



Recent Publications of the Pacific Northwest Research Station, Second Quarter 1998



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.

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

July 1998

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.

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
P.O. Box 20909
Juneau, AK 99802

La Grande

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

Olympia

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

Portland

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

Seattle

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

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 website. The order forms include email addresses to direct your requests to the appropriate office.

This page intentionally left blank.
Document continues on next page.

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.

General

97-195

Amaranthus, Michael P.

1997. Forest sustainability: an approach to definition and assessment. Gen. Tech. Rep. PNW-GTR-416. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 14 p.

Forest sustainability is a concept for the desired condition of forest ecosystems all over the world. The essential aspects of sustainable forests differ tremendously, however, among peoples of the world. Sustainability needs to be defined to minimize conflict, confusion, and mistrust. One approach is to assess sustainability at the landscape level and define the processes, structures, and resources needed to meet at least many of society's objectives. A landscape-level example is given using the 200 000-hectare Applegate watershed in southwest Oregon.

Keywords: Applegate watershed, landscape level, forest management, social values, spatial and temporal scales, sustainability.

96-223

Hall, Frederick C.

1998. Pacific Northwest ecoclass codes for seral and potential natural communities. Gen. Tech. Rep. PNW-GTR-418. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 290 p. In cooperation with: Pacific Northwest Region.

This publication lists codes for identification of potential natural communities (plant associations, habitat types), their seral status, and vegetation structure in and around the Pacific Northwest. Codes are a six-digit alphanumeric

system using the first letter of tree species, lifeform, seral status, and structure so that most codes can be directly interpreted. Seven appendices list various groupings of codes, a synonymy with plants listing, and a complete list with descriptions of all codes with references to publications.

Keywords: Plant association, seral, structure, potential natural community, Pacific Northwest.

General, Nontechnical

98-073

Pacific Northwest Research Station

1998. Recent publication of the Pacific Northwest Research Station, first quarter 1998. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 14 p.

Keywords: Bibliographies (forestry).

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

Genetics

97-073

Johnson, Randy

1998. Breeding design considerations for coastal Douglas-fir. Gen. Tech. Rep. PNW-GTR-411. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 34 p.

The basic principles of designing forest tree breeding programs are reviewed for Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) in the Pacific Northwest. Breeding populations are discussed given current and future breeding zone sizes and seed orchard designs. Seed order composition is discussed for potential

genetic gain and maintaining genetic diversity in the forest. Mating and field testing designs are described and compared. Recommendations of the Breeding Zone and Restructuring Cooperatives Working Group of the Northwest Tree Improvement Cooperative are presented.

Keywords: Douglas-fir, multiple populations, sublines, breeding population, gene resource populations, mating designs, selection, breeding seed orchard.

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

Plant Pathology

97-229

Cochran, P.H.

1998. Examples of mortality and reduced annual increments of white fir induced by drought, insects, and disease at different stand densities. Res. Note PNW-RN-525. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 19 p.

Mortality between 1991 and 1995 destroyed a levels-of-growing-stock study installed in four widely separated blocks in the Deschutes and Fremont National Forests in Oregon. Mortality at one block was attributed to root rot (*Armillaria ostoyea* (Romagnesi) Herink) and western spruce budworm (*Choristoneura occidentalis* Freeman). Mortality at the other blocks was due to fir engraver beetles (*Scolytus ventralis* LeConte). Stand densities under investigation were low.

Keywords: White fir, stand density, mortality, periodic annual increments, fir engraver, Modoc budworm, root rot, western spruce budworm.

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

Soil, Site, Geology

97-013

Klemmedson, James O.; Tiedemann, Arthur R.
1998. Lithosequence of soils and associated vegetation on subalpine range of the Wasatch Plateau, Utah. Res. Note PNW-RN-524. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 16 p.

On degraded subalpine range in Utah, the authors examined the role of soil and parent material nutrients and organic carbon (C_{org}) in the development of soil and plants on a transect across six strata that formed visible concentric alternating bands of high and low productivity. Relations for soil and parent material phosphorus (P) and sulfur (S) were of particular interest. Odd-numbered strata displayed visibly lower amounts of surface rock cover and greater vegetative cover than even-numbered strata. Data suggest that S of the parent material may play a key role in the development of these soil plant systems.

Keywords: Parent material, soil nutrients, pattern, phosphorus, sulfur, Stipa lettermanii, Cymopterus lemmonii, overgrazing, erosion, productivity.

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

Supply and Demand

97-142

Haynes, Richard W.

1998. Stumpage prices, volume sold, and volumes harvested from the National Forests of the Pacific Northwest Region,

1984 to 1996. Gen. Tech. Rep. PNW-GTR-423. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 91 p.

Two measures of stumpage prices and timber volumes from individual National Forests have been compiled for the Pacific Northwest Region, USDA Forest Service. The first measure is the price and volume of timber sold (1984-96) for the major species for each National Forest. The second measure is the price and volume of timber harvested (1988-96) from individual National Forests. Several price-related issues are discussed, including seasonality in the data, the role of prices in monitoring market activity, and the impact of the recent drop in Forest Service timber sales.

Keywords: Stumpage price, National Forests, monitoring, Pacific Northwest.

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

98-022

Warren, Debra D.

1998. Production, prices, employment, and trade in Northwest forest industries, second quarter 1997. Resour. Bull. PNW-RB-228. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 130 p.

Provides current information on lumber and plywood production and prices; employment in the forest industries; international trade in logs,

lumber, and plywood; volume 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).

Timber Management

97-006

Cochran, P.H.; Dahms, Walter G.

1998. Lodgepole pine development after early spacing in the Blue Mountains of Oregon. Res. Pap. PNW-RP-503. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 24 p.

Seedlings were thinned to spacings of 6, 9, 12, 15, and 18 feet and measured periodically. Twenty-seven years later, height did not differ with spacing, but diameters increased while basal areas and cubic volumes decreased as spacing widened. Simulation to age 100 years indicated that about the same board volume would be produced at 12-, 15-, and 18-foot spacings.

Keywords: Growth, lodgepole pine, Blue Mountains (Oregon), thinning, simulation.

(This publication is available to download in pdf format 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.

Economics in Forest Management

Richardson, Catherine Woods; Christensen, Harriet

1997. From rhetoric to reality: research on the well-being of forest-based communities. In: Cordell, H. Ken; Caldwell, Linda; Mou, Shela, eds. and comps. Integrating social science and ecosystem management: a national challenge: Proceedings of the conference on integrating social sciences and ecosystem management; 1995 December 12-14; Helen, GA. Gen. Tech. Rep. SRS-GTR-17. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station: 195-201.

Despite regular references to the welfare of timber towns in forest management discussions over the past century, it is only within the past decade that researchers have begun to critically examine the contributions of forest management to the welfare of neighboring communities. This paper reviews changing foci in United States forest-community research and explores how the resulting improvements in knowledge may assist the inclusion of rural communities in ecosystem management.

Keywords: Community stability, community well-being, forest dependency, ecosystem management.

(To order, write Seattle FSL, 4043 Roosevelt Way NE, Seattle, WA 98105 or email mailroom/r6pnw_seattle@fs.fed.us. **Note:** Gen. Tech. Rep. SRS-GTR-17 also can be ordered by writing to the Southern Research Station, P.O. Box 2680, Asheville, NC 28802. More information about the publication is available online at <http://www.srs.fs.fed.us>.)

Ecosystem Function

Hansen, Andrew J.; Houlihan, Patrick

1996. Canopy tree retention and avian diversity in the Oregon Cascades. In: Szaro, Robert C.; Johnston, David W., eds. Biodiversity in managed landscapes: theory and practice. London, England: Oxford University Press: 401-421. Chapter 26.

The density of canopy trees in managed forest stands strongly influences breeding bird abundance and diversity. Significant relations were found between tree density variables and 13 of the 18 bird species and community variables with sufficient sample sizes for analysis. Moreover, the density of trees greater than 10 cm dbh was associated with more of the variation in the bird variables than were the other major habitat variables (elevation, aspect, and understory cover).

Keywords: Silviculture, bird (avian) ecology.

(See Corvallis order form.)

Swanson, Frederick

1997. H.J. Andrews Experimental Forest: assessing how land use, natural disturbances, and climate change affect carbon dynamics, biodiversity, and hydrology. LTER Network News. Seattle, WA: University of Washington, LTER Office. 20: 6-7.

The Long-Term Ecological Research program at the H.J. Andrews Experimental Forest has four synthesis areas of research: (1) effects of species on ecosystem function, (2) early succession, (3) small watersheds, and (4) landscape dynamics.

Keywords: H.J. Andrews Experimental Forest, hydrology.

(See Corvallis order form.)

Fish and Wildlife

Ben-David, M.; Flynn, R.W.; Schell, D.M.
1997. Annual and seasonal changes in diets of martens: evidence from stable isotope analysis. *Oecologia*. 111: 280-291.

Seasonal and annual changes in diets of American marten were studied in relation to changing abundance of small rodents in their habitat in southeastern Alaska. Repeated captures of 75 martens during a 4-year period and carcass samples from 165 trapper-caught marten revealed that salmon carcasses comprised a large portion of the marten diet in autumn during years of low abundance of rodents. Very little use was made of salmon when rodent abundance was relatively high. Although salmon was not a preferred food for martens, it provided a suitable alternative to maintain body condition during years when the preferred prey (small mammals) was not readily available.

Keywords: American marten, *Martes americana*, salmon, predation, stable isotope analysis, southeastern Alaska.

(See Juneau order form.)

Cascade Center for Ecosystem Management
1997. The northern spotted owl: central Cascades demography study. Corvallis, OR: Oregon State University; [U.S. Department of Agriculture, Forest Service], Pacific Northwest Research Station; [U.S. Department of Agriculture, Forest Service], Blue River Ranger District, Willamette National Forest. 2 p.

Studies of northern spotted owls have been underway in the vicinity of the H.J. Andrews Experimental Forest for nearly 30 years. Demographics of the local population of owls are the focus of this study.

Keywords: Northern spotted owl, H.J. Andrews Experimental Forest.

(See Corvallis order form.)

Gende, Scott M.; Willson, Mary F.
1997. Supplemental feeding experiments of nesting bald eagles in southeastern Alaska. *Journal of Field Ornithology*. 68(4): 590-601.

Nesting success of bald eagles (*Haliaeetus leucocephalus*) near Juneau, Alaska, was compared for experimental nests (supplementally fed pink salmon [*Oncorhynchus gorbuscha*] for 7 weeks) and control nests (no supplemental food) to determine whether food limits reproductive success during the nestling period. Although supplemental food accounted for at least 50 percent of the estimated nestling energy requirements, brood reduction and the number of nests failing posthatch were small and differed little in experimental and control nests. Most active nests that failed were abandoned during incubation, which may be a critical phase in determining nesting success of eagles along the coast of southeast Alaska.

Keywords: Bald eagle, *Haliaeetus leucocephalus*, southeast Alaska, nesting success, supplemental food.

(See Juneau order form.)

Gende, Scott M.; Willson, Mary F.; Marston, Brian H. [and others]
1998. Bald eagle nesting density and success in relation to distance from clearcut logging in southeast Alaska. *Biological Conservation*. 83(2): 121-126.

The relation between bald eagle (*Haliaeetus leucocephalus*) nesting parameters, including density of active nests and productivity, and proximity to clearcuts was studied for several areas in southeast Alaska. The average distance between active bald eagle nests was found to be greater as proximity to clearcuts increased. These results, and studies elsewhere, indicated that buffer zones around eagle nests probably should be at least 300 meters wide. Nevertheless, the necessary width of the

buffer strip may vary with other locally important factors. The conservation implications of the results are discussed.

Keywords: Bald eagle, Haliaeetus leucocephalus, southeast Alaska, nesting success, clearcut logging, conservation.

(See Juneau order form.)

Gillingham, Michael P.; Parker, Katherine L.; Hanley, Thomas A.

1997. Forage intake by black-tailed deer in a natural environment: bout dynamics. *Canadian Journal of Zoology*. 75: 1118-1128.

The authors studied the within-bout and seasonal dynamics of intake rate for free-ranging, tame black-tailed deer throughout a 2-year period. Regardless of sex or season, deer spent about 92 percent of their active time foraging. Mean dry matter intake rates ranged from 0.5 g/min in winter to 1.5 g/min in summer and from 300 g/day in winter to more than 1300 g/day in summer. Intake rates in summer approached theoretical maximum values for deer of their body weight. Implications are discussed for sampling foraging bouts in observational studies and for differences in selected versus available forage.

Keywords: Foraging theory, deer, dry matter intake, diet selection.

(See Juneau order form.)

Griswold, Kitty E.; Currens, Kenneth P.; Reeves, Gordon H.

1997. Genetic and meristic divergence of coastal cutthroat trout residing above and below barriers in two coastal basins. In: Hall, James D.; Bisson, Peter A.; Gresswell, Robert E., eds. *Sea-run cutthroat trout: biology, management, and future conservation*. 183 p.

conservation: Proceedings of a symposium; 1995 October 12-14; Reedsport, OR. Corvallis, OR: Oregon Chapter of the American Fisheries Society: 167-169.

The relation between coastal cutthroat trout above and below migration barriers (waterfalls) in two coastal streams was examined. One was in southeast Alaska (Vixen Inlet) and one in south coastal Oregon (Elk River). Among fish from Elk River, the authors detected 12 foci where the most frequent allele had a frequency of 0.95 or less. At Vixen Inlet, nine loci were variable at the same level. Significant differences ($P < 0.01$) were found in two of the three populations residing above barriers in Elk River. There were significant differences ($P < 0.05$) among all populations in Elk River for all nine meristic features examined. Only two of nine were significantly different ($P < 0.05$) in Vixen Inlet. Results of this study suggest that in some cases waterfall barriers are not barriers to gene flow, even if they appear to be migration barriers to anadromous fish.

Keywords: Coastal cutthroat trout, genetic diversity.

(See Corvallis order form.)

Hall, James D.; Bisson, Peter A.; Gresswell, Robert E., eds.

1997. *Sea-run cutthroat trout: biology, management, and future conservation: Proceedings of a symposium; 1995 October 12-14; Reedsport, OR. Corvallis, OR: Oregon Chapter of the American Fisheries Society. 183 p.*

This compilation from a 1995 meeting of the Oregon Chapter of the American Fisheries Society includes 27 invited papers, 4 contributed papers, and 6 extended abstracts from a poster session. Papers deal with biology and genetics, status of the stocks, a case study for

Oregon's Umpqua River, and restoration and recovery of anadromous salmonids in the Pacific Northwest.

Keywords: Fishery management, coastal cutthroat trout, sea-run cutthroat trout.

(Available from Oregon Chapter, American Fisheries Society, P.O. Box 722, Corvallis, OR 97339.)

Kiesecker, Joseph M.; Baulstein, Andrew R.
1997. Influences of egg laying behavior on pathogenic infection of amphibian eggs. *Conservation Biology*. 11(1): 214-220.

Mass mortality of amphibian eggs and larvae from fungal infection (*Saprolegnia ferax*) is reported. Communal oviposition increases the susceptibility of eggs to pathogenic infection.

Keywords: Mortality, declines, amphibian, frog, fungus.

(See Corvallis order form.)

Norton, Douglas I.; Flood, Mark A.; McIntosh, Bruce A. [and others]
1996. Modeling, monitoring, and restoring water quality and habitat in Pacific Northwestern watersheds. Washington, DC: U.S. Environmental Protection Agency; final report; EPA GATF '95 project. 68 p. [plus appendices].

This paper reports on a project that examined water temperatures in eight rivers in the Pacific Northwest in 1995 (about 1500 river kilometers) that contain anadromous salmonids. The main goal of the project was to provide environmental remote sensing data to help watershed management organizations and agencies develop models of heat budget for these rivers. The second goal was to identify valuable instream features, particularly coldwater seeps, so that very localized fish habitat features may be considered along with the overall water temperature budget. Results are presented for each basin.

Keywords: Monitoring, water quality, aquatic habitat.

(See Corvallis order form.)

Pollock, Michael M.; Naiman, Robert J.; Hanley, Thomas A.

1998. Plant species richness in riparian wetlands—a test of biodiversity theory. *Ecology*. 79(1): 94-105.

Flood frequency, productivity, and spatial heterogeneity were correlated with plant species richness (SR) in wetlands and riparian forest in southeastern Alaska. Data from 16 sites demonstrated nonlinear, unimodal relations between flood frequency and SR, productivity and SR, and linear relations between SR and the spatial variation in microtopographical relief. A nonlinear regression model relating SR to flood frequency and variation in microtopographical relief accounted for 78 percent of the variation in SR. Sites with intermediate flood frequencies and high microtopographical relief were most species-rich. The data indicated that small-scale spatial variation can dramatically alter the ecological consequences of physical disturbance. The models provide a predictive tool for evaluating habitat-community relations in riparian forests.

Keywords: Biodiversity, species richness, community structure, riparian forests, wetlands, southeastern Alaska, flooding.

(See Juneau order form.)

Reeves, Gordon H.; Hall, James D.; Gregory, Stanley V.

1997. The impact of land-management activities on coastal cutthroat trout and their freshwater habitats. In: Hall, J.D.; Bisson, P.A.; Gresswell, R.E., eds. *Sea-run cutthroat trout: biology, management, and future conservation: Proceedings of a symposium; 1995 October 12-14; Reedsport, OR. Corvallis, OR: Oregon Chapter of the American Fisheries Society: 138-144.*

Numbers of cutthroat trout juveniles and smolts have declined after such activities as timber harvest. Their numbers may remain depressed for extended periods following such disturbances, for reasons that are not clear. The authors suggest that changes in pool depth and complexity may reduce habitat suitability, which

may in turn reduce the carrying capacity of the stream or reduce survival by forcing juveniles to compete with other species. Coastal cutthroat trout may be the “canary in the coal mine” with respect to the integrity of aquatic ecosystems throughout their range. Management policies must be directed at arresting the decline in quality and quantity of freshwater habitat if coastal cutthroat trout populations are to persist.

Keywords: Coastal cutthroat trout, habitat alteration, fish community.

(See Corvallis order form.)

Thoms, Chris; Corkran, Charlotte C.; Olson, Deanna H.

1997. Basic amphibian survey for inventory and monitoring in lentic habitats. In: Olson, Deanna H.; Leonard, William P.; Bury, R. Bruce, eds. Sampling amphibians in lentic habitats: methods and approaches for the Pacific Northwest. Northwest Fauna 4. Olympia, WA: Society for Northwest Vertebrate Biology: 35-46. Chapter 3.

A standardized inventory for pond-breeding amphibians is described: the basic amphibian survey. This method involves visual searches and dipnetting. A review of sampling methods is provided along with guidance as to which techniques are most effective.

Keywords: Inventory, sampling methods, frogs, amphibians, wetlands.

(Book may be ordered from Janet Jones, Treasurer, Society for Northwestern Vertebrate Biology, 4820 Yelm Highway SE, Suite B-175, Olympia, WA 98503. Cost is \$12.00 plus \$1.50 for shipping within the United States and \$2.50 outside the United States; Washington residents, add 8% sales tax.)

Williams, Thomas H.; Currens, Kenneth P.; Ward, Neil E., III; Reeves, Gordon H.

1997. Genetic population structure of coastal cutthroat trout. In: Hall, James D.; Bisson, Peter A.; Gresswell, Robert E., eds. Sea-run cutthroat trout: biology, management, and future conservation: Proceedings

of a symposium; 1995 October 12-14; Reedsport, OR. Corvallis, OR: Oregon Chapter of the American Fisheries Society: 16-17.

The authors sampled 90 populations of coastal cutthroat trout in locations from the Eel River, CA, to Prince William Sound, AK, to determine the variation in genetic structure. Data from a subset of 24 of these populations were summarized. Populations were characterized at 37 allozyme loci by starch-gel electrophoresis. About 22 percent of the total gene diversity (expected heterozygosity) occurred as variation in allele frequencies among populations (relative gene diversity, $G_{ST} = 0.22$). This value is higher than that reported for other anadromous salmonids in western North America. These patterns of genetic variation for coastal cutthroat trout have important implications for protection and recovery efforts of declining populations.

Keywords: Coastal cutthroat trout, genetics.

(See Corvallis order form.)

Zimmerman, Christian E.; Currens, Kenneth P.; Reeves, Gordon H.

1997. Genetic population structure of coastal cutthroat trout in the Muck Creek basin, Washington. In: Hall, James D.; Bisson, Peter A.; Gresswell, Robert E., eds. Sea-run cutthroat trout: biology, management, and future conservation: Proceedings of a symposium; 1995 October 12-14; Reedsport, OR. Corvallis, OR: Oregon Chapter of the American Fisheries Society: 170-172.

Coastal cutthroat trout from six areas in Muck Creek, WA, a tributary of the Nisqually River, were examined to describe the degree of differentiation among populations based on genetic and meristic features. These features were not homogeneous among populations. Contingency chi-square tests of allelic homogeneity indicated significant differences between Chambers Lake fish and the fish from other sites at four loci. Successful management of coastal cutthroat trout in the Muck Creek basin

will have to consider the degree of differentiation among populations within the basin. This will require measures to maintain local populations as well as connections among populations in different parts of the basin.

Keywords: Coastal cutthroat trout, genetic diversity.

(See Corvallis order form.)

General

Carson, Ward W.; Reutebuch, Steve E. [n.d.]. Experience with the spatial accuracy of a single aerial photograph. In: *Unlocking the puzzle: international symposium on the spatial accuracy of natural resource data bases*; 1994 May 16-20; Williamsburg, VA. Bethesda, MD: American Society for Photogrammetry and Remote Sensing: 47-56.

A digital elevation model (DEM) is required to map for a single aerial photograph. The accuracy of single-photo mapping compares well with the traditional stereomodel procedure. Both depend on photo orientation(s), camera characteristics, and accuracy of the photo measurement system. The influence of these variables and DEM error for a single photo are investigated. Simple algebraic expressions are proposed and tested as indicators of accuracy.

Keywords: Mapping, photogrammetry, accuracy.

(To order write Seattle FSL, 4043 Roosevelt Way NE, Seattle, WA 98105 or email mailroom/r6pnw_seattle@fs.fed.us.)

Cascade Center for Ecosystem Management
1997. Cascade center research and management news. Corvallis, OR: Oregon State University; [U.S. Department of Agriculture, Forest Service], Pacific Northwest Research Station; [U.S. Department of Agriculture, Forest Service], Blue River Ranger District, Willamette National Forest. 4 p.

Current projects of the Cascade Center for Ecosystem Management deal with the effects of floods on forest roads and forest ecosystems.

Some of this work occurs in the H.J. Andrews Experimental Forest, which will celebrate its 50th anniversary in summer 1998.

Keywords: Floods, H.J. Andrews Experimental Forest, forest roads.

(See Corvallis order form.)

Franklin, Jerry F.

1995. Sustainability of managed temperate forest ecosystems. In: Munasinghe, Mohan; Shearer, Walter, eds. *Defining and measuring sustainability: the biogeophysical foundations*. Washington, DC: The World Bank: 355-385.

This chapter reviews what we know about the sustainability of managed temperate forest ecosystems. Because this is such an immense topic, the review is primarily an overview with an emphasis on recent knowledge and emerging concepts of the productivity and maintenance of forest ecosystems, rather than a comprehensive review of the last 100 years of forest science.

Keywords: Forest management, sustainability, temperate ecosystems.

(See Corvallis order form.)

Franklin, Jerry F.; Graber, David; Johnson, K. Norman [and others]

1996. Alternative approaches to conservation of late-successional forests in the Sierra Nevada and their evaluations: working group on late-successional conservation strategies. In: *Sierra Nevada ecosystem project: final report to Congress, addendum*. David, CA: University of California, Centers for Water and Wildland Resources: 53-70.

This paper describes approaches to conserving old-growth forests in the Sierra Nevada ecosystem project.

Keywords: Conservation, bioregional assessments, old growth, Sierra Nevada.

(See Corvallis order form.)

Mount St. Helens

Lawrence, Rick L.

1997. A landscape-scale analysis of vegetation recovery at Mount St. Helens. Corvallis, OR: Oregon State University. 127 p. Ph.D. dissertation.

Satellite remote sensing was used to examine the key factors controlling the natural revegetation of Mount St. Helens since its eruption in 1980. The study required three stages: determining the amount of vegetation present, characterizing vegetation change, and analyzing the influence of factors affecting vegetation change.

Keywords: Remote sensing, disturbance, volcanic, disturbance history, disturbance ecology.

(Available only through library or interlibrary loan.)

Mycorrhizae

Agerer, Reinhard; Trappe, James M.

1996. "Tsugaerhiza tripigmentata" + *Tsuga heterophylla* (Rafin.) Sarg. In: Agerer, R.; Danielson, R.M.; Egli, S. [and others], eds. Descriptions of ectomycorrhizae. 2: 85-89.

This lilac, irregularly monopodial-pinnate to -pyramidal mycorrhiza is characterized by yellowish brown plasmatid as well as yellowish brown membranaceous pigment of some of the mantle hyphae. In addition, a lilac vacuolar pigment occurs. Rhizomorphs are slightly differentiated with randomly distributed, thick hyphae.

Keywords: Mycorrhiza, western hemlock.

(See Corvallis order form.)

Jumpponen, Ari; Mattson, Kim; Trappe, James M.; Ohtonen, Rauni

1998. Effects of established willows on primary succession on Lyman Glacier forefront, north Cascade Range, Washington, U.S.A.: evidence for simultaneous canopy inhibition and soil facilitation. *Arctic and Alpine Research*. 30(1): 31-39.

The effect of established shrub willows (*Salix commutata* and *S. phylicifolia*) was tested in a primary successional ecosystem at Lyman

Glacier forefront in the north Cascade Range (Washington, USA). Results from two experiments suggest that while the willow canopy is either neutral or inhibitory in its effects on establishment of indigenous plants, the soil developing beneath the willow can actually be a positive factor in plant establishment.

Keywords: Mycorrhizae, fungi, plant succession, safe sites, soil microbes.

(See Corvallis order form.)

Larsen, Michael J.; Smith, Jane E.; McKay, Donaraye

1997. On *Piloderma bicolor* and the closely related *P. byssinum*, *P. croceum*, and *P. fallax*. *Mycotaxon*. 63: 1-8.

The authors confirm an earlier conclusion that two species of mycorrhizal fungi, *Piloderma bicolor* and *P. byssinum*, are distinct and that the name *P. bicolor* has been correctly applied in North America. They also conclude that *P. fallax* is the most appropriate name for what has been called *P. bicolor* and *P. croceum*. Descriptions of the two species are supplemented with line drawings and photomicrographs.

Keywords: Piloderma bicolor, P. fallax, P. croceum, P. byssinum, mycorrhizal fungi.

(See Corvallis order form.)

Molina, R.; Amaranthus, M.; Pilz, D.; Fischer, C.

1996. Commercial harvest of edible ectomycorrhizal fungus sporocarps from Pacific Northwest forests: ecological and management implications. In: Azcon-Aguilar, C.; Barea, J.M., eds. Mycorrhizas in integrated systems from genes to plant development: Proceedings of the 4th European symposium on mycorrhizas; 1994 July 11-14; Granada, Spain. Luxembourg: European Commission, Directorate-General XII: 561-564.

Edible sporocarps of many ectomycorrhizal fungi are highly prized by different cultures. The decline of favorite edible species in some

countries, however, has created a market demand for these wild fungi from countries where they remain plentiful. These economic forces have led to development of a multimillion dollar industry of wild mushroom harvest from the extensive ectomycorrhizal forests of western North America: approximately 1 800 000 kilograms were harvested in 1992. This paper discusses ecological and management implications of this commercial harvest on ectomycorrhizal fungi and focuses on current research aimed at developing management guidelines for protecting the mushroom resource and ensuring a sustainable harvest.

Keywords: Mushrooms, truffles, special forest products.

(See Corvallis order form.)

Redhead, Scott A.; Norvell, Lorelei L.; Dannell, Eric

1997. *Cantharellus formosus* and the Pacific golden chanterelle harvest in western North America. *Mycotaxon*. 65: 285-322.

This paper discusses the taxonomy and commercial harvest of the golden chanterelle in the Pacific Northwest. There has been considerable confusion about the name of the widely harvested chanterelle. The correct name for the most commonly harvested chanterelle in western North America (western British Columbia, Washington, and Oregon, and northwestern California) is *C. formosus* and not *C. cibarius*. The type locality for *C. formosus* is Long Beach, Pacific Rim National Park, Vancouver Island, British Columbia, Canada. Fresh topotypical material was gathered for morphological and molecular characterization. A less commonly harvested western chanterelle is *C. cibarius* var. *roseocanus*.

Keywords: Fungus, mushroom, special forest product, nontimber forest product, mycorrhizae.

(See Corvallis order form.)

Rossmann, Amy Y.; Tulloss, Rodham E.; O'Dell, Thomas E.; Thorn, R. Greg

1998. Protocols for an all taxa biodiversity inventory of fungi in a Costa Rican conservation area. Boone, NC: Parkway Publishers, Inc. 195 p.

This book is a how-to manual for conducting an all-taxa biodiversity inventory of fungi with recommended procedures for sampling and isolating all groups of fungi. In addition, it lists literature for identification of fungal species and outlines the procedures for developing fungal culture collections and specimen herbaria.

Keywords: Mycology, monitoring, biological diversity.

(Available from bookstores and libraries.)

Physiology

Lindstrom, Orville M.; Johnson, G. Randy; Dirr, Michael A.

1997. Cold hardiness of redbud. *SNA Research Conference*. 42: 343-345.

Laboratory cold hardiness was examined for 13 *Cercis* taxa from 6 species (*C. canadensis*, *C. chinensis*, *C. mexicana*, *C. racemosa*, *C. gigantea*, *C. yunnanensis*). Within-species variation for December cold hardiness was documented for *C. canadensis*, but none was detectable in January because all taxa within the species were hardened off beyond the limits of the lab equipment. The other species showed variation in cold hardiness in both January and February. The data are preliminary and the taxa should be further examined over multiple years and different months.

Keywords: Cold hardiness, redbud, Cercis.

(See Corvallis order form.)

Plant Ecology

Halpern, Charles B.; Miller, Eric A.; Geyer, Melora A.

1996. Equations for predicting above-ground biomass of plant species in early successional forests of the western Cascade Range, Oregon. *Northwest Science*. 70(4): 306-320.

The authors present a set of 152 regression equations that predict the aboveground biomass of 38 herb, shrub, and tree species common on early successional (clearcut) sites on the west side of the Cascade Range in Oregon. Biomass of herbaceous taxa is best predicted by cover, and biomass of woody species is best predicted by stem diameter or length.

Keywords: Plant biomass, shrubs, herbs.

(See Corvallis order form.)

Halpern, Charles B.; Antos, Joseph A.; Geyer, Melora A.; Olson, Annette M.

1997. Species replacement during early secondary succession: the abrupt decline of a winter annual. *Ecology*. 78(2): 621-631.

Manipulative field experiments were used to examine the effects of interspecific competition on the population dynamics of *Senecio sylvaticus*, a winter annual that briefly dominates postharvest sites on the west side of the Cascade Range in Oregon. *Senecio* increased in density 400-fold from the first to the second growing season after disturbance but decreased precipitously in the third year to 3 to 10 percent of the density and 0.5 percent of the biomass per plot of the previous year. Although interspecific competition reduced the cover and biomass of *Senecio* during its peak year, it had little or no effect on either the population increase or decline; the pattern of change was similar among all treatments. These counterintuitive results underscore the impor-

tance of testing, not simply assuming, that interspecific competition is responsible for the replacement of a species during succession.

Keywords: Allelopathy, annual plants, competition, germination, interspecific competition, intraspecific competition, secondary succession, Senecio sylvaticus, soil nutrients, winter annual.

(See Corvallis order form.)

Jonsson, Bengt Gunnar

1997. Riparian bryophyte vegetation in the Cascade mountain range, Northwest U.S.A.: patterns at different spatial scales. *Canadian Journal of Botany*. 75: 744-761.

Riparian forests are productive and species-rich ecosystems where the vegetation is structured by sharp environmental gradients. This study describes community patterns of bryophytes in streamside forests, relates these patterns to major environmental gradients, and compares within-site factors with site-level variables.

Keywords: Old-growth forest, CCA analysis, fluvial disturbance, bryophytes, elevation effects, coarse woody debris.

(See Corvallis order form.)

Parendes, Laurie Anne

1997. Spatial patterns of invasion by exotic plants in a forested landscape. Corvallis, OR: Oregon State University. 208 p. Ph.D. dissertation.

This study examined how biological factors and physical factors interact to produce the observed spatial pattern of invasion of exotic plant species into the forested landscape, particularly along roads and streams. Results from a seed bank study indicated that dispersal barriers may be preventing movement of some exotics from the road into mature forest. Surveys at 1- and 100-kilometer scales showed that the most frequent species also had a high potential for dispersal. The heterogeneous

arrangement of patches on the landscape suggests that the process of invasion is generating multiple, discrete foci from which further invasion can occur.

Keywords: Vegetation ecology, road management, seedbanks, exotic plants.

(Available only through library or interlibrary loan.)

Shirazi, A.M.; Muir, Patricia S.; McCune, Bruce 1996. Environmental factors influencing the distribution of the lichens *Lobaria oregana* and *L. pulmonaria*. *The Bryologist*. 99(1): 12-18.

Lobaria oregana (Tuck.) Müll. Arg. and *L. pulmonaria* (L.) Hoffm. are parapatric in western North America. However, *L. pulmonaria* is more widely distributed than *L. oregana*; in western Oregon, *L. pulmonaria* occurs in the Willamette Valley and forests of the Cascades and Coast Ranges, and *L. oregana* is largely restricted to the mountain forests.

Keywords: Lichens, H.J. Andrews Experimental Forest, biogeography.

(See Corvallis order form.)

Range Management

Tiedemann, A.R.; Lambert, S.M.; Carlson, J.R. [and others]

1997. 'Umatilla' snow buckwheat for rangeland restoration in the interior Pacific Northwest. *Rangelands*. 19(3): 22-25.

'Umatilla' snow buckwheat (*Eriogonum niveum* Dougl.) was released in November 1990 by the USDA Natural Resources Conservation Service and Forest Service, Washington State University, Washington Department of Wildlife, and Oregon State University as a selected cultivar for rangeland seeding, wildlife habitat improvement, and critical area plantings. This fall-blooming halfshrub establishes readily from seed in well-drained soils throughout interior Pacific Northwest and western Intermountain

areas, from basin big sagebrush to ponderosa pine habitats in precipitation ranges from 6 to 18 inches. Its fall-blooming nature makes it an excellent ornamental and a valuable plant for pollinators at a time when little else is flowering.

Keywords: Plant characteristics, plant morphology, adaptation, revegetation, crude protein, digestibility.

(To order write La Grande FSL, 1401 Gekeler Lane, La Grande, OR 97850 or email mailroom/r6pnw_lagrande@fs.fed.us.)

Regeneration

Scherer, George; Everett, Richard

1998. Soil island planting as dispersal vectors in large area copper tailings reforestation. In: 15th annual national meeting of the American Society for Surface Mining and Reclamation; 1998 May 17-21; St. Louis, MO. [Place of publication unknown]: American Society for Surface Mining and Reclamation: 78-84.

Twenty one-fourth acre, triangular-shaped soil islands were used as a source of plant propagules targeted for gravel-covered tailings surfaces in Washington State. The islands were constructed of soil and surface litter transported from a nearby gravel pit and planted with four species of conifer seedlings, the shrub Sitka alder (*Alnus sinuata*), and eight species of grasses. After 36 months, grass seed had migrated 32 feet (11 meters) from the soil-island source. Among the tree species, lodgepole pine (*Pinus contorta*) and Sitka alder grew an average of 6 inches (15 to 16 centimeters) after 40 months on the soil islands but somewhat less on the tailing surface. By the third growing season, the only tree species in reproductive condition on the tailings was alder. The soil-island technique is successful for grass dispersal and may have potential for conifer and alder migration.

Keywords: Reforestation, *Alnus sinuata*, *Bromus marginatus*, *Pinus contorta*, *Holden mine*.

(To order write Wenatchee FSL, 1133 N. Western Avenue, Wenatchee, WA 98801 or email dwiser/r6pnw_wenatchee@fs.fed.us.)

Social Sciences

Ngoy, Kikombo Ilunga

1997. Spatial and temporal patterns of forest cover in the central western Cascades of Oregon and southeast Zaire: a test of distance decay and deforestation models. Corvallis, OR: Oregon State University. 247 p. Ph.D. dissertation.

The central western Cascades and southeast Zaire were used to test the distance decay and deforestation models on forest environments. Distance gradients included away from cities and away from highways and roads. The deforestation model was not validated in the central western Cascades. The average forest loss rate was 0.5 percent per year (1972-88), and it was 1.3 percent in southeast Zaire (1973-89). Differences in results were due to natural variability of forest environments, external demands, forest cut policy, socioeconomic factors, and population density.

Keywords: Forest cover loss, remote sensing.

(Available only through library or interlibrary loan.)

Soil, Site, Geology

Iverson, Richard M.; Reid, Mark E.; Lahusen, Richard G.

1997. Debris-flow mobilization from landslides. *Annual Review of Earth and Planetary Sciences*. 25: 85-138.

Field observations, laboratory experiments, and theoretical analyses indicate that landslides mobilize to form debris flows by three processes: (1) widespread Coulomb failure within a sloping soil, rock, or sediment mass, (2) partial or complete liquefaction of the mass by high pore-fluid pressures, and (3) conversion of landslide translational energy to internal

vibrational energy (i.e., granular temperature). These processes can operate independently, but in many circumstances they seem to operate simultaneously and synergistically. Analyses of multidimensional experiments reveal complications ignored in one-dimensional models and demonstrate that debris-flow mobilization may occur by at least two distinct modes in the field.

Keywords: Debris flow, mudflow, initiation, hillslope, soil, mechanics, pore pressure.

(See Corvallis order form.)

Major, Jon J.

1997. Depositional processes in large-scale debris-flow experiments. *The Journal of Geology*. 105: 345-366.

This study examines the depositional process and characteristics of deposits of large-scale experimental debris flows (to 15 m²) composed of mixtures of gravel (to 32 mm), sand, and mud. The experiments were performed at the H.J. Andrews Experimental Forest by using a 95-meter-long, 2-meter-wide debris-flow plume that slopes 31 degrees. Following release, experimental debris flows invariably developed numerous shallow (about 10 centimeters deep) surges.

Keywords: Debris flows, landslides.

(See Corvallis order form.)

Montgomery, David R.; Buffington, John M.

1997. Channel-reach morphology in mountain drainage basins. *Geological Society of America Bulletin*. 109(5): 2-17.

This paper presents a classification that characterizes aspects of reach-level channel morphology useful for assessing channel condition and potential response to natural and human-caused disturbance in mountain drainage basins.

Keywords: Channel-reach morphology, mountain drainage basins.

(See Juneau order form.)

Timber Management

Kellogg, Loren; Reed, Mark

1998. Thinning young stands [video].
Corvallis, OR: Forestry Media Center. 31
min.

This video describes the early phases of an adaptive management project at the Willamette National Forest, Oregon, where researchers from several disciplines are working to find ecologically sustainable, economical, technically feasible, and socially acceptable ways of managing 50-year-old Douglas-fir plantations for various outputs. The video includes interviews with silviculturists, wildlife biologists, soil scientists, a mycologist, a forest engineer, and a sociologist. Computer simulations and aerial footage show how the stand looks before and after treatment.

Keywords: Silviculture, thinning, logging costs, managed forests, fungi.

(Available to purchase from Forestry Media Center, Oregon State University, 248 Peavy Hall, Corvallis, OR 97331-5702. For information call (541) 737-4702 or email forestrm@ccmail.orst.edu.)

Smith, Jeff P.; Gresswell, Robert E.; Hayes, John P.

1997. A research problem analysis in support of the cooperative forest ecosystem research (CFER) program. Corvallis, OR: Oregon State University; report submitted to U.S. Department of Interior, U.S. Geological Survey, Biological Resources Division, Forest and Rangeland Ecosystem Science Center, Corvallis, OR: contract H952A1-0101-25. 92 p.

The Cooperative Forest Ecosystem Research program was initiated in June 1995. The intent of the program is to facilitate ecosystem

management in the Pacific Northwest. This problem analysis was developed to provide scientific foundation and serve as the primary reference document for the program.

Keywords: Forest management, riparian areas, biodiversity, species of special concern.

(See Corvallis order form.)

Watershed Management

Perkins, Reed M.

1997. Climatic and physiographic controls on peakflow generation in the western Cascades, Oregon. Corvallis, OR: Oregon State University. 190 p. Ph.D. dissertation.

This study investigated the influence of soil and snowpack moisture on peakflow hydrograph shape in three small (less than 60 hectares) control subwatersheds and the containing Lookout Creek watershed (6200 hectares) along the west side of the Cascade Range in Oregon with three main objectives: (1) determine the statistical correlation between antecedent conditions and peakflow hydrograph shape within each small watershed; (2) determine how these correlations differed between small watersheds; and (3) determine the correlation between subwatershed and Lookout Creek peakflow hydrograph shapes. Results from this study indicate that by altering snowpack dynamics, and therefore the frequency distribution of peakflow types, climate change or land use may differentially affect peakflow hydrographs in small watersheds.

Keywords: Peakflow, snowpack dynamics, watershed management.

(Available only through library or interlibrary loan.)

Ricks, Cynthia L.

1995. Effects of channelization on sediment distribution and aquatic habitat at the mouth of Redwood Creek, northwestern California. In: Nolan, K.M.; Kelsey, H.M.; Marron, D.C., eds. Geomorphic processes and aquatic habitat in the Redwood Creek basin, northwestern California. U.S. Geol. Sur. Prof. Pap. 1454-Q. Washington, DC: U.S. Government Printing Office: Q1-Q17.

Since the early 1950s, the distribution of sediment at the mouth of Redwood Creek has been altered by the effects of channel aggradation and channelization along the lower reach. Severe flooding in 1953, 1955, and 1964 caused bank erosion, landslides, and changes in channel geometry upstream along Redwood Creek. The increased sediment load also resulted in channel aggradation and widening along the lower flood plain. Flood-control levees constructed from 1966 to 1968 channelized the lower reach of Redwood Creek and cut off the last downstream meander. Frequent closure and flooding of backwater areas and adjacent pastures historically have

led to artificial breaching of the berm. Recently, such premature breaching released 75 percent of the embayed water, which was inhabited by 20,000 juvenile salmonids.

Keywords: Watershed management, geomorphology, estuary, fisheries.

(See Corvallis order form.)

Swanson, Fred

1997. The landslide quandary [Perspective]. *Journal of Forestry*. 95(7): 48.

The urban-wildland interface has several issues that bring people into potential conflict with natural processes—fire, floods, landslides. These potential conflicts can be managed in a thoughtful, integrated manner or as sources of additional conflict.

Keywords: Landslide, fire, urban-wildland interface.

(See Corvallis order form.)

Corvallis Order Form (A)

To order copies of these publications, circle the reference, and mail the form to:

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

Cascade Center for Ecosystem Management. *Cascade center research and management news.*

Cascade Center for Ecosystem Management. *The northern spotted owl: central Cascades demography study.*

Franklin, Jerry F. *Sustainability of managed temperate forest ecosystems.*

Franklin, Jerry F.; Graber, David; Johnson, K. Norman [and others]. *Alternative approaches to conservation of late-successional forests in the Sierra Nevada and their evaluations.*

Griswold, Kitty E.; Currens, Kenneth P.; Reeves, Gordon H. *Genetic and meristic divergence of coastal cutthroat trout residing above and below barriers in two coastal basins.*

Halpern, Charles B.; Miller, Eric A.; Geyer, Melora A. *Equations for predicting aboveground biomass of plant species in early successional forests of the western Cascades.*

Halpern, Charles B.; Antos, Joseph A.; Geyer, Melora A.; Olson, Annette M. *Species replacement during early secondary succession: the abrupt decline of a winter annual.*

Hansen, Andrew J.; Houlihan, Patrick. *Canopy tree retention and avian diversity in the Oregon Cascades.*

Iverson, Richard M.; Reid, Mark E.; Lahusen, Richard G. *Debris-flow mobilization from landslides.*

Jonsson, Bengt Gunnar. *Riparian bryophyte vegetation in the Cascade mountain range.*

Kiesecker, Joseph M.; Balstein, Andrew R. *Influences of egg laying behavior on pathogenic infection of amphibian eggs.*

Major, Jon J. *Depositional processes in large-scale debris-flow experiments.*

Norton, Douglas I.; Flood, Mark A.; McIntosh, Bruce A. [and others]. *Modeling, monitoring, and restoring water quality and habitat in Pacific northwestern watersheds.*

Reeves, Gordon H.; Hall, James D.; Gregory, Stanley V. *The impact of land-management activities on coastal cutthroat trout and their freshwater habitats.*

Ricks, Cynthia L. *Effects of channelization on sediment distribution and aquatic habitat at the mouth of Redwood Creek, northwestern California.*

Shirazi, A.M.; Muir, Patricia S.; McCune, Bruce. *Environmental factors influencing the distribution of the lichens *Lobaria oregana* and *L. pulmonaria*.*

Swanson, Fred. *The landslide quandary [Perspective].*

Swanson, Frederick. *H.J. Andrews Experimental Forest: assessing how land use, natural disturbances, and climate change affect carbon dynamics, biodiversity, and hydrology.*

Williams, Thomas H.; Currens, Kenneth P.; Ward, Neil E., III; Reeves, Gordon H. *Genetic population structure of coastal cutthroat trout.*

Zimmerman, Christian E.; Currens, Kenneth P.; Reeves, Gordon H. *Genetic population structure of coastal cutthroat in the Muck Creek basin, Washington.*

Name: _____

Street address: _____

City, ST ZIP: _____

Cut here

From:

Place
Postage
Stamp
Here

Attn: Publication Request
Corvallis Forestry Sciences Laboratory
3200 SW Jefferson Way
Corvallis, OR 97331

Corvallis Order Form (B)

To order copies of these publications, circle the reference, and mail the form to:

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

Agerer, Reinhard; Trappe, James M. "Tsugaerhiza tripigmentata" + Tsuga heterophylla (*Rafin.*).

Jumpponen, Ark; Mattson, Kim; Trappe, James M.; Ohtonen, Rauni. *Effects of established willows on primary succession on Lyman Glacier forefront, north Cascades Range, Washington, U.S.A.*

Larsen, Michael J.; Smith, Jane E.; McKay, Donaraye. *On Piloderma bicolor and the closely related P. byssinum, P. croceum, and P. fallax.*

Lindstrom, Orville M.; Johnson, G. Randy; Dirr, Michael A. *Cold hardiness of redbud.*

Molina, R.; Amaranthus, M.; Pilz, D.; Fischer, C. *Commercial harvest of edible mycorrhizal fungus sporocarps from Pacific Northwest forests: ecological and management implications.*

Redhead, Scott A.; Norvell, Lorelei L.; Dannell, Eric. *Cantharellus formosus and the Pacific golden chanterelle harvest in northern North America*

Smith, Jeff P.; Gresswell, Robert E.; Hayes, John P. *A research problem analysis in support of the cooperative forest ecosystem research (CFER) program.*

Name: _____

Street address: _____

City, ST ZIP: _____



Cut here



From:

Place
Postage
Stamp
Here

Attn: Publication Request
Corvallis Forestry Sciences Laboratory
3200 SW Jefferson Way
Corvallis, OR 97331

Juneau Order Form

To order copies of these publications, circle the reference, and mail the form to:

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

The Juneau Forestry Sciences Laboratory is able to accept email requests for these publications. Send requests to mestenson/r10@fs.fed.us.

Ben-David, M.; Flynn, R.W.; Schell, D.M. *Annual and seasonal changes in diets of martens: evidence from stable isotope analysis.*

Gende, Scott M.; Willson, Mary F. *Supplemental feeding experiments of nesting bald eagles in southeastern Alaska.*

Gende, Scott M.; Willson, Mary F.; Marston, Brian H. [and others]. *Bald eagle nesting density and success in relation to distance from clearcut logging in southeast Alaska.*

Gillingham, Michael P.; Parker, Katherine L.; Hanley, Thomas A. *Forage intake by black-tailed deer in a natural environment: bout dynamics.*

Montgomery, David R.; Buffington, John M. *Channel-reach morphology in mountain drainage basins.*

Pollock, Michael M.; Naiman, Robert J.; Hanley, Thomas A. *Plant species richness in riparian wetlands--a test of biodiversity theory.*

Name: _____

Street address: _____

City, ST ZIP: _____



Cut here



From:

Place
Postage
Stamp
Here

Attn: Publication Request
Juneau Forestry Sciences Laboratory
2770 Sherwood Lane Suite 2A
Juneau, AK 98801-8545

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.

96-223	97-142	98-073
97-006	97-195	
97-013	97-229	
97-073	98-022	

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.

The United States Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, and marital or familial status. (Not all prohibited bases apply to all programs). Persons with disabilities who require

alternative means of communication of program information (Braille, large print, audiotape, etc.) should contact the USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, DC 20250, or call (800) 245-6340 (voice), or (202) 720-1127 (TDD). USDA is an equal employment opportunity employer.

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

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

Official Business
Penalty for Private Use, \$300

BULK RATE
POSTAGE +
FEES PAID
USDA - FS
PERMIT No. G-40

do NOT detach label