United States
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Forest Service

Pacific Northwest
Research Station

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October 1998

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Pacific Northwest Research Station Publications

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

Economics in Forest Management

97-194

Allen, Stewart D.; Robertson, Guy; Schaefers, Julie

1998. Economies in transition: an assessment of trends relevant to management of the Tongass National Forest. Gen. Tech. Rep. PNW-GTR-417. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 101 p. (Shaw, Charles G., III, tech. coord.; Conservation and resource assessments for the Tongass land management plan revision).

This assessment focuses on the regional and community economies of southeast Alaska. Regional trends are reflected very differently across boroughs, and even more so across the many small communities of southeast Alaska; analysis at diverse scales is needed to accurately portray economic and social conditions and trends. A mixed economy composed of subsistence harvests and cash income characterizes the economies of most of the region's rural communities.

Keywords: Tongass National Forest, southeast Alaska, economic trends, employment, subsistence, communities.

(This publication is available online at http://www.fs.fed.us/pnw/tongass1.htm.)

General

97-196

Geier, Max G.

1998. Forest Science research and scientific communities in Alaska: a history of the origins and evolution of USDA Forest Service research in Juneau, Fairbanks, and Anchorage. Gen. Tech. Rep. PNW-GTR-426. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 220 p.

Reviews the history of Forest Service Research in Alaska.

Keywords: Forest research, Alaska, history, ecology, fisheries, entomology, wildlife, survey, inventory, timber, taiga, Tongass, Chugach, Pacific Northwest, fire, clearcut, salmon, watershed, landslide, experimental forest, research natural area, aerial photography, remote sensing, transportation, boats, aircraft.

98-006

Henshaw, Donald L.; Greene, Sarah E.; Lowry, Tami, comps.

1998. Research publications of the H.J. Andrews Experimental Forest, Cascade Range, Oregon: 1998 supplement. Gen. Tech. Rep. PNW-GTR-427. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 94 p.

This bibliography updates the list of publications, abstracts, theses, and unpublished reports included in "Research Publications of the H.J. Andrews Experimental Forest, Cascade Range, Oregon, 1948 to 1986" (General Technical Report PNW-GTR-201) and "Research Publications of the H.J. Andrews Experimental Forest: 1988 Supplement" (General Technical Report PNW-GTR-223). Citations are referenced under appropriate keywords.

Keywords: Bibliography, experimental forest, research publications.

(This publication is available online at http://www.fs.fed.us/pnw/pubs.htm.)

97-299

Norwacki, Gregory J.; Kramer, Marc G.

1998. The effects of wind disturbance on temperate rain forest structure and dynamics of southeast Alaska. Gen. Tech. Rep. PNW-GTR-421. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 25 p. (Shaw, Charles G., III, tech. coord.; Julin, Kent R., ed.; Conservation and resource assessments for the Tongass land management plan revision).

Wind disturbance plays a fundamental role in shaping forest dynamics in southeast Alaska. Recent studies have increased our appreciation for the effects of wind at both large and small scales. Current thinking is that wind disturbance characteristics change over a continuum dependent on landscape features (e.g., exposure, landscape position, topography). Data modeling has revealed the existence of distinct wind disturbance regimes, grading from exposed landscapes where recurrent, large-scale wind events prevail to wind-protected landscapes where small-scale canopy gaps predominate. Emulating natural disturbances offers a way to design future management plans and silvicultural prescriptions consistent with prevailing ecological conditions.

Keywords: Tongass National Forest, old growth, forest development, small-scale canopy gaps, large-scale catastrophic blowdown, predictive windthrow model, silviculture.

(This publication is available online at http://www.fs.fed.us/pnw/tongass1.htm.)

Insects

97-192

Mason, R.R.; Wickman, B.E.; Paul, H.G.; Torgersen, T.R.

1998. A pilot experiment of forest fertilization during an outbreak of the western spruce budworm in northeastern Oregon. Res. Pap. PNW-RP-506. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 25 p.

Mixed-conifer stands were fertilized with nitrogen and with combination treatments of nitrogen, phosphorus, potassium, and sulfur to test their effects on trees and associated insects during an outbreak of the western spruce budworm. None of the treatments significantly influenced budworm dynamics or the impact of defoliation on foliage and shoot growth, radial increment, or tree mortality. Lack of a more significant response of trees to fertilization was attributed to site variability and extreme densities of budworm larvae that severely impacted growth of grand fir and Douglas-fir during the experiment.

Keywords: Insect defoliators, defoliation, tree growth, silvicultural control, Choristoneura occidentalis.

Plant Ecology

97-026

Mead, Bert R.

1998. Phytomass in southeast Alaska. Res. Pap. PNW-RP-505. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 48 p.

Phytomass tables are presented for the southeast Alaska archipelago. Average phytomass for each sampled species of tree, shrub, forb, lichen, and moss in 10 forest and 4 nonforest vegetation types is shown.

Keywords: Alaska, southeast, phytomass, biomass, inventory, wildlife, plant ecology.

(This publication is available online at http://www.fs.fed.us/pnw/pubs.htm.)

Watershed Management

97-069

Cissel, John H.; Swanson, Frederick J.; Grant, Gordon E. [and others]

1998. A landscape plan based on historical fire regimes for a managed forest ecosystem: the Augusta Creek study. Gen. Tech. Rep. PNW-GTR-422. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 82 p.

Vegetation management regimes governing the frequency, intensity, and spatial pattern of future timber harvest activities were derived from historic fire regimes for a 7600-hectare study area in western Oregon. Results showed a greater amount of late-successional habitat, large patches, and better habitat connectivity across the landscape than would result from literal application of standards and guidelines in the Northwest Forest Plan.

Keywords: Landscape ecology, landscape management, fire history, range of historic variability, watershed analysis, fire ecology.

Publications Available Elsewhere

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

Ecosystem Function

Esselstyn, Jacob A.; Wildman, Randall C.
1997. Observations of *Juga* in the diet of larval Pacific giant salamanders (*Dicamptodon tenebrosus*). Northwestern Naturalist. 78: 70-73.

This study was conducted on two reaches of Lookout Creek at the H.J. Andrews Experimental Forest, Lane County, Oregon. Lookout Creek is a fourth-order stream on the west side of the Cascade Range. Results from this study indicate that larval *Dicamptodon tenebrosus* prey on *Juga* spp. Salamander diets are compared in stream reaches with and without *Juga*.

Keywords: Aquatic ecosystems, trophic relations, amphibians.

(See Corvallis order form A.)

Johnson, Sherri L.; Grant, Gordon E.; Swanson, Frederick J.; Wemple, Beverly C.
1997. Lessons from a flood: an integrated view of the February 1996 flood in the McKenzie River basin. In: Laenen, Antonius, ed. The Pacific Northwest floods of February 6-11,1996: Proceedings of the Pacific Northwest water issues conference; 1997 October 7-8; Portland, OR. St. Paul, MN: American Institute of Hydrology: 159-166.

This manuscript presents preliminary results and outlines the study plan of ongoing research of hillslope and channel responses to a major flood in the upper McKenzie River basin, Oregon.

Kewords: Disturbance, streams, landslides, debris flows, roads.

(See Corvallis order form A.)

Tappeiner, John C.; Huffman, David; Marshall, David [and others]
1997. Density, ages, and growth rates in old-growth and young-growth forests in coastal Oregon. Canadian Journal of Forest Research. 27: 638-648.

The ages, diameters, and diameter growth rates of trees in former old-growth stands were studied and compared with young-growth stands (50-70 years) that regenerated after timber harvest. Development of young-growth Douglas-fir stands was quite different from old-growth development.

Keywords: Old-growth forests, forest growth, forest stand dynamics.

(See Corvallis order form A.)

Fire

Chen, Shu-Huei
1997. Characterization of fire effects on forest ecosystems in the Tillamook Forest, Oregon. Corvallis, OR: Oregon State University. 108 p. M.S. thesis.

From the 1920s through 1951, several severe fires occurred in the predominantly conifer forest ecosystems of the northern Oregon Coast Range. A reconstruction of fire history was conducted to help investigate the effects of fire severity, frequency, and area extent on distribution of postfire tree regeneration, species composition, and stand tree size, as well as on current species composition and stand tree size.

Keywords: Fire history, disturbance ecology, landscape ecology.

(Available only through library or interlibrary loan.)

Impara, Peter C.
1997. Spatial and temporal patterns of fire in the forests of the central Oregon Coast Range. Corvallis, OR: Oregon State University. 354 p. Ph.D. dissertation.

Fire history and fire regime were interpreted from tree ring analysis of 4,320 stumps at 178 sites in a 25- by 55-kilometer area in the central Oregon Coast Range. A total of 27 fire episodes was identified in a 516-year period, with sizes estimated at 18 to 544 square kilometers and a mean of 97 square kilometers. The mean fire return interval was 85 years; the natural fire rotation for the 516-year period was 271 years. Old-growth stands were more abundant than shown in previous studies.

Keywords: Fire history, disturbance, landscape dynamics, old-growth forest.

(Available only through library or interlibrary loan.)

Fish and Wildlife

Brown, Catherine
1997. Habitat structure and occupancy patterns of the montane frog, *Rana cascadae*, in the Cascade Range, Oregon, at multiple scales: implications for population dynamics in patchy landscapes. Corvallis, OR: Oregon State University. 161 p. M.S. thesis.

Associations between *Rana cascadae* occupancy patterns and habitat structure at multiple scales were examined. Site-scale habitat conditions explained many occupancy patterns.

Keywords: Metapopulation, connectivity, habitat, frog, montane.

(Available only through library or interlibrary loan.)

Frissell, Christopher A.; Liss, William J.; Gresswell, Robert E. [and others]
1997. A resource in crisis: changing the measurement of salmon management. In: Stouder, D.J.; Bisson, P.A.; Naiman, R.J., eds. Pacific salmon and their ecosystems: status and future options. New York: Chapman and Hall: 411-444.

An overriding focus on extraction of biomass and numerical goals in fishery management has promoted the depletion and biotic impoverishment of Pacific salmon (*Oncorhynchus* spp.). The authors advocate a more contextual perspective of management and science, emphasizing that numerical performances are outcomes of underlying causal processes that determine the realized capabilities of resources and ecosystems.

Keywords: Salmon, management, land use, restoration, harvest.

(Available from libraries and bookstores.)

Gresswell, Robert E.; Harding, Roger D.
1997. The role of special angling regulations in management of coastal cutthroat trout. In: Hall, James D.; Bisson, Peter D.; 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 American Fisheries Society: 151-156.

Sea-run coastal cutthroat trout are vulnerable to overharvest by sport angling, and special angling regulations have often been proposed to maintain or rebuild naturally reproducing populations. Although harvest reduction is only one part of an integrated management program, evidence suggests that special regulations should probably be incorporated into efforts to maintain or rebuild populations.

Keywords: Special angling regulations, coastal cutthroat trout, fish management.

(See Corvallis order form B.)

Gresswell, Robert E.; Liss, William J.; Lomnicky, Gregg A. [and others]
1997. Using mark-recapture methods to estimate fish abundance in small mountain lakes. Northwest Science. 71(1): 39-44.

Mark-recapture experiments were used to estimate fish populations in nine small lakes. Resulting estimates furnish a substantial increase in information when compared to more common assessments of relative abundance, but logistical requirements are modest. This technique may be useful for survey purposes in other small, remote lakes.

Keywords: Mark-recapture, population estimation, lakes, trout.

(See Corvallis order form B.)

Ormsbee, Patricia C.; McComb, William C.
1998. Selection of day roosts by female long-legged myotis in the central Oregon Cascade Range. Journal of Wildlife Management. 62(2): 597-603.

Sixteen female long-legged myotis in the central Oregon Cascade Range that used a total of 41 day roosts were radiotracked. Large Douglas-fir snags averaging 97± 3 (SE) centimeters in diameter at breast height and 38 ± 3 meters tall were the most commonly used roost structures (88 percent). The odds that a snag was used as a day roost increased as snag height increased ($P < 0.001$); after snag height was accounted for, the odds of use decreased as stand height within 20 meters of the snag increased ($P = 0.024$). The frequency of occurrence of roosts between young and late seral stands did not differ from that by chance in these two stand conditions ($P = 0.76$). Day roosts generally occurred in upland habitats associated with streams that contained night roosts. Management of large-diameter, tall snags that extend above the canopy will provide one component of day-roost habitat for long-legged myotis in managed landscapes.

Keywords: Bats, forest dwelling, long-legged myotis, Myotis volans*, radiotelemetry, snags, terrestrial/upland habitat, old-growth forests.*

(See Corvallis order form A.)

Reese, Ed O.; Barnard, Jeffrey C.; Hanley, Thomas A.
1997. Food preference and *ad libitum* intake of wild-captured Sitka mice, *Peromyscus keeni sitkensis*. Canadian Field-Naturalist. 111(2): 223-226.

Food preferences of Sitka mouse were studied in four experiments involving five major species of shrubs and three major species of trees. *Ad libitum* intake trials were conducted with the same foods plus beetles and pink salmon. Salmonberry and stink currant fruit and seeds were highly preferred and valuable foods. Devil's club and elderberry were least preferred. Blueberry fruit was intermediate in both preference and intake. Tree seed palatability ranked Sitka spruce greater than western hemlock and western hemlock greater than red alder*. Ad libitum* intake of beetles was low and that of pink salmon was near zero. These results should be helpful in interpreting diet composition studies of Sitka mouse throughout its range and possibly other *Peromyscus* species in wet coastal forests of the Pacific Northwest and Alaska.

Keywords: Sitka mouse, Peromyscus keeni sitkensis*, food habits, small mammals, southeast Alaska.*

(See Juneau order form.)

Rosing, Michael N.; Ben-David, Merav; Barry, Ronald P.
1998. Analysis of stable isotope data: a K nearest-neighbors randomization test. Journal of Wildlife Management. 62(1): 380-388.

A K nearest-neighbor randomization test is described and shown to be useful for analyzing stable isotope data in studies of nutrient flow in ecosystems. Results from simulations of power revealed that the test has high power even when sample sizes are small and displacement is low. Test performance was illustrated with data collected from American marten and their prey in southeast Alaska.

Keywords: Stable isotope analysis, American marten, Martes americana*, southeast Alaska.*

(See Juneau order form.)

Williams, Thomas H.; Currens, Kenneth P.; Reeves, Gordon H.

[n.d.]. Genetic diversity of coastal cutthroat trout. In: Gresswell, Robert E.; Dwyer, Pat; Hamre, R.H., tech. eds. Wild trout IV: putting the native back in wild trout; 1997 August 17-20; Bozeman, MT. [Place of publication unknown]: [Publisher unknown]: 87-88.

Populations of coastal cutthroat trout contain more unique genetic information than other species of anadromous salmonids. Consequently, there is great variability among populations. Loss of individual populations will have greater implications to these fish than to other species.

Keywords: Genetics, coastal cutthroat trout.

(See Corvallis order form A.)

Young, John A.; Heise, William A.; Aubry, Keith B.; Lehmkuhl, John F.

1993. Development and analysis of a landscape-level GIS database to assess wildlife use of managed forests. In: Proceedings of the annual symposium on geographic information systems in forestry, environment, and natural resources management; 1993 February 15-18; Vancouver, BC. Vancouver, BC: Ministry of Supply and Service: 541-547.

Analysis of wildlife response to managed forest landscapes evaluated managed forest stands from a landscape perspective to examine how stand shape, size, connectivity, and position affect wildlife abundance and diversity. Remote sensing and geographic information systems (GIS) were used extensively to evaluate landscapes and select candidate stands for sampling wildlife. Landscapes in southwest Washington were assessed by integrating classified Landsat imagery with other GIS base layers and landscape pattern indices. The ability to characterize and screen large areas using this methodology may prove to be an invaluable tool for large-area analysis and wildlife research.

Keywords: Analysis, landscape-level, GIS, wildlife abundance, remote sensing, Landsat.

(See Olympia order form.)

General

Krankina, Olga N.; Fiorella, Maria; Cohen, Warren; Treyfeld, Rudolf

1998. The use of Russian forest inventory data for carbon budgeting and for developing carbon offset strategies. World Resource Review. 10(1): 52-66.

For many countries, including Russia, forests play a major role in carbon cycling. This role is not fully understood, and in the past, Russian forests were reported to be both a sink and a source of carbon. Accurate assessment of the role of Russian forests in carbon cycling is of global significance as these forests make up over 20 percent of the world's resources.

Keywords: Carbon budgets, Russia, forest inventory, carbon cycling.

(See Corvallis order form A.)

Kratz, Timothy K.; Magnuson, John J.; Bayley, Peter [and others]

1995. Temporal and spatial variability as neglected ecosystem properties: lessons learned from 12 North American ecosystems. In: Rapport, D.J.; Gaudet, C.L.; Calow, P., eds. Evaluating and monitoring the health of large-scale ecosystems. NATO ASI series, Vol. 128. Berlin: Springer-Verlag: 359-383.

This paper describes general patterns exhibited by ecological parameters across a wide variety of ecosystem types. Three basic questions about ecological variability are addressed: (1) Do climatic, edaphic, and biological parameters differ systematically in variability? (2) How is variability partitioned between spatial and

temporal components? and (3) To what extent are ecological parameters spatially or temporally coherent? Data were collected at 12 diverse North American ecosystems represented in the Long-Term Ecological Research network. For each of the 12 sites, data were available for several years at several locations; both the spatial and temporal aspects of variability were analyzed.

Keywords: Ecosystem processes, environmental data, ecosystem dynamics, variability, LTER, intersite studies.

(See Corvallis order form A.)

Kukuev, Yuri A.; Krankina, Olga N.; Harmon, Mark E.

1997. The forest inventory system in Russia: a wealth of data for western researchers. Journal of Forestry. 95(9): 15-20.

The forested area in Russia is the largest of any country in the world and therefore plays a crucial role in a wide range of global environmental and economic issues, from timber supply to biotic responses to climate change. In its current form, the Russian inventory system is handled by the state, which nationalized all forest lands in 1981. With information on Russian forests, English-speaking scientists and resource managers can consider potential applications of data, from timber market projections to mitigation measures for climatic change.

Keywords: Forest ecosystems, forest inventory, biological diversity, Russia.

(See Corvallis order form A.)

General, Nontechnical

Cascade Center for Ecosystem Management

1998. Cascade center research and management news. Corvallis, OR: Oregon State University; [U.S. Department of Agriculture, Forest Service], Pacific Northwest Research Station; Blue River, OR: [U.S. Department of Agriculture, Forest Service], Willamette National Forest, Blue River Ranger District. 4 p.

This newsletter offers information about field tours being offered to mark the 50th anniversary of the H.J. Andrews Experimental Forest; describes a new video, *Thinning Young Stands*; provides a summary of the young stand management workshop; and concludes with a description of exotic plant invasion along roads and streams in the Andrews Forest.

Keywords: Cascade Center for Ecosystem Management, technology transfer, newsletter.

(See Corvallis order form A.)

Genetics

Johnson, G.R.

1997. Site-to-site genetic correlations and their implications on breeding zone size and optimum number of progeny test sites for coastal Douglas-fir. Silvae Genetica. 46(5): 280-285.

Type-B genetic correlations were used to examine the relations among geographic differences between sites and their site-site genetic (type-B) correlations. Examination of six local breeding zones in Oregon indicated that breeding zones were, for the most part, not too large because few environmental variables were correlated with type-B genetic correlations. The data also were used to examine expected gains from using combinations of sites in selection indices. Although additional sites always increased the efficiency of the index, and hence gain, the marginal increase was only minimal if three or four sites were already in the index. The trend was consistent over all six breeding zones.

Keywords: Forest genetics, Douglas-fir, genotype-by-environmental interaction, breeding zones, type-B correlation.

(See Corvallis order form B.)

Sorensen, Frank C.; Campbell, Robert K.
1997. Near neighbor pollination and plant vigor in coastal Douglas-fir. Forest Genetics. 4(3): 149-157.

Near neighbor and wind, compared with far neighbor, pollination gave slightly reduced height in a 10-year field trial at tight spacing. The estimate of nonself inbreeding associated with wind pollination was intermediate compared with isozyme estimates for Douglas-fir in the literature. The effect of cone bagging on plant size was present in the nursery but did not persist in the field test.

Keywords: Pseudotsuga menziesii *(Mirb.) Franco var.* menziesii*, inbreeding, stand structure, sib-mating, mixed mating, seed size, aftereffect.*

(See Corvallis order form B.)

Insects

Halaj, J.; Ross, D.W.; Moldenke, A.R.
1997. Negative effects of ant foraging on spiders in Douglas-fir canopies. Oecologia. 109: 313-322.

Spiders and ants are potential competitors and mutual predators. Indirect evidence from previous research has suggested that ant foraging may significantly lower the abundance of arboreal spiders in young Douglas-fir plantations in western Oregon. This study tested the effect of foraging by ants, dominated by *Camponotus* spp., on spider assemblages in Douglas-fir canopies in a 5-month ant-exclusion experiment.

Keywords: Forest ecosystem, invertebrates, spiders, biological diversity, species list, trophic relations, predation.

(See Corvallis order form A.)

Mycorrhizae

Agerer, Reinhard; Molina, Randy
1997. "*Tsugaerhiza luteoannulata*" + *Tsuga heterophylla* (Rafin.) Sarg. In: Agerer, R.; Danielson, R.M.; Egli, S. [and others], eds. Descriptions of ectomycorrhizae. 2: 79-84.

This paper is one of a series providing technical scientific descriptions of ectomycorrhizae on North American tree hosts. Characteristics of this ectomycorrhiza on western hemlock are the long monopodial-pinnate system, the yellow color, the ringlike structures of the outer and middle mantle layers with plasmatical and membranaceous yellowish pigment, highly differentiated rhizomorphs with vessel-like hyphae, thick rhizomorphs with short cylindric to inflated cells at their periphery, and the lack of clamps.

Keywords: Ectomycorrhizae.

(See Corvallis order form B.)

Physiology

Joseph, Gladwin; Kelsey, Rick G.
1997. Ethanol synthesis and water relations of flooded *Pseudotsuga menziesii* (Mirb.) Franco (Douglas-fir) seedlings under controlled conditions. International Journal of Plant Science. 158(6): 844-850.

Three-year-old and 6-month-old Douglas-fir seedlings were flooded in controlled environments. Roots rapidly synthesized ethanol that diffused into the flooding solution and moved up the transpirational stream. Ethanol did not accumulate to high concentrations in the needles where it may have been metabolized to other compounds. Three-year-old seedlings were more sensitive to flooding stress than the younger seedlings. The ethanol produced by flooded Douglas-fir seedlings did not appear to cause changes in stomatal conductance, water uptake, or net photosynthesis.

Keywords: Douglas-fir, Pseudotsuga menziesii*, anaerobic respiraton, flooding, ethanol, stomatal conductance, water potential, net photosynthesis.*

(See Corvallis order form B.)

Joseph, Gladwin; Kelsey, Rick G.; Thies, Walter G.

1998. Hydraulic conductivity in roots of ponderosa pine infected with black-stain (*Leptographium wageneri*) or annosus (*Heterobasidion annosum*) root disease. Tree Physiology. 18: 333-339.

Roots from healthy and diseased mature ponderosa pine were excavated from a site near Burns, Oregon. Diseased trees were infected with black stain root disease, *Leptographium wageneri*, and annosus root disease, *Heterobasidion annosum*. In diseased roots, only 8 to 12 percent of the cross-sectional xylem was conducting water. Resinosis accounted for 13 to 16 percent of the lost conductivity and embolized xylem accounted for 17 percent. The specific conductivity (k_s) of functional xylem in roots infected with black stain was 3 to 13 percent of the k_s in healthy roots. The k_s of disease-free roots from diseased trees was only 70 percent of the k_s of healthy roots from healthy trees.

Keywords: Root conductivity, Leptographium wageneri*, black stain root disease*, Heterobasidion annosum*, annosus root disease, specific conductivity, ponderosa pine.*

(See Corvallis order form B.)

Swanston, C.W.; Myrold, D.D.

1998. Evaluation of the stem injection technique and subsequent ^{15}N partitioning in red alder crowns. Plant and Soil. 198: 63-69.

This study was conducted in the Cascade Range at the H.J. Andrews Experimental Forest, Willamette National Forest, Oregon. The objectives of the study were to evaluate the viability of using the stem-injection procedure to label red alder foliage with $_{15}NO_3^-$ and $_{15}NH_4^+$ and to assess the uniformity of foliar $_{15}N$-labeling and N concentration between several different crown positions 3 and 15 months after injection.

Keywords: Nitrogen cycling, alder, Alnus*, nitrogen fixation.*

(See Corvallis order form A.)

Plant Ecology

Acker, S.A.; Sabin, T.E.; Ganio, L.M.; McKee, W.A.

1998. Development of old-growth structure and timber volume growth trends in maturing Douglas-fir stands. Forest Ecology and Management. 104: 265-280.

This paper explores trends in development of old-growth characteristics and timber volume growth rates from long-term observations of permanent plots in maturing Douglas-fir (*Pseudotsuga menziesii*) forests in western Oregon and Washington.

Keywords: Old-growth forest, succession.

(See Corvallis order form A.)

Acker, Steven A.

1998. Ecology and management of Sitka spruce, emphasizing its natural range in British Columbia [Book review]. Northwest Science. 72(1): 59-60.

This paper reviews *Ecology and Management of Sitka Spruce, Emphasizing Its Natural Range in British Columbia* by E.B. Peterson, N.M. Peterson, G.F. Weetman, and P.J. Martin and published by the University of British Columbia in 1997.

Keywords: Ecology, silviculture, forest ecosystems.

(See Corvallis order form A.)

Gray, Andrew N.; Franklin, Jerry F.

1997. Effects of multiple fires on the structure of southwestern Washington forests. Northwest Science. 71(3): 174-185.

The effect of an intense wildfire and subsequent severe fires within a short period (reburns) on forest establishment, composition, and age structure was examined in the 16 000-hectare Siouxon Creek watershed on the west side of the Cascade Range in southern Washington. Evidence of large intense fires and small patchy fires was found in the watershed, with four fires occurring since 1990. Tree

establishment was rapid and abundant throughout most of the area burned in the 1902 fire, possibly from survival of onsite seed sources. Tree establishment was delayed on most reburns and corresponded with years of abundant regional Douglas-fir cone production, indicating offsite sources of seed. Western hemlock was less abundant on reburns than on the 1902 burn. The ranges of Douglas-fir ages within stands was greater on reburns than on single burns.

Keywords: Fire, disturbance, ecology, community structure, landscape ecology.

(See Corvallis order form A.)

Gray, Andrew N.; Spies, Thomas A.
1997. Microsite controls on tree seedling establishment in conifer forest canopy gaps. Ecology. 78(8): 2458-2473.

The importance of fine-scale processes within coarser scale ecological features is not well known. Tree establishment and growth were studied in canopy gaps to determine the effect of heterogeneity within and among gaps on species dynamics in mature forests. The study examined the relative importance of substrate type, shade from woody debris and shade cloth, density of understory vegetation, gap size, and forest age on the success of *Abies amabilis*, *Pseudotsuga menziesii*, and *Tsuga heterophylla*. Seedlings originating from seed sown on controlled microsites were compared with naturally regenerating seedlings on a range of microsites.

Keywords: Seedling establishment, canopy gaps, disturbance, old-growth forest, microsites, heterogeneity, succession, Abies amabilis, Pseudotsuga menziesii, Tsuga heterophylla.

(See Corvallis order form A.)

Ohmann, Janet L.; Spies, Thomas A.
1998. Regional gradient analysis and spatial pattern of woody plant communities of Oregon forests. Ecological Monographs. 68(2): 151-182.

Knowledge of regional-scale patterns of ecological community structure, and factors controlling it, are largely conceptual. Data on woody plant species abundance from 2,443 field plots across natural and seminatural forests of Oregon were analyzed to(1) identify and quantify environmental factors associated with species gradients; (2) examine how these change with scale, location, and vegetation layer; and (3) characterize and map geographic patterns. In direct gradient analyses, climate explained most species variation at all locations and extents, followed by geology, disturbance, and topography. Dominant gradients and species diversity are quantified and mapped, and vegetation characteristics among subregions are quantified and contrasted.

Keywords: Gradient analysis, canonical correspondence analysis, variance partitioning, plant communities, regional vegetation analysis, woody plants, species diversity, Oregon, forest ecology.

(See Corvallis order form A.)

Plant Pathology

Luoma, Daniel L.; Thies, Walter G.
1997. Stumps fumigated with chloropicrin: effects on surrounding plants. Canadian Journal of Forest Research. 27: 1737-1745.

Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) stumps, both healthy and infected by *Phellinus weirii* (Murr.) Gilbertson, were fumigated with chloropicrin at a clearcut site on the Olympic Peninsula, Washington. Vegetation cover on plots adjacent to treated and untreated stumps was evaluated to determine fumigant effects on vascular plants and moss. Three years after applications to stumps, chloropicrin had little or no effect on other surrounding vegetation. The general lack of interaction effects between distance of plot to stump and fumigation treatments led to the

conclusion that the chloropicrin largely stayed in the stumps during the first 3 years after treatment. The results also demonstrate the potential magnitude and legacy of edge effects in forest stands and the need to account for those effects in study design.

Keywords: Fumigation, chloropicrin, laminated root rot, edge effects.

(See Corvallis order form B.)

Thies, W.G.
1997. Laminated root rot. In: Hansen, Everett M.; Lewis, Katherine J. Compendium of conifer diseases. St. Paul, MN: APS Press:14-15.

Laminated root rot is the most important single natural disturbance causing long-term change in the forest ecosystems of the Northwestern United States and Canada and is one of the most difficult to manage. This article about laminated root rot was included in a collection published by the American Phytopathological Society.

Keywords: Conifer diseases, laminated root rot.

(See Corvallis order form B.)

Remote Sensing

Lawrence, Rick L.; Ripple, William J.
1998. Comparisons among vegetation indices and bandwise regression in a highly disturbed, heterogeneous landscape: Mount St. Helens, Washington. Remote Sensing of Environment. 64: 91-102.

Mount St. Helens provides a nearly unique opportunity to address some of the more perplexing problems in remote sensing. This paper examines the use of various vegetation indices and multiple linear regression using raw spectral bands for predicting vegetation cover in a landscape characterized by high variability in vegetation cover and soil properties. Explanatory values of several vegetation indices were improved by using regression fitting techniques, including log transformations and polynomial regressions.

Keywords: Mount St. Helens, disturbance, volcanic, succession.

(See Corvallis order form A.)

Social Sciences

Findley, Angela J.
1996. Analyzing multiple worldviews of forestry: local perceptions of the 1994 fires on the Wenatchee National Forest, Washington. Corvallis, OR: Oregon State University. 152 p. M.S. thesis.

This paper analyzes world views of resource allocation and suggests conflict management methods that can contribute to improvement of fire recovery efforts.

Keywords: Social assessment, fire recovery.

(Available only through library or interlibrary loan.)

Mendez, Sandra Rodriguez
1995. Smoke on the hill: a comparative study of wildfire and two forest communities. Pullman, WA: Washington State University. 60 p. M.S. thesis.

This paper looks at the response to wildfire in two rural communities in north-central Washington that experienced an intense fire season in summer 1994. Through qualitative research, the study attempted to capture the communities' responses to fire and analyze the responses in the context of the social history of each community.

Keywords: Social assessment, fire recovery.

(Available only through library or interlibrary loan.)

Shindler, Bruce; Neburka, Julie
1995. “It was the most arduous experience of my life”: citizen participation on the Willamette National Forest. Corvallis, OR: Oregon State University. 34 p.

This study systematically compared five projects undertaken on the Willamette National Forest in which citizens were asked to interact with Forest Service personnel and assist in project planning. Agency staffers and citizen participants were interviewed to determine what happened in these groups; of particular interest were those attributes that contributed to successful interactions or outcomes. Groups where the members were selected by the agency for their understanding of the issues and a willingness to commit to a group process were more effective. Projects in which the group’s purpose was defined and an end product identified at the outset were more successful.

Keywords: Public involvement, forest planning.

(See Corvallis order form A.)

Soil, Site, Geology

Hart, Stephen C.; Binkley, Dan; Perry, David A.
1997. Influence of red alder on soil nitrogen transformations in two conifer forests of contrasting productivity. Soil Biology and Biochemistry. 29(7): 1111-1123.

Laboratory studies were conducted to determine the effects of red alder (*Alnus rubra* Bong.) on soil nitrogen transformations and nitrogen availability indices at two conifer forest sites of contrasting productivity. Inclusion of red alder in conifer forests significantly increased gross rates of nitrogen mineralization, nitrogen immobilization, nitrification, and nitrate immobilization, and the effects of alder were generally similar for soils from low and high productivity sites. The addition of alder to the conifer stand at the high-productivity site increased gross nitrogen mineralization and immobilization processes more than at the low-productivity site.

Keywords: Soil, soil nitrogen, Alnus rubra*, forest-conifer.*

(See Corvallis order form A.)

Jandl, R.; Sollins, P.
1997. Water-extractable soil carbon in relation to the belowground carbon cycle. Biology and Fertility of Soils. 25: 196-201.

The role of water-extractable carbon (C-extr) as potential substrate for forest soil microorganisms was investigated by comparing belowground carbon fluxes at a plot with the forest floor removed (no litter) and at a control plot. One-third lower soil respiration rates at the no-litter plot gave evidence that the forest floor was the source of considerable amounts of microbially degradable carbon. Laboratory incubation of C-extr, fractionated into neutral and acid moieties, showed that part of the C-extr was degraded rapidly, and that the high-molecular-weight acid fraction was much less degradable than the neutral carbon. To the extent that the degradable portion of the water-extractable carbon can be regenerated quickly, it may supply much of the substrate for heterotrophic soil respiration.

Keywords: Soil, soil carbon, soil chemistry, carbon cycling.

(See Corvallis order form A.)

Richardson, Jonathon H.T.
1995. Spatial structure and composition of the soil mesofauna in differently-managed forest stands. Portland, OR: Reed College. 62 p. B.A. thesis.

Soil mesofauna are known to have important effects on the soil fauna, nutrient cycling, and plant growth. However, factors affecting the distribution and composition of soil mesofauna are poorly understood. This paper examines the effects of environmental variables on soil microarthropod density and richness within an old-growth Douglas-fir forest, a regrowth stand, a stand disturbed by fire, and a green-tree retention harvest site.

Keywords: Soils, arthropods.

(Available only through library or interlibrary loan.)

Supply and Demand

Haynes, Richard W.

1994. One perspective of fiber supplies in the United States. In: 1994 pulping conference: book 2: Proceedings; 1994 November 6-10; San Diego, CA. Atlanta, GA: TAPPI Press: 557-563.

The early 1990s have seen a shift in public perceptions about timber supply. Current harvest projections do not support some of the perceptions of shortfalls. Change is coming in the proportions of hardwoods and softwoods harvested for sawtimber and nonsawtimber uses. Change is also expected in the size of trees harvested, although not so extensive as seen in the last 15 years.

Keywords: Timber supply, demand.

(See Portland order form.)

Timber Management

Peck, JeriLynn E.; McCune, Bruce

1997. Remnant trees and canopy lichen communities in western Oregon: a retrospective approach. Ecological Applications. 7(4): 1181-1187.

The “new forestry” practice of green-tree retention is becoming an important management tool for publicly owned lands, yet few data exist to demonstrate that this tool can succeed at enhancing biodiversity. The authors addressed this issue by using a retrospective approach to compare canopy lichen litter in adjacent, paired stands of rotation age (55-120 years), one with and one without old-growth (> 300 years) remnant trees.

Keywords: Silvicultural systems, ecosystem management, epiphytes, lichens.

(See Corvallis order form A.)

Scott, William; Meade, Rodney; Leon, Richard [and others[

1998. Planting density and tree-size relations in coast Douglas-fir. Canadian Journal of Forest Research. 28: 74-78.

Test plantations were established in western Washington and Oregon to compare tree growth at six initial planting densities ranging from 120 to 1,200 per acre (300 to 2,960 trees per hectare). A size-density relation was visually apparent 3 years after planting. Inventory data from the oldest 11 trials (5 to 7 years after planting) showed that initial spacing strongly influenced early growth of Douglas-fir (*Pseudotsuga menziesii* Mirb. Franco var. *menziesii*). Average height and diameter at breast height were progressively larger as planting density deceased; at the widest spacing (lowest stand density), average height was 75 percent and average diameter at breast height was 67 percent of that at the closest spacing.

Keywords: Plantation spacing, growth, stand density, Douglas-fir, Pseudotsuga menziesii*.*

(See Olympia order form.)

Watershed Management

Bates, Deigh; Willis, Katherine; Swanson, Frederick [and others]

1998. North Santiam River turbidity study, 1996-1997. [Eugene, OR]: [U.S. Department of Agriculture, Forest Service, Willamette National Forest]; final report. 26 p.

Following the flooding of February 1996, the North Santiam River below Detroit Reservoir carried an extraordinarily high level of turbidity that lasted for months. The Willamette National Forest, Pacific Northwest Research Station, Oregon State University, and City of Salem undertook a joint effort to determine the composition and source of the persistent turbidity. The findings of this joint effort are reported in this paper.

Keywords: Watershed, water quality, cumulative effects, sedimentation.

(See Corvallis order form A.)

Benda, Lee; Dunne, Thomas

1997. Stochastic forcing of sediment supply to channel networks from landsliding and debris flow. Water Resources Research. 33(12): 2849-2863.

Sediment influx to channel networks is stochastically driven by rainstorms and other perturbations that are discrete in time and space and that occur on a landscape with its own spatial variability in topography, colluvium properties, and state of recovery from previous disturbances. The resulting stochastic field of sediment supply interacts with the topology of the channel network and with transport processes to generate spatial and temporal patterns of flux and storage that characterize the sedimentation regime of a drainage basin. The regime differs systematically with basin area. The stochastic sediment supply generated by climatic, topographic, geotechnical, and biotic controls that differ among regions is described.

Keywords: Landslides, debris flows, cumulative effects.

(See Corvallis order form A.)

Braudrick, Christian A.

1997. Entrainment, transport, and deposition of large woody debris in streams: results from a series of flume experiments. Corvallis, OR: Oregon State University. 87 p. M.S. thesis.

Two flume experiments were conducted to study the dynamics of wood in streams. The first experiment examined the effects of piece interaction on wood transport, and the second experiment evaluated a theoretical model predicting the threshold of movement and factors controlling the deposition of individual logs. Flume experiments allowed for modeling of the wood movement under various piece geometries, piece concentrations, and hydraulic conditions.

Keywords: Aquatic ecosystems, geomorphology, woody debris, flume studies, wood movement.

(Available only through library or interlibrary loan.)

Braudrick, Christian A.; Grant, Gordon E.; Ishikawa, Yoshiharu; Ikeda, Hiroshi

1997. Dynamics of wood transport in streams: a flume experiment. Earth Surface Processes and Landforms. 22: 669-683.

Movement of large woody debris in streams was examined in a series of flume experiments in Tsukuba, Japan. Three distinct transport regimes of wood transport were observed: congested, semicongested, and uncongested; the transport regime was primarily controlled by the rate at which logs entered the channel. Depositional fabrics of debris accumulations differed with transport regime. The authors expect uncongested transport to dominate in low-order streams and congested transport in high-order streams. The relation between transport regime and stream order has implications for assessing stability of log pieces introduced or maintained in channels for stream restoration purposes.

Keywords: Woody debris, fluvial transport, channel change, watershed management.

(See Corvallis order form A.)

DeNatale, Jay S.; Fiegel, Gregg L.; Iverson, Richard M. [and others]

1997. Response of flexible wire rope barriers to debris-flow loading. In: Chen, Cheng-lung, ed. Debris-flow hazards mitigation: mechanics, prediction, and assessment: Proceedings of 1st international conference; 1997 August 7-9; San Francisco, CA. New York: American Society of Civil Engineers: 616-625.

In June 1996, an experimental study at the U.S. Geological Survey debris-flow flume in the H.J. Andrews Experimental Forest, Oregon, established the degree to which flexible wire rope barriers could contain rapidly moving, staged debris flows consisting of water-saturated, poorly graded gravelly sand. Six tests were conducted with four different barrier designs. All debris flows had volumes of about 10 cubic meters, masses of about 20 metric tons, and impact velocities of 5 to 9 meters per second.

The study demonstrated that flexible wire rope barriers can effectively mitigate or even completely contain small debris flows.

Keywords: Geomorphology, debris slides, debris flows, debris flow flume.

(See Corvallis order form A.)

Lambert, Beth C.

1997. The effects of hillslope and fluvial processes on particle size of the stream bed at the watershed, reach, and within-reach scales in a fifth-order mountain stream. Corvallis, OR: Oregon State University. 68 p. M.S. thesis.

This study addressed the effects of hillslope and fluvial processes on spatial patterns of streambed particle size at the watershed, reach, and within-reach scales. The study was conducted in Lookout Creek watershed, a fifth-order, 64-km^2 basin on the west side of the Cascade Range in Oregon. This study showed that (1) particle size patterns can be used to test for both hillslope and fluvial controls on the streambed, and (2) a hierarchical approach is useful in understanding the effects of hillslope and fluvial processes. In lowland streams, downstream fining trends have been used as indicators of fluvial processes; this study showed that particle size patterns can be used to identify hillslope processes as well.

Keywords: Geomorphology, alluvial deposits, alluvial forms, channel morphology, sedimentation.

(Available only through library or interlibrary loan.)

Nichols, Kyle

1996. Large wood debris' effect on channel roughness, at varying flow stages, of a forested channel in southeast Alaska. Seattle, WA: University of Washington. 48 p. Senior thesis.

The influence of roughness on a stream channel depends on flow stage, channel size, and the loading and positioning of the debris. A field study of the roughness at increasing flow heights in a 14-meter-wide large woody debris (LWD)-rich stream and a 4-meter-wide debris-free stream showed the roughness decreasing at twice the rate for the larger stream. This study suggested that LWD is a key contributor to overall roughness in forest streams and that loading and positioning of LWD within the channel controls the rate of roughness variation. Removal of LWD decreases roughness and increases sediment transport, which scours the bed, reduces pool frequency, and may increase deposition downstream.

Keywords: Large wood debris, channel roughness, fluvial geomorphology.

(Available only through library or interlibrary loan.)

Swanson, Frederick J.

1997. Development in river and watershed management from ecosystem perspectives. In: 50th anniversary meeting of the Japan Society for Erosion Control Engineering; 1997 October 8-9; Tokyo, Japan. JSECE Publ. 23. [Place of publication unknown]: Japan Society of Erosion Control Engineering: 173-181.

This paper outlines some of the current thinking in the United States about how watersheds function geomorphically and ecologically and about how understanding of watershed function can be used to restore watersheds where past land use has modified the system. Some of the different approaches to watershed restoration underway in the United States are briefly summarized, and an approach to planning restoration actions is described.

Keywords: Watershed management, disturbance regimes, ecosystem restoration, watershed restoration, ecosystem management.

(See Corvallis order form A.)

Wallenstein, Matt

1995. Controls on landslide distribution in the western Cascade Range, Oregon. Lancaster, PA: Franklin and Marshall College. 24 p.

Slope, aspect, and rock strength were evaluated by using the Geographic Information System (GIS) to examine controls on spatial distribution of landslides in the Blue River watershed, Oregon. A logistic regression was run, and only rock strength was found to have a significant influence on landslide occurrence. Land use also was evaluated to determine its effect on landslide hazard. A temporal model of varying landslide hazard due to land use also was developed and run for existing land use data sets for the study area. A GIS map was generated at selected years to show the increase in landslide hazard caused by land use. A landscape scale landslide hazard index was generated separately for two adjacent watersheds with different land use histories.

Keywords: Landslides, watershed management, disturbances, GIS.

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