark E.; Poth, Mark A.; Aber, John D. [and others]

1998. Nitrogen excess in North American ecosystems: predisposing factors, ecosystem responses, and management strategies. Ecological Applications. 8(3): 706-733.

The phenomenon of nitrogen excess in North American ecosystems was reviewed by summarizing data from case studies. The major objectives were to describe the geographic extent and factors predisposing terrestrial ecosystems to nitrogen saturation; to compare the responses of ecosystems to nitrogen deposition in widely different climates, vegetation types, and levels of nitrogen inputs; to discuss management strategies for reducing nitrogen losses from watersheds and undesirable environmental impacts of excess nitrogen; and to outline the effects of nitrogen loss from watersheds on downstream estuaries and coastal marine systems.

Keywords: Atmospheric nitrogen deposition, eutrophication, forest ecosystems, nitrate leaching, nitrogen cycling, nitrogen saturation, soil acidification.

(See Corvallis order form.)

Johnson, Marlin; Barbour, James; Green, David W. [and others]

1999. Ecosystem management and the use of natural resources. In: Johns, N.C.; Malk, A.J.; Sexton, W.T.; Szaro, R., eds. Ecological stewardship: a common reference for ecosystem management. Oxford, England: Elsevier Science Ltd.: 557-582.

Ecosystem management provides the opportunity to produce and use natural resources in ways that ensure, within reasonable limits, sustained ecosystem functions. In fact, ecosystem management includes providing for the needs of humans. It is a challenge to find ways to forecast how ecosystems are likely to respond to changes related to the production and use of our resources. The resources desired from public lands include wildlife and fish, recreation, minerals, wood fiber, forage for livestock, clean water, and many special forest products, including Christmas trees, mushrooms, and berries.

Keywords: Ecosystem management, sustainable forestry, wood utilization, recreation.

(Available in bookstores and libraries.)

Fire

Ottmar, Roger D.

1998. Photo series developed for major natural fuel types of the United States. In: The fuels profile–a newsletter of the Great Basin fuels committee. [Place of publication unknown]: [U.S. Department of Agriculture, Forest Service, Intermountain Region]; 1(1): 1, 4-5.

Estimating biomass loading is a critical component enabling fire managers to determine fuel consumption and the resulting fire effects following prescribed fire and wildfire. Biomass quantification is also critical for determining cover for large and small animals, soil protection, nutrient cycling, and microclimate effects. A series of photos, called a photo series, provides a quick, easy-to-use way to of quantify and describe existing biomass. The series will be a six-volume publication delineated by region. Each volume will contain 25 to 40 photos along with a short summary of how to use the series. Subsequent publications will describe inventory methods in more detail, contain maps and directions for relocating the sites, and provide tables of fire behavior prediction for use with the photo series.

Keywords: Wildland fire, prescribed fire, biomass combustion, photo series, fuel types.

(See Seattle order form.)

Ottmar, Roger D.

1999. New approaches to quantifying fuels and fuel consumption. In: The fuels profile–a newsletter of the Great Basin fuels committee. [Place of publication unknown]: [Publisher unknown]: 2(1): 6-8.

Congress, agency administrators, land managers, and others have recognized that the accumulation of wildland fuels must be reduced to mitigate the threat to humans from fire and to maintain natural resource values. Congress directed the Department of the Interior and the USDA Forest Service to develop a joint fire science plan to provide science-based support to land management agencies as they address this need. A consortium of federal wildland management agencies came together to develop the fire science program and requested science proposals to address issues critical to the success of the fuels management and fire use programs. Three proposals submitted by the Pacific Northwest Research Station were selected for funding. They will provide the means to (1) characterize fuelbeds in relation to fire effects and fire behavior by using a nationally consistent but locally flexible classification system, (2) predict fuel consumption by combustion stage for new fuel types, and (3) inventory fuelbeds through an extended series of photographs.

Keywords: Wildland fire, prescribed fire, fuels, joint fire science program.

(See Seattle order form.)

Fish

Cederholm, C.J.; Bilby, R.E.; Bisson, P.A. [and others]

1997. Response of juvenile coho salmon and steelhead to placement of large woody debris in a coastal Washington stream. American Journal of Fisheries Management. 17: 947-963.

The response of populations of juvenile coho salmon (*Oncorhynchus kisutch*) and steelhead (*O. mykiss*) to the addition of large woody debris (LWD) was tested in North Fork Porter Creek, a small coastal tributary of the Chehalis River, Washington. The creek was divided into three 500-meter study sections; two sections were altered through engineering and "logger's choice" of adding LWD, and the third was kept as a reference site. Immediately after LWD addition, the abundance of LWD pieces was 7.9 and 2.7 times greater than the pretreatment level in the engineered site and logger's choice site, respectively; abundance was unchanged in the reference site. Subsequent winter storms brought additional LWD into all three study sites. In subsequent years, the amount of pool surface area increased significantly in both the engineered and logger's choice sites but decreased slightly in the reference site. After LWD addition, winter populations of juvenile coho salmon increased significantly in the engineered and logger's choice sites and remained the same in the reference site.

Keywords: Pacific salmon, stream enhancement, large woody debris.

(See Olympia order form.)

Graf, William L.; Aichinger, Clifton J.; Anderson, Blake P. [and others]

1999. New strategies for America's watersheds. Washington, DC: National Academy Press. 311 p.

Management of water and related resources based on a regional perspective is not a new concept, but as the 21st century approaches, it has taken on added importance for America's watersheds. National goals of vibrant economic development with simultaneous progress in environmental restoration and preservation emphasize the need to bring together the public, decisionmakers, and scientists in effective strategies. The attainment of these goals is not mutually exclusive but can be assured only with the integration of ecological, social, and economic approaches to environmental management problems.

Keywords: Watershed management, Clean Water Act, land use policy, agency framework.

(Available at bookstores and libraries.)

Tinus, Craig A.

1999. Territorial behavior in juvenile steelhead trout (*Oncorhynchus mykiss):* how redside shiner (*Richardsonius balteatus*) influence intraspecific interactions. Corvallis, OR: Oregon State University. 43 p.

Juvenile steelhead are known to associate with shiner groups, though they also compete for food. Steelhead form dominance hierarchies within cohorts and aggressively defend feeding territories against all other fish. The effects of shiner density and temperature on the survival and growth of subordinate juvenile steelhead were tested. Mechanisms were determined for significant differences.

Keywords: Steelhead trout, Oncorhynchus mykiss, *redside shiners,* Richardsonius balteatus, *social behavior.*

(Available only through library or interlibrary loan.)

Harvesting

Coulter, Keith M.

1999. The effects of silvicultural treatments on harvesting production and costs. Moscow, ID: University of Idaho. 113 p. M.S. thesis.

Production and cost for alternative silvicultural treatments on second-growth Douglas-fir stands in western Washington were compared. The alternative prescriptions were clearcut, two-aged, patch cut and thinning, group selection and thinning, and thinning. The contractor, equipment, and crew were the same for all silvicultural treatments. A procedure referred to as a snap-back-time study method was performed on each component of the harvesting operation to obtain production times. This information was used to determine production costs for each option.

Keywords: Silviculture, harvesting, costs.

(Available only through library or interlibrary loan.)

Invertebrates

Cronin, James T.; Turchin, Peter; Hayes, Jane L.; Steiner, Chris A.

1999. Area-wide efficacy of a localized forest pest management practice. Environmental Entomology. 28(3): 496-504.

Few experimental studies have examined the movement of forest pest populations, particularly in response to management tactics designed to disrupt the growth of pest infestations. Interinfestation patterns of dispersal of the southern pine beetle, *Dendroctonus frontalis* Zimmermann (Coleoptera: Scolytidae), were quantified by monitoring the fates of fluorescently marked beetles after emergence from small natural infestations. Overall, colonization success for treated infestations was almost a fourfold increase over untreated infestations. This suggests that by altering the dispersal patterns of beetles, a cut-and-leave suppression tactic may favor increased densities of flying beetles, and possibly more infested timber, in the surrounding region. Effective control of mobile pests may be enhanced by expanding spatial scope and seeking to maximize the area-wide efficacy of management tactics.

Keywords: Dendroctonous frontalis*, bark beetles, dispersal, mark-recapture experiment, pest management techniques, spatial dynamics.*

(See La Grande order form.)

Landscape Ecology

Bergen, Scott D.; McGaughey, Robert J.; Fridley, James L.

1998. Data-driven simulation, dimensional accuracy and realism in a landscape visualization tool. Landscape and Urban Planning. 40: 283-293.

Computer-based landscape simulation tools are used to assess the visual impact of land-use decisions. Many systems rely on the artistic manipulation of two-dimensional scanned photographic or videotape images. The specific manipulation of an image is often not directly driven by data describing the proposed landscape modification. Also, it is difficult to move from a modified two-dimensional image to a

three-dimensional real world design. This paper discusses how issues of data-driven simulation and dimensional accuracy are addressed in the Vantage Point visualization tool. Features that contribute to image realism are discussed as well as the use of the tool for research in visual quality management and psychophysics.

Keywords: Visualization, landscape, data-driven simulation.

(See Seattle order form.)

Plant Ecology

Edson, J.L.; Everett, R.L.; Wenny, D.L.; Henderson, D.M.

1998. Shoot culture of *Astragalus*: toward conserving a threatened genus. Botanic Gardens Micropropagation News. 2(2): 34-36.

Four threatened North American species of *Astragalus* were evaluated for ease of micropropagation by shoot culture. Average multiplication rates of axillary microshoots ranged from 2.5 to 3.1 after culture in MS with 0.1 milligram per liter IAA. Over 90 percent of the plantlets survived acclimatization, and all species flowered and produced viable seed in the greenhouse.

Keywords: Astragalus*, micropropagation, conservation strategies, acclimatization.*

(See Wenatchee order form.)

Liegel, Leon H.; Busing, Richard

1998. Forest health monitoring in the West Coast, 1998. In: Jones, Stephen M.; Adams, David H.; Rios, Jesse E., eds. Symposium: forest health, hazard trees, and other legal issues of mature and overmature forests: Proceedings of the 47th annual meeting; 1998 November 19-20; Sacramento. Sacramento, CA: California Department of Forestry and Fire Protection; California Forest Pest Council: 8-10. Appendix.

At the end of summer 1998, 75 percent of the forest health monitoring (FHM) 1992-95 baseline plots in California had been remeasured and 25 percent of the 1997 baseline plots in Oregon and Washington were remeasured. In comparing California and Washington-Oregon baseline data, timberland percentage was highest in Washington and nonforest was highest in California. Density and basal area of live stems and species diversity indices were similar in all states, but snag density in Washington was about twice that found in California or Oregon. Personnel changes, future analytical work, and reporting accomplishments are summarized.

Keywords: Forest health monitoring, California, Oregon, Washington, forest types, forest health indicators, forest conditions, forest health, stand structure, biodiversity.

(See Corvallis order form.)

Liegel, Leon H.; Busing, Richard

1998. Keynote talk II: forest health monitoring data for old/mature trees and forests in California and elsewhere. In: Jones, Stephen M.; Adams, David H.; Rios, Jesse E., eds. Symposium: forest health, hazard trees and other legal issues of mature and overmature forests: Proceedings of the 47th annual meeting; 1998 November 19-20; Sacramento. Sacramento, CA: California Department of Forestry and Fire Protection; California Forest Pest Council: 11-14.

Forest health monitoring (FHM) data can be used to assess old and mature stands and trees. Of 197 baseline plots in California, 25 plots had site trees that were 150 years or older or had more than five individuals with a diameter at breast height greater than 100 centimeters; these stands were assigned to an OLD stand group. Mean densities of live and dead trees and species diversity in the OLD group were significantly higher than values in the other 172 plots. Select crown, mortality, damage, and other FHM indicator measurements also are being used to determine conditions of old and young trees in urban and army base settings in the Eastern United States.

Keywords: Old growth, forest health monitoring, California, old stands, mature stands, forest conditions, forest health, urban forest health.

(See Corvallis order form.)

Roorbach, Ashley H.

1999. The ecology of devil's club (*Oplopanax horridum* (J.E. Smith) Miq.) in western Oregon. Corvallis, OR: Oregon State University. 106 p. M.S. thesis.

Devil's club (*Oplopanax horridum* (J.E. Smith) Miq.) is an indigenous shrub of the Pacific Northwest, commonly found in western Oregon in a western hemlock (*Tsuga heterophylla*)/devil's club association. In the same family as ginseng, devil's club is gaining attention for its medicinal uses. Historically, it has been one of the most important medicinal and sacred plants of the Pacific Northwest native people. Although the medicinal uses and modern potential of devil's club are well understood, little biological research has been conducted. Devil's club's ecological niche, adaptive limitations, and growth patterns were studied in the Oregon Cascade and Coast Ranges. Devil's club was found growing in a wide range of light environments but was limited to moist soil environments. Retrospective measurements of stem growth and branching patterns showed that occupation of growing sites is achieved primarily through layering of aerial stems. A greenhouse experiment indicated that production of rooting stock should not be difficult.

Keywords: Devil's club, Oplopanax horridum*, medicinal plants.*

(Available only through library or interlibrary loan.)

Wu, Xinyuan; McCormick, J. Frank; Busing, Richard T.

1999. Growth pattern of *Picea rubens* prior to canopy recruitment. Plant Ecology. 140: 245-253.

The growth of red spruce (*Picea rubens*) was studied in an old-growth forest. Prior to canopy recruitment, trees experienced up to seven periods of suppression. Processes of canopy recruitment and canopy disturbance were inferred from the tree-ring data.

Keywords: Canopy gaps, dendrochronology, disturbance ecology, red spruce, Picea rubens*.*

(See Corvallis order form.)

Plant Pathology

Mathiasen, Robert L.; Parks, Catherine G.; Geils, Brian W.; Beatty, Jerome S.

1998. Notes on the distribution, host range, plant size, phenology, and sex ratio of two rare dwarf mistletoes from Central America: *Arceuthobium hawksworthii* and *A. hondurense*. Phytologia. 84(2): 154-164.

New information on the distribution, host range, plant size, and flowering periods of *Arceuthobium hawksworthii* and *A. hondurense* are provided based on observations and surveys conducted in 1998 in Belize, Guatemala, and Honduras. *Arceuthobium hawksworthii* parasitizes only *Pinus caribaea* var. *hondurensis* in Belize and does not parasitize *P. oocarpa* var. *ochoterenai* as previously reported. Surveys in the *P. caribaea* forest near Poptun, Guatemala, indicate that *A. hawksworthii* does not occur there and, therefore, probably does not occur in Guatemala. This dwarf mistletoe probably has the most restricted geographic range of any known dwarf mistletoe. No new populations of *A. hondurense* were discovered in Honduras, but examination of a previously reported population of this mistletoe indicates it is parasitizing *P. oocarpa* at this location and not *P. maximinoi* as previsously reported. *Arceuthobium hondurense* is known to parasitize only *P. oocarpa* in Honduras.

Keywords: Hawksworth's dwarf mistletoe, Honduran dwarf mistletoe, Caribbean pine.

(See La Grande order form.)

Remote Sensing

Gray, John E.

1998. Testing two applications of image analysis for use in species-independent biomass equations for western Oregon forests. Corvallis, OR: Oregon State University. 42 p. M.S. thesis.

Remote sensing technologies have proven useful and cost-efficient for quantifying various forest vegetation characteristics over multiple scales. Significant limitations were encountered, however, in each of two related experiments conducted to explore their potential to supplement

or replace traditional, single-species biomass equations for estimation of ground vegetation and tree overstory on 1- to 3-hectare forest plots.

Keywords: Long-term productivity, dimension analysis.

(Available only through library or interlibrary loan.)

Silviculture

Cascade Center for Ecosystem Management
1999. The H.J. Andrews uneven-aged management project: managing young stands. 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 project summary describes the H.J. Andrews uneven-age management project. This study is designed to compare and evaluate alternative approaches to initiating uneven-age/multicohort stand structure in the 30- to 40-year-old plantations.

Keywords: Silviculture, thinning, managed forests.

(See Corvallis order form.)

Cole, E.C.; Newton, M.; Youngblood, A.
1999. Regenerating white spruce, paper birch, and willow in south-central Alaska. Canadian Journal of Forest Research. 29: 993-1001.

The current spruce bark beetle (*Dendroctonus rufipennis*) epidemic in interior Alaska is leaving large expanses of dead spruce with little spruce regeneration. Many of these areas are habitat for moose. To establish spruce regeneration and improve production for moose, paper birch, willow, and three stock types of white spruce were planted in freshly cutover areas on Fort Richardson, near Anchorage. Four vegetation management treatments were compared: broadcast site preparation with herbicides, banded site preparation with herbicides, mechanical scarification, and untreated control. Spruce seedlings had the greatest growth in the broadcast site preparation treatment. Stock type was the most important factor in spruce growth, with bareroot transplant seedlings being the tallest and largest 5 years after planting. Results indicate the spruce can be regenerated and moose browse enhanced simultaneously in forests in interior Alaska.

Keywords: Regeneration, white spruce, paper birch, willow, Alaska.

(See La Grande order form.)

Social Sciences

Kavanagh, Kathleen; Stankey, George; Boyle, Jim
1999. The integration of planted and natural forests in a regional landscape. New Forests. 18: 97-109.

Northwestern Oregon is dominated by mountainous forested landscapes fringed by agricultural lands and rapidly expanding urban areas. Timber harvest was the dominant land use for much of the 20th century. Many current forest stands are planted and have potential to be managed and shaped for various traditional and evolving forestry objectives. The ages, resilience, and productivity of these forests and mosaics of land ownerships permit a variety of future scenarios of forested landscapes, constrained largely by capacities of social organizations to plan and execute management for desired future conditions.

Keywords: Forest management, human influences, sustainability.

(See Corvallis order form.)

Shindler, Bruce; Reed, Michelle
1996. Forest management in the Blue Mountains: public perspectives on prescribed fire and mechanical thinning. Corvallis, OR: Oregon State University, Department of Forest Resources. 58 p.

Accurate information about public support for ecosystem management practices is essential for implementing effective long-term management policies. This study describes citizen perspectives of the use of prescribed fire and mechanical thinning for fuels reduction in four National

Forests in the Blue Mountains of eastern Oregon and Washington. Empirical results from mail survey data indicated a strong level of support for both practices. In addition, most citizens were willing to live with resulting short-term impacts on soils, wildlife habitat, water and air quality, recreation, and scenic views. Additional findings suggested that citizens will be waiting to see how well plans are carried out before making final judgments. Management implications are described.

Keywords: Prescribed fire, mechanized thinning, public preferences, social acceptability, ecosystem management.

(Only 50 copies of this older report are available. To order, email Diane Smith at desmith@fs.fed.us or write her at P.O. Box 3890, Portland, OR 97208-3890.)

Special Forest Products

Blatner, Keith A.; Alexander, Susan
1998. Recent price trends for non-timber forest products in the Pacific Northwest. Forest Products Journal. 48(10): 28-34.

Many of the industries that comprise the nontimber forest products (NTFPs) market in the Pacific Northwest have existed since the early 1900s. Recently, NTFPs have been receiving more attention from land managers and researchers. There is very little information about year-to-year prices for products within the different industries, so although general trends can be discussed, specific prices and industry trends are not well understood. This paper defines the NTFP industry segments, discusses some of the history and markets in the various industries, and presents a price series dating to 1989.

Keywords: Nontimber forest products, price trends.

(See Corvallis order form.)

Watershed Management

Alexander, J. Scott
1999. Two decades of post-logging recovery: examining stream communities in southeast Alaska. Ann Arbor, MI: University of Michigan. [Pages unknown]. M.S. thesis.

Physical and biological aspects of two second-growth streams on southeast Alaska's Prince of Wales Island were compared to two similar old-growth systems by using data collected 25 to 30 years after logging. Several comparisons were drawn to data collected 5 to 10 years after logging. Thirty years after logging, despite excessive inputs of large woody debris (LWD) during logging, accelerated depletion of wood from small second-growth streams had resulted in LWD levels comparable to levels found in old-growth reference sites. Pool and riffle structure were similar among old-growth and second-growth streams. Macroinvertebrate communities of the four study streams displayed differences in composition and abundance, though few trends were seen between second-growth and old-growth streams.

Keywords: Large woody debris, coho salmon, Oncorhynchus kisutch*, riparian, stream ecology, logging.*

(Available only through library or interlibrary loan.)

Berg, Neil; Carlson, Ann; Azuma, David
1998. Function and dynamics of woody debris in stream reaches in the central Sierra Nevada, California. Canadian Journal of Fisheries and Aquatic Science. 55: 1807-1820.

In 1993, almost 1,700 woody debris pieces were located, measured, and tagged in six streams in the Sierra Nevadas. The stability, geomorphic function, and use by fish for cover of each piece were recorded. In 1994 and 1995, piece movement was quantified, and new debris pieces were measured. In the 60 study reaches, debris was not influential in shaping channel morphology and fish cover. Although woody debris often was associated with habitat units, few pieces deflected flow or contributed to the formation of pools or steps. Fish used deep water as cover more often than debris or any other cover type.

Little sediment was stored by debris, and five large pieces stored 85 percent of the sediment volume measured. Debris frequency and volume did not differ significantly by channel type.

Keywords: Woody debris, channel morphology, fish cover, sediment.

(See Portland order form.)

Wildlife

Bowyer, R. Terry; Van Ballenberghe, Victor; Kie, John G.

1998. Timing and synchrony of parturition in Alaskan moose: long-term versus proximal effects of climate. Journal of Mammalogy. 79(4): 1332-1344.

Timing and synchrony of parturition in Alaska moose (*Alces alces*) were studied in Denali National Park and Preserve, Alaska, from 1990 to 1994. Mean date of birth was 25 May and did not differ significantly among years. Ninety-five percent of births occurred in 16 days with no significant differences among years. Most young moose were killed by predators, especially grizzly bears (*Ursus arctos*), but timing of reproduction had no effect on survivorship of young, which was low. Both timing and synchrony may be adaptations to long-term patterns of climate that provide the most hospitable conditions for bearing and rearing young. Moose may be more susceptible to climatic change than are other ungulates more adapted to climatic variability.

Keywords: Alces alces*, moose, parturition, synchrony, predation, survivorship, weather, forage, climatic change, Alaska.*

(See Anchorage order form.)

Brett, Tiffany A.

1997. Habitat associations of woodpeckers at multiple scales in managed forests of the southern Oregon Cascades. Corvallis, OR: Oregon State University. 95 p. M.S. thesis.

Nest-site characteristics and habitat relations were studied for three species of primary cavity-nesting birds–hairy woodpecker (*Picoides villosus*), northern flicker (*Colaptes auratus*), and red-breasted sapsucker (*Sphyrapicus ruber*)–over spatially heterogeneous landscapes in managed forests of the southern Oregon Cascades during 1995 and 1996. More woodpecker nests were found in landscapes with lower proportions of mature closed canopy forest and greater overall habitat complexity. Regeneration prescriptions such as shelterwoods, commercial thinning, and partial cuts increase landscape diversity and enhance habitat conditions for nesting woodpeckers.

Keywords: Hairy woodpecker, northern flicker, red-breasted sapsucker, woodpecker habitat.

(Available only through library or interlibrary loan.)

Carey, Andrew B.; Maguire, Christine C.; Biswell, Brian L.; Wilson, Todd M.

1999. Distribution and abundance of *Neotoma* in western Oregon and Washington. Northwest Science. 73(2): 65-80.

The distribution of bushy-tailed woodrat (*Neotoma cinerea*) and dusky-footed woodrat (*N. fuscipes*) in Douglas-fir dominated forests on the west side of the Cascade Range was studied. In Washington, *N. cinerea* is rare in upland forests but abundant along rocky streams on the eastern Olympic Peninsula and in rock bluffs on the west slope of the Cascade Range; *N. fuscipes* does not occur in Washington. In Oregon's Douglas-fir/western hemlock forests, *N. fuscipes* is rare and at the northern limits of its range in upland forests, but *N. cimerea* is common in old forests and along streams. In mixed-conifer forests, both species are occasionally abundant under various conditions, but their abundances are negatively correlated.

Keywords: Neotoma*, woodrat, Douglas-fir, western hemlock, Olympic Peninsula, Cascade Range.*

(See Olympia order form.)

Carey, Andrew B.; Wilson, Todd M.; Maguire, Christine C.; Biswell, Brian L.

1997. Dens of northern flying squirrels in the Pacific Northwest. Journal of Wildlife Management. 61(3): 684-699.

Silvicultural prescriptions to enhance northern flying squirrel habitat have been suggested as an aid for recovery of the threatened northern spotted owl. During 1986-94 radiotelemetry was used to locate 604 different den sites in the southern Coast Range of Oregon and the southern Olympic Peninsula and Puget Trough of Washington. Den sites included cavities in live and dead old-growth trees; cavities, stick nests, and moss nests in young second-growth trees; dens in cavities in branches of fallen trees; and dens in decayed stumps of old-growth trees and suppressed young trees. Two-thirds of all the dens located were in live trees. Most dens were located during a study of second-growth forest in the Puget Trough. Management for cavity trees and dens could prove fruitful in owl recovery and habitat restoration efforts.

Keywords: Glaucomys sabrinus*, northern flying squirrel, Pacific Northwest, Washington, Oregon, den, nest, cavity, prey, telemetry, old growth, spotted owl.*

(See Olympia order form.)

Feen, Jeffrey S.

1997. Winter den sites of northern flying squirrels in Douglas-fir forests of the south-central Oregon Cascades. Corvallis, OR: Oregon State University. 45 p. M.S. thesis.

Selection of winter den sites by northern flying squirrels (*Glaucomys sabrinus*) were studied in forests of the Oregon Cascade Range. Fifty-six squirrels were radio-collared in three managed, 80- to 130-year-old Douglas-fir stands in the Umpqua National Forest during winters 1994-95 and 1995-96. Characteristics of 134 winter den sites were compared with randomly selected sites. Nests of flying squirrels were more likely found in large, dead trees that leaned.

Keywords: Flying squirrels, Glaucomys sabrinus*, winter dens.*

(Available only through library or interlibrary loan.)

Parks, Catherine G.; Bull, Evelyn L.

1999. Wildlife use of dwarf mistletoe brooms in Douglas-fir in northeast Oregon. Western Journal of Applied Forestry. 14(2): 100-105.

Douglas-fir (*Pseudotsuga menziesii*) trees with and without dwarf mistletoe (*Arceuthobium douglasii*) brooms were examined in the Starkey Experimental Forest in the Blue Mountains of northeastern Oregon for evidence of use by wildlife. Evidence of foraging occurred in 51 percent of the broomed trees and in 29 percent of the trees without brooms. Evidence of nesting by mammals occurred in 18 percent of the broomed trees and in none of the trees without brooms. Brooms used and those not used by wildlife significantly differ in type and volume.

Keywords: Dwarf mistletoe, (Arceuthobium douglasii)*, wildlife habitat.*

(See La Grande order form.)

Thompson, Rebecca L.

1997. Home range and habitat use of western red-backed voles in mature coniferous forests in the Oregon Cascades. Corvallis, OR: Oregon State University. 88 p. M.S. thesis.

Short rotations associated with forest management practices in the Pacific Northwest may reduce the abundance of habitat features within home ranges of western red-backed voles (*Clethrionomys californicus*). Red-backed voles were radio-collared and telemetry locations were recorded hourly during active periods. Females exhibited bimodal patterns of activity; males were active all evening, ranged farther, and had larger core areas. Home range core areas were characterized by deep organic soil layers and large volumes of decayed logs.

Keywords: Western red-backed voles, Clethrionomys californicus*, habitat, home range.*

(Available only through library or interlibrary loan.)

White, Denis; Preston, Eric M.; Freemark, Kathryn E.; Kiester, A. Ross

1999. A hierarchical framework for conserving biodiversity. In: Klopatek, Jeffrey M.; Gardner, Robert H., eds. Landscape ecological analysis: issues and applications. New York City: Springer-Verlag: 127-153. Chapter 8.

Multiple-scale, hierarchical approaches are needed for conserving biodiversity. Such approaches should be interdisciplinary, including contributions not only from biology and ecology but also from other applied sciences such as hydrology, agriculture, and forest science, and from the social sciences and arts as well. With collaboration from many perspectives, richer databases and analytical approaches can be formulated. More significantly, a multifaceted approach promises better links between scientific perspectives and the spatial, temporal, and political structure of decisionmaking. Clarifying the scientific status of biodiversity can set the stage for moving the biodiversity debate from one primarily about the facts of the issue to one about values.

Keywords: Biodiversity, conservation, landscape planning.

(Available in bookstores and libraries.)

Wood Utilization

Eastin, Ivan L.; Lane, Christine L.; Fight, Roger D.; Barbour, Jamie

1998. An assessment of the industrial markets for softwood clearwood lumber. Forest Products Journal. 48 (11/12): 48-54.

This project assessed the market opportunities for second-growth clearwood lumber by identifying industry segments that currently use clearwood lumber and determining whether alternative markets will continue to exist for clearwood lumber produced from intensively managed forests in the Pacific Northwest. A survey of industrial lumber remanufacturers was conducted in 1995 to identify those industry segments currently using clearwood lumber and the clearwood attributes perceived to be important to managers in the manufacturing industry.

Keywords: Forest management, forest economics, sustainable forestry.

(See Portland order form.)

Anchorage Lab Order Form

To order a copy of this publication, check the reference, and mail the form to:
Anchorage Forestry Sciences Laboratory
3301 C Street Suite 200
Anchorage, AK 99503

The Anchorage Forestry Sciences Laboratory is able to accept email requests for this publication. Send requests to lhill/r10_chugach@fs.fed.us.

____ Terry R. Bowyer, Victor Van Ballenberghe, and John G. Kie
Timing and synchrony of parturition in Alaskan moose: long-term versus proximal effects of climate

First Quarter 2000

Please print. This may be used as a mailing label:

Name

Address

Address

City, ST zip

Cut here

From: _____

_____

_____

_____

Place Postage Stamp Here

Attn: L. Hill, Publication Requests
Anchorage Forestry Sciences Laboratory
3301 C Street Suite 200
Anchorage, AK 99503

Corvallis Lab Order Form

To order copies of these publications, check the reference, and mail the form to:
Corvallis Forestry Sciences Laboratory
3200 S.W. Jefferson Way
Corvallis, OR 97331

The Corvallis Forestry Sciences Laboratory is able to accept email requests for these publications. Send requests to ibutler@fs.fed.us.

____ Ralph J. Alig, Darius M. Adams, John T. Chmelik, and Pete Bettinger
Private forest investment and long-run sustainable harvest volumes

____ Ralph J. Alig, Darius M. Adams, and Bruce A. McCarl
Impacts of incorporating land exchanges between forestry and agriculture in sector models

____ Keith A. Blatner and Susan Alexander
Recent price trends for non-timber forest products in the Pacific Northwest

____ Cascade Center for Ecosystem Management
The H.J. Andrews uneven-aged management project: managing young stands

____ Mark E. Fenn, Mark A. Poth, John D. Aber, and others
Nitrogen excess in North American ecosystems: predisposing factors, ecosystem responses, and management strategies

____ Elizabeth A. Gerson and Rick G. Kelsey.
Piperidine alkaloids in nitrogen fertilized *Pinus ponderosa*

____ Kathleen Kavanagh, George Stankey, and Jim Boyle
The integration of planted and natural forests in a regional landscape

____ Leon H. Liegel and Richard Busing
Forest health monitoring in the West Coast, 1998

____ Leon H. Liegel and Richard Busing
Keynote talk II: forest health monitoring data for old/mature trees and forests in California and elsewhere

____ Xinyuan Wu, J. Frank McCormick, and Richard T. Busing
Growth pattern of *Picea rubens* prior to canopy recruitment

First Quarter 2000

Please print. This may be used as a mailing label:

Name

Address

Address

City, ST zip

Cut here

From: _____

_____

_____

_____

Place Postage Stamp Here

Publication Requests
Corvallis Forestry Sciences Laboratory
3200 SW Jefferson Way
Corvallis, OR 97331

La Grande Lab Order

To order copies of these publications, check the reference, and mail the form to:
La Grande Forestry and Range Sciences Laboratory
1401 Gekeler Lane
La Grande, OR 97850

____ E.C. Cole, M. Newton, and A. Youngblood
Regenerating white spruce, paper birch, and willow in south-central Alaska

____ James T. Cronin, Peter Turchin, Jane L. Hayes, and Chris A. Steiner
Area-wide efficacy of a localized forest pest management practice

____ Robert L. Mathiasen, Catherine G. Parks, Brian W. Geils, and Jerome S. Beatty
Notes on the distribution, host range, plant size, phenology, and sex ratio of two rare dwarf mistletoes from Central America: *Arceuthobium hawksworthii* and *A. hondurense*

____ Catherine G. Parks and Evelyn L. Bull
Wildlife use of dwarf mistletoe brooms in Douglas-fir in northeast Oregon

First Quarter 2000

Please print. This may be used as a mailing label:

Name

Address

Address

City, ST zip

Cut here

From:

Place Postage Stamp Here

Attn: Publication Request
La Grande Forestry and Range Sciences Laboratory
1401 Gekeler Lane
La Grande, OR 97850

Olympia Lab Order Form

To order copies of these publications, check the reference, and mail the form to:
Olympia Forestry Sciences Laboratory
3625 93d Avenue SW
Olympia, WA 98512-9193

The Olympia Forestry Sciences Laboratory is able to accept email requests for these publications. Send requests to tmullen/r6pnw_olympia@fs.fed.us.

____ Andrew B. Carey, Christine C. Maguire, Brian L. Biswell, and Todd M. Wilson
Distribution and abundance of *Neotoma* in western Oregon and Washington

____ Andrew B. Carey, Todd M. Wilson, Christine C. Maguire, and Brian L. Biswell
Dens of northern flying squirrels in the Pacific Northwest

____ C.J. Cederholm, R.E. Bilby, P.A. Bisson, and others
Response of juvenile coho salmon and steelhead to placement of large woody debris in a coastal Washington stream

First Quarter 2000

Please print. This may be used as a mailing label:

Name

Address

Address

City, ST zip

.

Cut here

From: _____

_____

_____

_____

Place Postage Stamp Here

Olympia Forestry Sciences Laboratory
3625 93d Avenue S.W.
Olympia, WA 98512-9193

Portland Lab Order Form

To order copies of these publications, check the reference, and mail the form to:
Portland Forestry Sciences Laboratory
P.O. Box 3890
Portland, OR 97208-3890

____ Darius M. Adams and Richard W. Haynes
Forest sector modeling: current state and promise for the future.

____ Debby Beardsley, Charles Bolsinger, and Ralph Warbington
Keynote talk I: old growth in California's conifer forests–definition and area

____ Neil Berg, Ann Carlson, and David Azuma
Function and dynamics of woody debris in stream reaches in the central Sierra Nevada, California.

____ Ivan L. Eastin, Christine L. Lane, Roger D. Fight, and Jamie Barbour
An assessment of the industrial markets for softwood clearwood lumber.

____ Richard W. Haynes and Darius M. Adams
Have forest sector models changed forest policy in the United States?

____ Francis G. Wagner, Charles E. Keegan, Roger D. Fight, and Susan WIllits
Potential for small-diameter sawtimber utilization by the current sawmill industry in western North America.

First Quarter 2000

Please print. This may be used as a mailing label:

Name

Address

Address

City, ST zip

.

Cut here

From:

Place Postage Stamp Here

Publication Request
Portland Forestry Sciences Laboratory
P.O. Box 3890
Portland, OR 97208-3890

Seattle Lab Order Form

To order copies of these publications, check the reference, and mail the form to:
Seattle Forestry Sciences Laboratory
4043 Roosevelt Way N.E.
Seattle, WA 98105-6497

____ Scott D. Bergen, Robert J. McGaughey, and James L. Fridley
Data-driven simulation, dimensional accuracy and realism in a landscape visualization tool

____ Roger D. Ottmar
Photo series developed for major natural fuel types of the United States

____ Roger D. Ottmar
New approaches to quantifying fuels and fuel consumption

First Quarter 2000

Please print. This may be used as a mailing label:

Name

Address

Address

City, ST zip

.

Cut here

From:

Place Postage Stamp Here

Seattle Forestry Sciences Laboratory
4043 Roosevelt Way N.E.
Seattle, WA 98105-6497

Wenatchee Lab Order Form

To order a copy of this publication, check the reference, and mail the form to:
Wenatchee Forestry Sciences Laboratory
1133 N. Western Avenue
Wenatchee, WA 98801

The Wenatchee Forestry Sciences Laboratory is able to accept email requests for this publication. Send requests to kfrance/r6pnw_wenatchee@fs.fed.us or kforsberg/r6pnw_wenatchee@fs.fed.us.

____ J.L. Edson, R.L. Everett, D.L. Wenny, and D.M. Henderson
Shoot culture of *Astragalus*: toward conserving a threatened genus

First Quarter 2000

Please print. This may be used as a mailing label:

Name

Address

Address

City, ST zip

Cut here

From: _____

_____

_____

_____

Place Postage Stamp Here

Attn: Publication Request
Wenatchee Forestry Sciences Laboratory
1133 N. Western Avenue
Wenatchee, WA 98801

To receive a publication from this list, circle the appropriate number, cut out this order card, place it in an envelope, and mail to:

PNW Publications

Portland Habilitation Center, Inc.

5312 N.E. 148th

Portland, OR 97230-3438

Please leave label attached.

97-176	98-376
98-024	99-007
98-364	99-053
98-365	99-244

Northwest Science No. 73

☐ *Check here to remove your name from mailing list or to indicate changes you made on the label.*

The **Forest Service** of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives—as directed by Congress—to provide increasingly greater service to a growing Nation.

Pacific Northwest Research Station, 333 S.W. First Avenue, P.O. Box 3890, Portland, Oregon 97208-3890.