United States
Department of
Agriculture

Forest Service

Pacific Northwest
Research Station

Recent Publications of the Pacific Northwest Research Station, First Quarter 2003

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The first section shows items published by the PNW Research Station. The second section shows publications available elsewhere. In each section, items are grouped alphabetically by author within categories.

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April 2003

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Alaska Wood Utilization Research and
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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.

Aquatic/Riparian Systems

02-118

Hemstrom, M.A.; Smith, T.; Evans, D. [and others]

2002. Midscale analysis of streamside characteristics in the upper Grande Ronde subbasin, northeastern Oregon. Res. Note. PNW-RN-534. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 16 p.

Riparian or streamside areas are the focus of considerable management and public interest in the interior Northwest. Unfortunately, the vegetation and geomorphic characteristics of streamside areas are difficult to assess across large landscapes because streamside areas are geographically small in much of the arid interior. However, managers and scientists need methods to assess streamside conditions across large landscapes for land management planning, watershed analysis, and landscape simulation modeling. We present proposed methods for characterizing streamside vegetation and topography by using geographic information systems, terrain models, and photointerpreted vegetation maps. We propose application of resulting information for restoration planning and linkage to landscape wildlife and aquatic habitat models in the upper Grande Ronde subbasin of northeastern Oregon.

Keywords: Riparian areas, streamside areas, GIS modeling, interior Pacific Northwest, vegetation, geomorphology.

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

Bibliographies

01-340

Harrington, C.A.; Kallas, M.A., comps.

2002. A bibliography for *Quercus garryana* and other geographically associated and botanically related oaks. Gen. Tech. Rep. PNW-GTR-554. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 115 p.

This publication is a comprehensive bibliography for *Q. garryana*. It includes articles published in scientific or technical journals, accepted theses and dissertations, published or widely distributed documents from federal and state organizations, published conference proceedings (as well as chapters from those proceedings), and books (including chapters or articles in books). The citations pertain primarily to *Q. garryana*; some references, however, pertaining to other geographically related oaks, *Q. alba* (a species closely related to *garryana*), and general information about the genus *Quercus* also are included. A section entitled “Topics and Keywords” is included to facilitate searching the paper copy of the bibliography for topics of interest.

Keywords: Oregon white oak, Garry oak, Quercus garryana.

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

03-047

Pacific Northwest Research Station

2002. Recent publications of the Pacific Northwest Research Station, fourth quarter 2002. Portland, OR: U.S. Department of Agriculture, Forest Service. 28 p.

Keywords: Bibliographies (forestry).

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

Fish and Wildlife

01-158

Findholdt, S.L.; Johnson, B.K.; McDonald, L.L. [and others]

2002. Adjusting for radiotelemetry error to improve estimates of habitat use. Gen. Tech. Rep. PNW-GTR-555. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 14 p.

Animal positions estimated from radiotelemetry have traditionally been treated as error-free when analyzed in relation to habitat variables. One of the effects of position error is to lower the power of statistical tests of habitat selection. We describe a method to incorporate the error surrounding point estimates into measures of environmental variables determined from a geographic information system (GIS). The frequency with which soil, plant community, and canopy cover types were correctly classified with simulated radiotelemetry point estimates increased with increasing patch sizes ($p \leq 0.005$). Our method could be used to assess how accurately environmental variables can be determined across extremes of habitat and topographic diversity and the spatial scale at which analyses retain adequate power. It also could be used with other radiotelemetry systems, including those based on GIS technology, if enough positions are obtained to describe the probability distribution of the observations.

Keywords: Automated tracking, error neighborhood, habitat selection, LORAN-C, Oregon, principal components analysis, radiotelemetry location error, Starkey.

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

Forest Management

03-044

Johnson, A.C.; Haynes, R.W.; Monserud, R.A., eds.

2002. Congruent management of multiple resources: proceedings from the Wood Compatibility Initiative workshop. Gen. Tech. Rep. PNW-GTR-563. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 252 p.

The Wood Compatibility Initiative (WCI) addresses options that may increase the compatibility between wood production and other societal values derived from forest lands. The set of 25 papers included in this proceedings presents the summaries of WCI-related research, compiled from a workshop held in 2001. The workshop proceedings papers are grouped into six general topics: (1) workshop keynote papers, (2) aquatic-related studies, (3) issues relating to scale, (4) silviculture studies, (5) nontimber forest products-related research, and (6) socioeconomic studies. These papers set the context for scientific management inferences as well as illustrate the complex and diverse array of information needed in the development of land management strategies at different spatial scales.

Keywords: Forest management, societal values, wood production, tradeoffs, compatibility.

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

02-200

Peterson, C.E.; Monserud, R.A.

2002. Compatibility between wood production and other values and uses on forested lands: a problem analysis. Gen. Tech. Rep. PNW-GTR-564. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 51 p.

We provide background documentation for the Pacific Northwest Research Station's Wood Compatibility Initiative (WCI), a 5-year multidisciplinary research effort that began in 1998. This problem analysis was the initial effort to examine the state of knowledge regarding

wood compatibility and to develop a framework for directing the research program. The WCI examines the central question: “Can we as a society produce wood commodities and other forest values in an environmentally acceptable and sustainable manner?” The research challenge is to determine if, and at what level, timber harvest and other forest services and products can complement one another. Compatibility is seen as the degree that we can manage for wood production without impairing other values.

Keywords: Compatibility, tradeoffs, forest management, sustainable, silviculture, watershed, wildlife, aquatics, social acceptability, forest policy.

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

03-026

Rapp, V.

2002. Dynamic landscape management. Science Update 3. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 11 p.

The dynamics of disturbance regimes were basic to how Pacific Northwest forests changed and renewed, and these dynamics created the landscape patterns seen historically in the forests. Forest management is creating new landscape patterns in the forests of western Oregon and Washington, but some of the results are now considered undesirable ecologically. Scientists and managers are using a new approach, dynamic landscape management, which emulates historical disturbance regimes through forest management practices. By using this approach, they expect to sustain native species and habitats and maintain ecological processes within their historical ranges, while providing a sustained flow of timber. Scientists from the USDA Forest Service Pacific Northwest Research Station and managers from the Willamette National Forest are using this approach in the Blue River Landscape Study, a 57,000-acre experiment in forest management in the Oregon Cascade Range.

Keywords: Landscape, management, disturbance regime, historical range of variability, Blue River Landscape study.

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

02-102

Wipfli, M.S.; Deal, R.L.; Hennon, P.E. [and others].

2002. Managing young upland forests in southeast Alaska for wood products, wildlife, aquatic resources, and fishes: problem analysis and study plan. Gen. Tech. Rep. PNW-GTR-558. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 64 p.

Red alder appears to influence the productivity of young-growth conifer forests and affect the major resources (timber, wildlife, and fisheries) of forested ecosystems in southeast Alaska. We propose an integrated approach to understanding how alder influences trophic linkages and processes in young-growth ecosystems. The presence of red alder is expected to increase understory biomass and aquatic, riparian, and terrestrial invertebrate abundance, providing more food for herbivores, fish, and birds. We predict that most red alder trees will die standing, and woody debris will be small and mobile in streams. Nitrogen fixation by red alder in mixed stands may result in larger, more commercially valuable conifers. Inclusion of red alder in the regenerating stand may therefore mitigate some negative impacts of clearcutting and may increase total wood production from the landscape.

Keywords: Tongass National Forest, southeast Alaska, red alder, young-growth management, vegetation, vertebrates, wildlife, fish, stream, nitrogen, disturbance process.

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

Recreation

01-284

Colt, S.; Martin, S.; Mieren, J.; Tomeo, M. 2002. Recreation and tourism in south-central Alaska: patterns and prospects. Gen. Tech. Rep. PNW-GTR-551. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 78 p.

This report describes the extent and nature of recreation and tourism in south-central Alaska. Current activities, past trends, and prospective developments are presented, with particular attention given to activities that take place on, or are directly affected by management of the Chugach National Forest. Recreation and tourism in and around the forest also are placed in a larger context. The Chugach National Forest is heavily used as a scenic resource by motorists and waterborne passengers; road access to the forest also supports a variety of land- and water-based recreation such as fishing, camping, hiking, and wildlife viewing. The annual rate of increase in visitors to south-central Alaska appears to have slowed in the late 1990s; there is evidence, however, that both visitors and Alaska residents are increasingly seeking active forms of recreation and "soft adventure." These demands, combined with likely capacity constraints at well-known attractions in Alaska and entrepreneurial efforts to provide short-duration recreation and tourism experiences, may lead to increasing use of the Chugach National Forest.

Keywords: Tourism, recreation, Chugach National Forest, land management planning.

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

Resource Inventory

02-002

Azuma, D.L.; Bednar, L.F.; Hiserote, B.A.; Veneklase, C.F. 2002. Timber resource statistics for western Oregon, 1997. Resour. Bull. PNW-RB-237. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 120 p.

This report is a summary of timber resource statistics for western Oregon, which includes Benton, Clackamas, Clatsop, Columbia, Coos, Curry, Douglas, Hood River, Jackson, Josephine, Lane, Lincoln, Linn, Marion, Multnomah, Polk, Tillamook, Washington, and Yamhill Counties. Data were collected as part of a statewide multiresource inventory. The inventory sampled all private and public lands except those administered by the National Forest System (NFS) and the Bureau of Land Management (BLM). The NFS and BLM provided data from regional inventories. Area information for parks and other reserves was obtained directly from the organizations managing these areas. Statistical tables provide estimates of land area, timber volume, growth, mortality, and harvest for individual survey units and at the half-state level.

Keywords: Forest surveys, forest inventory, statistics (forest), timber resources, resources (forest), western Oregon.

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

Silviculture

02-038

King, J.E.; Marshall, D.D.; Bell, J.F. 2002. Levels-of-growing-stock cooperative study in Douglas-fir: report no. 17—the Skykomish study, 1961-93; the Clemons study, 1963-94. Res. Pap. PNW-RP-548. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 120 p.

Stand treatments were completed as prescribed with an initial calibration cut and five thinnings resulting in eight new regimes for management of Douglas-fir (*Pseudotsuga menziesii* (Mirb.)

Franco). Measurements were continued for an additional 14 years to observe stability and yields of stands in a postthinning holding period. Detailed descriptions of each regime based on measurements at each thinning are summarized in stand development tables. Regimes with the highest levels of growing stock after the last thinning produced 30 to 38 percent more gross cubic volume per acre than regimes with the lowest levels. The complete regimes are compared at three stages of stand development followed by recommendations for applications.

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

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

Social Sciences

02-198

Rolle, S.

2002. Measures of progress for collaboration: case study of the Applegate Partnership. Gen. Tech. Rep. PNW-GTR-565. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 13 p.

Using the Applegate Partnership as a case study, this paper proposes a number of measures for evaluating the success of collaborative groups. These measures allow for providing evaluation and feedback, engaging needed participants, and responding to groups critical of the collaborative process. Arguing for the concept of progress in place of success, this paper points out that success is relative and should not be measured in absolute terms; tracking progress gives the sense of movement toward a goal or desired situation.

Keywords: Natural resources, collaboration, monitoring for success, progress, partnership.

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

Soil

02-173

Tepp, J.S.

2002. Assessing visual soil disturbance on eight commercially thinned sites in northeastern Washington. Res. Note. PNW-RN-535. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 15 p.

Randomly located transects were used to assess visual soil disturbance on eight units in the Fritz Timber Sale in the Colville National Forest. Equipment trails, mostly designated, accounted for about 25 percent of the total area. The cut-to-length harvester and forwarder combination with 130-foot trail spacing produced the least visual disturbance. Leaving slash on trails appeared to reduce displacement and rutting. Rehabilitation of trails, landings, and temporary roads could move seven of the eight units toward compliance with regional standards for detrimental disturbance. Validation of these regional standards is needed to determine the effects of soil disturbance on soil productive capacity.

Keywords: Soil disturbance, soil monitoring, harvesting effects, thinning, skyline, Pacific Northwest, assessment.

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

Science Findings

In 2002 the PNW Research Station continued its series that presents science findings for people who make and influence decisions about managing lands. The 2002 issues may be ordered by using the order form on the last page of this publication. These publications also are available in electronic format at http://www.fs.fed.us/pnw.

February David D'Amore
Soggy soils and sustainability: forested wetlands in southeast Alaska

March Janet Ohmann and Karen Waddell
Dead wood all around us: think regionally to manage locally

April Andrew N. Gray and Thomas A. Spies
Canopy gaps and dead tree dynamics: poking holes in the forests

May Ronald P. Neilson
Is carbon storage enough? Can plants adapt? New questions in climate change

July Tom Spies
Changing the scales of our thinking: landscape-level learning

September Fred Swanson
When the forest burns: making sense of fire history west of the Cascades

October Jim McIver and Roger Ottmar
Postfire logging: Is it beneficial to a forest?

November David D. Marshall and Robert O. Curtis
Volume, value, and thinning: logs for the future

December Gordon Grant
Geology as destiny: cold waters run deep in western Oregon

Publications Available Elsewhere

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

Aquatic/Riparian Systems

Clinton, S.M.; Edwards, R.T.; Naiman, R.J.
2002. Forest-river interactions: influence on hyporheic dissolved organic carbon concentrations in a floodplain terrace. Journal of the American Water Resources Association. 38(3): 619-631.

In large flood-plain rivers, hyporheic (subsurface) flow paths transfer nutrients from productive riparian terraces to oligotrophic off-channel habitats. Because dissolved organic carbon (DOC) fuels microbial processes, and hyporheic micro-organisms represent the first stage of retention and transformaton of these nutrients, understanding DOC flux can provide information on the constraints of microbial metabolism in the hyporheic zone of rivers. We monitored hydrology, physiochemical indicators, and DOC dynamics during low and high discharge periods in the hyporheic zone of a riparian terrace on the Queets River, Washington, to understand what processes control the supply of carbon to subsurface microbial communities.

Keywords: Aquatic ecosystems, hyporheic zone, riparian, flood-plain river, dissolved organic carbon.

(See Corvallis order form 1.)

Atmosphere

Bytnerowicz, A.; Fenn, M.; Ferguson, S.; Grulke, N.
1997. Nutrient cycles and energy flows. In: Atmospheric and biospheric interactions of gases and energy in the Pacific region of the United States, Mexico, and Brazil. Gen. Tech. Rep. PSW-GTR-161. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station: 13-19. Chapter 2.

Carbon and nitrogen are the key elements for any form of life on earth, and they are also essential constituents of various air pollutants affecting global climate. Better knowledge of carbon and nitrogen global cycles is needed for proper planning of management practices in terrestrial ecosystems. For the same reason, a sound knowledge of the climate-caused changes in distribution and rates of water resources also is critically needed.

Keywords: Air pollution, climate change, forests, nutrient cycles, plant responses, simulation modeling.

(See Seattle order form.)

Bytnerowicz, A.; Ferguson, S.; Fujioka, F. [and others].
1997. Simulation modeling: role and status. In: Bytnerowicz, A., tech. coord. Atmospheric and biospheric interactions of gases and energy in the Pacific region of the United States, Mexico, and Brazil. Gen. Tech. Rep. PSW-GTR-161. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station: 27-30.

Numerical model simulations can help to explain and summarize current information on atmosphere and biosphere interactions. However, absolution results are not possible because

models have unknown errors both for spatial and temporal applications, as well as limitations caused by variability and accuracy of input data. Thus, results of simulation models should be considered to be scenarios of possibilities rather than estimates of future conditions. Nevertheless, simulation models are valuable tools because they are designed on the basis of near-past and present conditions, not future conditions that are as yet unknown.

Keywords: Pollution, climate change, forests, nutrient cycles, plant responses, simulation modeling.

(See Seattle order form.)

Grulke, N.; Miller, P.; Ottmar, R. [and others] 1997. Exchanges of gases and aerosols between atmosphere and terrestrial ecosystems. In: Bytnerowicz, A., tech. coord. Atmospheric and biospheric interactions of gases and energy in the Pacific region of the United States, Mexico, and Brazil. Part 1: Synthesis of the current status of knowledge about atmospheric and biospheric interactions. Gen. Tech. Rep. PSW-GTR-161. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station: 5-11. Chapter 1.

Emissions of certain air pollutants have pronounced effects on global temperatures, the amount of ultraviolet radiation reaching the Earth, and the cycles of carbon and nitrogen. Forests and other terrestrial ecosystems may serve as sources and sinks for those pollutants. Rates of exchange of gases and aerosols between atmosphere and terrestrial ecosystems depend on many biotic and abiotic factors; climate warming, and forest management practices may be listed as some of the most important factors in this regard.

Keywords: Air pollution, climate change, forests, nutrient cycles, plant responses, simulation modeling.

(See Seattle order form.)

Ecology

Gervais, J.A.; Noon, B.R.; Willson, M.F. 1999. Avian selection of the color-dimorphic fruits of salmonberry, *Rubus spectabilis*: a field experiment. Oikos. 84: 77-86.

We conducted field experiments by using the color-dimorphic fruits of salmonberry (*Rubus spectabilis*) to determine whether free-ranging birds choose fruits on the basis of color, and if so, whether these patterns indicated the potential for birds to exert evolutionarily significant selective pressure on this fruit trait. Birds consistently selected red over orange fruit in experimental displays in the field despite wide geographic variation in fruit-color frequencies, fruit-crop densities, and number and species composition of avian frugivores in Oregon and Alaska. Results indicate that forces other than animal selective pressure are also shaping the occurrence of fruit color traits in bird-dispersed fruiting plants.

Keywords: Frugivory, salmonberry, fruit color, Rubus spectabilis*, avian fruit-color selection.*

(See Juneau order form.)

Economics in Forest Management

Alexander, S.J.; Weigand, J.; Blatner, K.A. 2002. Nontimber forest product commerce. In: Jones, E.T.; McLain, R.J.; Weigand, J., eds. Nontimber forest products in the United States. Lawrence, KS: University Press of Kansas: 115-150.

Nontimber forest products (NTFP) include many plants, lichens, and fungi from forests, including understory species used in the floral market, boughs, fungi, stems, poles and posts, wild

foods, medicinals, plant extracts, and transplants. Species with long traditions of use provide people with an identity that contrasts with other trends toward standardization, mass production, and uniformity. As the number of people desiring naturalness both in ecological and cultural senses grows, the value placed on these natural products increases. We discuss nontimber forest products by several categories, including medicinals, food and forage species, floral and horticultural species, resins and oils, and arts and crafts. Market structure, domestic trade, and international trade are outlined for products originating in and primarily native to the United States.

Keywords: Nontimber forest products, informal economies, commodity chains.

(See Corvallis order form 1.)

Kline, J.K.; Butler, B.J.; Alig, R.J.
2002. Tree planting in the South: What does the future hold? Southern Journal of Applied Forestry. 26(2): 99-107.

Projected increasing demands for timber coupled with reduced harvests on public lands have led to concern among forest policymakers regarding the adequacy of future U.S. timber supplies. One question concerns the likelihood that prevailing market incentives will induce industrial and nonindustrial private landowners to intensify forest management. We develop empirical models of historical tree planting in the Southern United States as functions of economic variables and federal cost sharing. We use the models to test whether tree planting has been measurably different in recent years and to make 50-year projections of future tree planting.

Keywords: Nonindustrial private forest owners, forest industry, cost-share programs, carbon sequestration, Renewable Resources Planning Act.

(See Corvallis order form 1.)

Ecosystem Structure and Function

Bible, K.J.
2001. Long-term patterns of Douglas-fir and western hemlock mortality in the western Cascade Mountains of Washington and Oregon. Seattle, WA: University of Washington. 85 p. Ph.D. dissertation.

This study is a detailed examination of Douglas-fir western hemlock mortality in advancing stages of forest structural development from young (45 to 80 years), to mature (81 to 200 years), and old growth (>200 years). The primary objectives were to investigate (1) changes in temporal patterns of mortality rates, (2) effects of mortality on tree population structure (density and sizes), (3) changes in patterns of biomass accumulation rates and stocks and inputs of woody debris, and (4) causes of mortality.

Keywords: Forest ecology, succession, tree mortality.

(Available only through library or interlibrary loan.)

Carey, A.B.; Colgan, W., III; Trappe, J.M.; Molina, R.
2002. Effects of forest management on truffle abundance and squirrel diets. Northwest Science. 76(2): 148-157.

We evaluated the effects of thinning and legacy retention on production of hypogeous fungal sporocarps and the use of truffles as food by squirrels in 55- to 65-year-old Douglas-fir forests in the Puget Trough of Washington. Mean standing crop biomass of truffles did not differ between thinned and legacy forests. However, dominant genera of truffles in the soil and in fecal pellets did differ as did population densities of flying squirrels and chipmunks. Truffles in soil and in flying squirrel diets were more diverse, and flying squirrels were more abundant in legacy forest than in thinned forest. *Gautieria* spp., a consistently important component of flying squirrel diets, but not chipmunk diets, were more abundant in legacy than in thinned forest. *Melanogaster* spp., eaten by both chipmunks and squirrels, were more abundant in thinned than in legacy forest, as were vascular plants. Flying squirrels consumed plant parts in thinned forest but did not consume measurable amounts

of plant materials in legacy forest. Squirrels consumed a greater diversity of truffles than were found by mycologists who used intensive random sampling.

Keywords: Forest management, mycophagy, northern flying squirrel, Townsend's chipmunk, truffles.

(See Olympia order form.)

Rojas, N.S.; Perry, D.A.; Li, C.Y.; Ganio, L.M. 2002. Interactions among soil biology, nutrition, and performance of actinorhizal plant species in the H.J. Andrews Experimental Forest of Oregon. Applied Soil Ecology. 19: 13-26.

Red alder seedlings given *Frankia* and macronutrients had greater biomass and nitrogen fixation than seedlings grown without additions. Adding ectomycorrhizal fungus *Alpova diplophloeus* increased nitrogen fixation over that attained by *Frankia* and macronutrients alone. Adding micronutrients completely negated the positive effect of the *Frankia* and macronutrients. Red alder grew better in upper slope soil. In contrast, snowbrush grew better in bottom slope soil and showed no significant effects by treatment of *Frankia* mycorrhizal fungus and nutrients.

Keywords: Red alder, snowbrush, Frankia*, actinorhizal plants.*

(See Corvallis order form 2.)

Fire

Lehmkuhl, J.F. 2002. The effects of spring burning and grass seeding in forest clearcuts on native plants and conifer seedlings in coastal Washington. Northwest Science. 76(1): 46-60.

Seeding clearcuts with grasses and legumes is used to increase ungulate forage, reduce browsing on seedlings, reduce competition with seedlings, or control erosion, but the effects on native plants and seedlings are poorly known. Also, a shift to spring or no burning of clearcuts may alter the effectiveness of seeding. I quantified over 5 years the effects of spring burning and forage seeding on seeded forage production, native and exotic plant cover and richness, and the growth of planted conifer seedlings in two clearcuts in coastal forests of western Washington. Burning doubled production of seeded grass, but seeding rate had no effect. Detrimental effects of both burning and seeding on native species appeared small and short-lived over a 5-year period. Hemlock seedling mortality was 64 percent higher in seeded, burned areas than in unseeded, burned areas. Results of the study should apply to wet coastal forests with mild year-round temperatures, and point to the need for more extensive and intensive studies.

Keywords: Prescribed burning, seeding, seedling mortality, native plants, weeds.

(See Wenatchee order form.)

Trentmann, J.; Andreae, M.O.; Graf, H.-F. [and others] 2002. Simulation of a biomass-burning plume: comparison of model results with observations. Journal of Geographical Research. 107(D2): 5-1 through 5-15.

The dynamic evolution of a plume from a prescribed fire was simulated by using the active tracer high-resolution atmospheric model (ATHAM). Initialization parameters were set to reflect the conditions of the fire. Model results are compared with airborne remote-sensing and in situ measurements of the plume. ATHAM reproduces the injection height and horizontal extent of the plume with good accuracy; aerosol mass concentrations are underestimated but still in the range of observations. Overall, it appears that ATHAM is a valuable tool for examining the transport processes within biomass burning plumes and is suitable for studies of the interaction between transport, chemistry, and microphysics within such plumes.

Keywords: Biomass burning, SCAR-C, aerosol transport, aerosol optical properties.

(See Seattle order form.)

Winter, G.J.; Vogt, C.; Fried, J.S.
2002. Fuel treatments at the wildland-urban interface: common concerns in diverse regions. Journal of Forestry. (January/ February): 15-21.

Forest fuels reduction is most successful if managers understand the factors that influence public acceptance of fuel management. This paper reports an analysis of focus group interviews with wildland-urban interface residents at sites selected to provide variation in fire regime, fire history, land-use and ownership patterns, and socioeconomic profile. Focus group data reveal four common factors that affect the acceptance of three fuel management strategies (prescribed fire, mechanical treatment, and defensible space requirements): beliefs about the outcomes of fuel management, personal importance of fuel management, situational specificity, and agency trust.

Keywords: Social acceptability, fuel management, prescribed fire, focus groups.

(See Portland order form.)

Fish and Wildlife

Bishop, M.A.; Meyers, P.M.; McNeley, P.F.
2000. A method to estimate migrant shorebird numbers on the Copper River Delta, Alaska. Journal of Field Ornithology. 71(4): 627-637.

We estimated the annual population of western sandpipers (*Calidris mauri*) and Dunlin (*Calidris alipina pacifica*) stopping over on Copper River Delta during peak spring migration 1992-95. Our calculations required total daily shorebird numbers, daily species proportions, average length of stay, and detection probability. For the 21-day period 26 April-16 May, annual population estimates for western sandpiper ranged from 1.2 to 4.1 million birds per year. Dunlin estimates for this same period ranged form 0.3 to 0.9 million birds. Power analysis determined that 15 years of aerial surveys are needed to detect a 10-percent decline in western sandpiper numbers. Based on the proportion of birds in the Pacific flyway stopping over on the Copper River Delta, we estimated the western sandpiper Pacific flyway population was more than 2.8 million birds in 1992 and more than 4.3 million birds in 1995.

Keywords: Calidris mauri*, western sandpiper, Pacific flyway, annual population, Copper River Delta.*

(See Juneau order form.)

Marcot, B.G.; Gullison, R.E.; Barborak, J.R.
[2001]. Protecting habitat elements and natural areas in the managed forest matrix. In: Fimbel, R.A.; Grajal, A.; Robinson, J.G., eds. The cutting edge: conserving wildlife in logged tropical forest. New York: Columbia University Press: 523-558. Chapter 23.

To meet objectives for conserving wildlife and biodiversity in tropical forests, a system of reserves, corridors, and protected habitat zones and elements can be designed at various scales as a protected area network or PAN for regional integration. Four main PAN elements include (1) habitats and wildlife use zones, (2) specific habitat elements such as individual trees or wildlife breeding sites, (3) habitat corridors connecting zones and parks, and (4) large reserves such as national parks and wildlife sanctuaries. Important research topics for aiding a PAN approach are identified.

Keywords: Protected area network, natural areas, wildlife habitat, tropics, forest planning.

(See Portland order form.)

Wisdom, M.J.; Warren, N.M.; Wales, B.C.
2002. Vertebrates of conservation concern in the interior Northwest: priorities for research. Northwest Science. 76(1): 90-94.

Research on terrestrial vertebrates typically has focused on species with commodity value or threatened or endangered status (TE species). Although these species deserve research attention, other species of conservation are neither commodity nor TE species, and thus may not be studied extensively. To better understand this issue and its implications for conservation, we identified 218 terrestrial species of conservation concern in the interior Northwest, and placed 187 of these species in three categories: (1) commodity, (2) TE, or (3) neither commodity nor TE. We conducted a literature search on the 187 species and calculated the mean number of citations per species, as an index of the degree to which studies have been conducted on species in each category. Our results confirm that the majority of vertebrates of conservation concern have received relatively little attention from research compared to those with commodity or TE designations.

Keywords: Species of conservation concern, research priorities, wildlife, interior Columbia basin, conservation planning.

(See La Grande order form.)

Forest Management

Carey, A.
2002. Everything you've wanted to know about VDT. Northwest Chapter Newsletter. Olympia, WA: Forest Stewards Guild. March: 1-4.

Variable-density thinning (VDT) is one of several tools useful in managing forests for environmental, economic, and aesthetic values over the long term. Other tools include (1) retention of biological legacies such as green trees, snags, and coarse woody debris at harvest (variable-retention harvest systems); (2) establishing multiple tree species in a new stand; (3) coarse woody debris management; and (4) cavity-tree management. Variable-density thinning is used to promote forest health by increasing (1) resistance to disturbance, (2) ability to recover after disturbance, and (3) biological diversity that allows ecosystems to function well through climate variation. Three concepts are important to understand how VDT works: connectedness, scale, and diversification.

Keywords: Sustainable forestry, thinning, variable-density thinning.

(See Olympia order form.)

Hummel, S.
2001. Native species in plantation: *Cordia alliodora* . Nishi-ku, Yokohama, Japan: International Tropical Timber Organization. Tropical Forest Update. 11(3): 18.

Tropical plantations can function to provide fuel, timber, and crops; contribute to site restoration; and reduce the conversion of forest land to alternative land uses. The species and life forms planted must, however, be matched to site conditions and objectives so that plantation functions and ecosystem processes are complementary. Native species may offer ecological and economic opportunities if information is available to guide site selection, plantation establishment, and management.

Keywords: Cordia alliodora*, plantation.*

(See Portland order form.)

Wisdom, H.W.; Brooks, D.J.
2001. International forest resources agreements: a primer. Journal of Forestry. 99(10): 29-33.

International agreements have become favored instruments for addressing large-scale, complex natural resource issues. Since 1973, not only the number but also the scope of agreements has increased. Although the Constitution of the United States grants the federal government exclusive power to sign international agreements that determine U.S. foreign policy, an increase in state and local government participation has presented the challenge of ensuring effective input from domestic stakeholders during international negotiations.

Keywords: International, treaties, forest management, policy.

(See Corvallis order form 2.)

Invertebrates

Gerson, E.A.; Kelsey, R.G.
2002. Piperidine alkaloids in Sitka spruce with varying levels of resistance to white pine weevil (Coleoptera: Curculionidae). Journal of Economic Entomology. 95(3): 608-613.

Our objective was to evaluate piperidine alkaloids as potential resistance factors in Sitka spruce at risk of attack by white pine weevils. We sampled seedlings, in two replicated field trials in the Oregon Coast Range, grown from open-pollinated seeds of putatively "resistant" or susceptible" offsite parent sources. Monoterpenes (quantified by rapid headspace sampling) and alkaloids in bark and foliage were measured in previously unweeviled trees at the time of weevil host selection. Subsequent leader mortality was evaluated in fall. Five families had 25 percent topkill and seven others >50 percent topkill. Chemical and morphological traits differed significantly between these families. Leader diameter was positively correlated with weevil topkill, regardless of family status. Generally, the highest monoterpene concentrations were observed in foliage or bark of three resistant families, whereas the lowest concentrations occurred in susceptible families. Alkaloids did not appear to be associated with topkill. Outstanding chemical and morphological traits were expressed in different combinations among the families; however, a synthesis of these traits was consistent with observed leader mortality.

Keywords: Sitka spruce, Picea sitchensis*, spruce weevil,* Pissodes strobi*, alkaloids, monoterpenes, plant-insect interactions, host selection, susceptible, resistant.*

(See Corvallis order form 1.)

Holsten, E.H.; Burnside, R.E.; Seybold, S.J.
2001. Verbenone interrupts the response to aggregation pheromone in the northern spruce engraver, *Ips perturbatus* (Coleoptera: Scolytidae), in south-central and interior Alaska. Journal of the Entomological Society of British Columbia. 98: 251-256.

Field tests of verbenone, a potential anti-aggregation pheromone of the northern spruce engraver, *Ips perturbatus*, were conducted in south-central and interior Alaska in stands of Lutz spruce, *Picea xlutzii*, and white spruce, *P. glauca*, respectively. Addition of a high release rate of 84 percent -(-)-verbenone to the three-component aggregation pheromone of *I. perturbatus* significantly reduced trap catches. The results of this study, combined with previous results on the presence of verbenone in extracts of volatiles collected from feeding *I. perturbatus* and GC-EAD data, are consistent with antiaggregation behavioral activity of verbenone for *I. perturbatus*.

Keywords: Bark beetles, Ips perturbatus*, semiochemicals, antiaggregation pheromones, verbenone, white spruce,* Picea glauca*, Lutz spruce*, Picea xlutzii*, Alaska (interior, south-central).*

(See Anchorage order form).

Ross, D.W.; Gibson, K.E.; Daterman, G.E.
2001. Using MCH to protect trees and stands from Douglas-fir beetle infestation. Morgantown, WV: U.S. Department of Agriculture, Forest Service, Forest Health Technology Enterprise Team. 11 p.

Until recently, managers had only the option of spraying insecticides on high-valued trees to protect them from Douglas-fir beetle. In 1999, however, the alternative of using the insect's antiaggregation pheromone, methylcyclohexenone (MCH) became available when a formulation was approved by the Environmental Protection Agency for operational use. In simple terms, MCH acts as a "no vacancy" signal to flying beetles, causing them to avoid trees in that specific area.

Keywords: Mycorrhizae, population biology, fungal DNA.

(See Corvallis order form 2.)

Landscape Ecology

McComb, W.C.; McGrath, M.T.; Spies, T.A.; Vesely, D.
2002. Models for mapping potential habitat at landscape scales: an example using northern spotted owls. Forest Science. 48(2): 203-216.

A habitat suitability index model for northern spotted owls was developed and tested in the Oregon Coast Range. Owl habitat suitability was mapped across all ownerships.

Keywords: Wildlife habitat relationships, forest habitat, forest planning.

(See Corvallis order form 2.)

Ohmann, J.L.; Gregory, M.J.
2002. Predictive mapping of forest composition and structure with direct gradient analysis and nearest-neighbor imputation in coastal Oregon, U.S.A. Canadian Journal of Forest Research. 32: 725-741.

Spatially explicit information on forest vegetation is needed at broad spatial scales for natural resource policy analysis and ecological research. We present a new method for predictive vegetation mapping that integrates vegetation measurements from regional grids of field plots, mapped environmental data, and Landsat TM imagery. The gradient nearest-neighbor method applies direct gradient analysis and nearest-neighbor imputation to ascribe detailed ground attributes of vegetation structure and composition to each pixel in a digital landscape map.

Keywords: Landscape analysis, forest composition, forest structure, ordination, vegetation modeling, Landsat TM, forest policy, inventory, land use, regional assessments.

(See Corvallis order form 2.)

Wimberly, M.C.; Spies, T.A.
2001. Modeling landscape patterns of understory tree regeneration in the Pacific Northwest, USA. Applied Vegetation Science. 4: 277-286.

We used a predictive vegetation mapping approach to model understory *Tsuga heterophylla* and *Picea sitchensis* regeneration in a forested landscape in the Oregon Coast Range. Models were based on Landsat TM imagery, aerial photographs, digital elevation models, and stream maps. Because the models explained only moderate amounts of variability (R^2 values of 0.24 to 0.56), we interpreted the predicted patterns as qualitative spatial trends rather than precise maps. *Picea sitchensis* regeneration was closely linked to the stream network, with highest abundance in coastal riparian areas. *Tsuga heterophylla* regeneration varied with topography and overstory forest cover and was spatially clustered around patches of old-growth forest.

Keywords: Tree regeneration, vegetation mapping, environmental gradients, disturbance, dispersal, western hemlock, Tsuga heterophylla*, Sitka spruce,* Picea sitchensis*.*

(See Corvallis order form 2.)

Land Use

Azuma, D.L.; Birch, K.R.; Herstrom, A.A. [and others].
2002. Forests, farms, and people: land use change on non-federal land in western Oregon, 1973-2000. [Salem, OR]: [Oregon Department of Forestry]. 48 p.

As of 1994, 89 percent of the nonfederal land in western Oregon has remained in forest and agricultural uses. However, between 1973 and 1994, significant shifts occurred in dominant land uses toward more developed categories. More

than 80 percent of the shifts in land use were from agriculture or wildland forests to low-density residential or urban areas. Annualized rates of change in conversion of forest and farm lands to residential and urban uses declined dramatically from the 1973-82 period to the 1982-94 period. The slowdown in development in the second period coincided with implementation of land use plans and with declines in the rates at which population and personal income grew. However, from 1994 to 2000, rates of development remained relatively low in spite of rapidly increasing population and personal income. Comprehensive land use planning may have slowed the conversion. In areas near the Portland metropolitan area, overall, significant additional space seems still to have existed in 2000 within areas zoned to accommodate additional development, such as urban growth boundaries.

Keywords: Land use planning, resources (forest), development, land use change, western Oregon.

(See Portland order form.)

Mycorrhizae

Humpert, A.J.; Muench, E.L.; Giachini, A.J. [and others]
2001. Molecular phylogenetics of *Ramaria* and related genera: evidence from nuclear large subunit and mitochondrial small subunit rDNA sequences. Mycologia. 93(3): 465-477.

Phylogenetic relations of the genus *Ramaria* and additional related taxa were examined through phylogenetic analysis of mitochondrial and nuclear ribosomal DNA sequence data. Related genera included *Clathrus*, *Clavariadelphus*, *Gautieria*, *Gomphus*, *Hysterangium*, *Kavinia*, and *Pseudocolus*. The nuclear large subunit ribosomal DNA (nuc LSU rDNA) from 78 isolates including 34 *Ramaria* species was used to test generic, subgeneric, and selected species concepts for *Ramaria*.

Keywords: Gomphales, mt SSU rDNA, nuc LSU rDNA, Phallales, systematics.

(See Corvallis order form 1.)

Kretzer, A.M.; Molina, R.; Spatfora, J.W.
2000. Microsatellite markers for the ectomycorrhizal basidiomycete *Rhizopogon vinicolor*. Molecular Ecology. 9: 1190-1191.

Rhizopogon vinicolor is an ectomycorrhizal fungus of Douglas-fir in the Pacific Northwest. It is widespread and is an excellent species to use in developing basic information on the population structure of mycorrhizal fungi. It forms large tuberculate mycorrhize, which are easily separated from the soil, and the DNA is readily extracted. This study details the development of microsatellite DNA markers that allow for differentiation of fungal individuals in the soil. This is the first step toward building an understanding of population sizes of mycorrhizal fungi.

Keywords: Mycorrhizae, population biology, fungal DNA.

(See Corvallis order form 1.)

Luoma, D.L.; Molina, R.; Pilz, D.; Lefevre, C. [2001] .Use of molecular techniques in the investigation of forest mushroom production under different ecosystem management options. In: Proceedings of an international symposium of the 50th anniversary of the College of Agriculture, Chungbuck National University. Chungbuk, Korea: Chungbuk National University: 59-69.

Ectomycorrhizal fungi perform many vital functions in forest ecosystems, from nutrient cycling to improvement of plant nutrition. We poorly understand the effects of forest disturbance on the diversity and function of mycorrhizal fungi. This paper summarizes current studies aimed to understand the effects of different timber harvesting patterns of diversity of ectomycorrhizal fungi. It also discusses current efforts to understand the productivity of valuable, commercially harvestable forest fungi.

Keywords: Ectomycorrhizal fungi, sporocarp.

(See Corvallis order form 2.)

Vernes, K.; Castellano, M.; Johnson, C.N.
2001. Effects of season and fire on the diversity of hypogeous fungi consumed by a tropical mycophagous marsupial. Journal of Animal Ecology. 70: 945-954.

Changes in the giving-up density (GUD) of hypogeous fungal sporocarps (truffles) by a mycophagous marsupial, the northern bettong (*Bettongia tropica*), was studied in fire-prone sclerophyll forest in northeastern Australia. Low- to medium-intensity experimental fires were set during the late dry season in 1995 and 1996. The GUD of hypogeous fungal sporocarps by *B. tropica* (expressed as biomass of sporocarps remaining at recent *B. tropica* diggings) was measured at unburned sites at approximately 6-week intervals for a period of 14 months. The GUD was significantly higher at burned sites immediately following fire compared with control sites, solely owing to increased GUD of hypogeous species belonging to the family Mesophelliaceae. Several months after fire, GUD was significantly higher on unburned sites than on burned sites. Twelve months after fire, GUDs in burned and unburned sites were not significantly different.

Keyword: Mycology, sequestrate, fungi, truffles.

(See Corvallis order form 2.)

Natural Resource Policy

Brooks, D.J.
2001. International issues and Pacific Northwest forests. Western Forester. Society of American Foresters. 46(5): 1, 4-5.

The Pacific Northwest faces an increasingly complex set of international issues and linkages. In the last decade of the 20th century, the extent and complexity of these international linkages increased as did their interactions with broad-scale trends such as technological, political, and environmental change. Although the commodity trade dimension of this interdependence has been recognized for some time, economic integration and linking of policy processes present additional challenges to forest managers and policymakers.

Keywords: Trade, forest policy, supply and demand.

(See Corvallis order form 1.)

Physiology

Gartner, B.L.; North, E.M.; Johnson, G.R.; Singleton, R.
2002. Effects of live crown on vertical patterns of wood density and growth in Douglas-fir. Canadian Journal of Forest Research. 32: 439-447.

A common assumption is that the bole produces juvenile wood within the crown and mature wood below. We tested that assumption by comparing growth ring widths and wood density components of the outer three growth rings in disks sampled from different crown positions of 34-year-old Douglas-fir (*Pseudotsuga menziesii*) trees. Wood in the crown had slightly wider growth rings, wider earlywood, wider latewood, and lower proportion latewood than wood below the crown, and differences were statistically significant at $p = 0.10$. The wood density characteristics (total ring density, earlywood density, latewood density) were not statistically significant at $p < 0.30$. This research suggests that there was no effect of the crown position on the transition from juvenile to mature wood as judged by wood density.

Keywords: Wood density, live crown, wood quality, Douglas-fir.

(See Corvallis order form 1.)

Plant Ecology

Aukema, J.E.; del Rio, C.M.
2002. Variation in mistletoe seed deposition: effects of intra- and interspecific host characteristics. Ecography. 25: 139-144.

We investigated differences in host infection by a desert mistletoe, *Phoradendron californicum*, and examined one of the processes that contributes to these differences: variation in seed deposition among host individuals and species. In the Sonoran Desert, *P. californicum* parasitizes the sympatric leguminous trees *Olneya tesota*, *Cercidium microphyllum*, *Prosopis velutina*, *Acacia constricta*, and *Acacia greggii*. At a site in Arizona, frequency of infection did not reflect host relative abundance. *Olneya tesota* was parasitized at a higher frequency than expected from its abundance and maintained the highest mistletoe loads per individual host. In contrast, *P. velutina* was infected less frequently than expected. Infection frequency increased with host tree height for all hosts. Mistletoe seed deposition by avian dispersers differed among host species. Seed deposition was higher in infected than in noninfected host trees.

Keywords: Mistletoe, seed dispersal, *desert mistletoe, Phoradendron californicum.*

(See Corvallis order form 1.)

Devall, M.S.; Parresol, B.R.; Smith, W.P.
1995. The effect of herbivory by white-tailed deer and additionally swamp rabbits in an old-growth bottomland hardwood forest. In: Hamel, P.B.; Foti, T.L., tech. eds. Bottomland hardwoods of the Mississippi alluvial valley: characteristics and management of natural function, structure, and composition: Proceedings of a symposium. Gen. Tech. Rep. SRS-42. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station: 49-64.

Forest openings create internal patchiness and offer different habitat qualities that attract wildlife, especially herbivores, that flourish along forest edges. But intense herbivory in these openings can reduce or eliminate herbaceous and woody species and thus influence local species composition and structure of the forest. This study in an old-growth bottomland forest in southeastern Arkansas compares plant colonization among experimental plots, which excluded while-tailed deer (*Odocoileus virginianus*), swamp rabbits *(Sylvilagus aquaticus*), and control plots. After the third year, plant species composition and abundance were significantly affected by herbivores.

Keywords: Bottomland hardwood forest, community structure, ecosystem function, herbivory, old growth, plant diversity, swamp rabbit, Sylvilagus aquaticus, *white-tailed deer,* Odocoileus virginianus*.*

(See Juneau order form.)

McDowell, N.; Barnard, H.; Bond, B.J. [and others].
2002. The relationship between tree height and leaf area: sapwood area ratio. Oecologia. 132: 12-20.

We tested the hypothesis that leaf area to sapwood area ratio A_l:A_s declines with tree height. Whole-tree A_l:A_s was measured on 15 Douglas-fir (*Pseudotsuga menziesii* var. *menziesii*) ranging in height from 13 to 62 meters (aged 20 to 450 years). Ai:As declined substantially as height increased ($p = 0.02$). Our test hypothesis was extended by using a combination of original and published data on nine species across a range of maximum heights and climates. Meta-analysis of 13 whole-tree studies revealed a consistent and significant reduction in Al:As with increasing height ($p < 0.05$). However, two species (*Picea abies* and *Abies balsamea*) A_l:A_s exhibited an increase in

A_l:A_s with height, although the reason for this is not clear. The decrease in A_l:A_s with increasing tree size that we observed in the majority of species may be a homeostatic mechanism that partially compensates for decreased hydraulic conductance as trees grow in height.

Keywords: Leaf area:sapwood area, old-growth trees, hydraulic architecture.

(See Corvallis order form 2.)

Plant Pathology

Maguire, D.A.; Kanaskie, A.; Voelker, W. [and others]

2002. Growth of young Douglas-fir plantations across a gradient in Swiss needle cast severity. Western Journal of Applied Forestry. 17(2): 86-95.

The impact of Swiss needle cast (SNC) on growth on young Douglas-fir plantations in north coastal Oregon was examined. Seventy stands throughout the region were sampled. Top height growth and basal area trends were analyzed separately, and the SNC effect was assessed by comparing growth of plantations with varying degrees of SNC damage to those that were relatively unaffected by the disease, after correcting for other covariates.

Keywords: Douglas-fir plantations, Swiss needle cast, Phaeocryptopus gaeumannii*, growth loss.*

(See Corvallis order form 2.)

Range Management

Jensen, M.E.; Dibenedetto, J.P.; Barber, J.A. [and others]

2001. Spatial modeling of rangeland potential vegetation environments. Journal of Range Management. 54: 528-536.

In this paper, we describe how a predictive vegetation mapping process was used to develop a 30-meter raster-based map of four grassland, five shrubland, and six woodland habitat types across the Little Missouri National Grasslands, North Dakota. Discriminant analysis was used in developing this potential vegetation map based on six primary GIS themes. Accuracy values of our map ranged from 54 to 77 percent in grasslands, 62 to 100 percent in shrublands, and 70 to 100 percent in woodlands dependent on geoclimatic subsection setting. Techniques also are described for generalizing the 30-meter pixel resolution habitat type map to appropriate ecological unit maps (e.g., landtype associations) for use in ecosystem health assessments and land use planning.

Keywords: Habitat types, ecological sites, range sites, ecological classification, geographical information system, remote sensing, vegetation mapping, ecological units.

(See Headquarters order form.)

Regional Assessments

Crone, L.K.; Haynes, R.W.

2001. Socioeconomic evaluation of broad-scale land management strategies. Forest Ecology and Management. 153: 147-160.

This paper examines the socioeconomic effects of alternative management strategies for Forest Service and Bureau of Land Management lands in the interior Columbia basin. From a broad-scale perspective, there is little impact or variation between alternatives in terms of changes in total economic activity or social conditions in the region. However, adopting a finer scale and examining effects on the counties that are likely to be most impacted by federal land management reveals that many of these counties may be better off under one alternative in the short term, but better off under another alternative in the longer term. The agencies can reduce their short-term impacts on federal resource-reliant counties with low socioeconomic resiliency, by concentrating initial restoration efforts in specific areas, but the environmental justice issues associated with such a policy also should be considered.

Keywords: Social impacts, economic impacts, socioeconomic resiliency.

(See Portland order form.)

Haynes, R.W.; Quigley, T.M.
2001. Broad-scale consequences of land management: Columbia basin example. Forest Ecology and Management. 153 (Special Issue): 179-188.

Integrating management actions to consistently achieve broad ecological and socioeconomic goals is a challenge largely unmet. Broad measures are needed to describe tradeoffs, trends in condition under varying management scenarios, and a transparent science underpinning. The Interior Columbia Basin Ecosystem Management Project in the Northwestern United States provides a useful example where scientists, managers, and the public have explored these issues in depth. From a science perspective, we conclude that a successful strategy for broad-scale management will need to (1) maintain long-term sustainability of resources and ecosystems, (2) maintain socioeconomic resiliency, (3) continually assess results of management activities, (4) manage risks and opportunities through consistent approaches at multiple scales, (5) expand our knowledge base, (6) and adaptively manage for new knowledge and assessments of resource conditions and capabilities.

Keywords: Land management, Columbia basin, tradeoffs, resource conditions.

(See Portland order form.)

Remote Sensing

Lefsky, M.A.; Cohen, W.B.; Parker, G.G.; Harding, D.J.
2002. Lidar remote sensing for ecosystem studies. BioScience. 52(1): 19-30.

In the last two decades, remote sensing has become a commonplace tool in ecology and related earth and environmental sciences. In this paper, we review the technology of lidar remote sensing and then describe existing applications of interest to the terrestrial ecology community.

Keywords: Remote sensing.

(See Corvallis order form 1.)

Lennon, J.J.; Kunin, W.E.; Corne, S. [and others]
2002. Are Alaskan trees found in locally more favourable sites in marginal areas? Global Ecology and Biogeography. 11: 103-114.

Species generally become rarer and more patchily distributed as the margins of their ranges are approached. We predicted that in such marginal sites, tree species would tend to occur where some key environmental factors are at particularly favorable levels, compensating in part for the low overall suitability of marginal sites. We quantified marginality by using the spatial distributions of eight tree species across more than 2,000 surveyed sites in southeast Alaska. For each species, we derived a site core/margin index by using a three-dimensional trend surface generated from logistic regression on site coordinates. Also, for each species, the relationships of site marginality with slope and aspect were then compared for occupied and unoccupied sets of sites.

Keywords: Spatial interpolation, land use, remote sensing, graphical information systems, forest, artificial neural networks.

(See Anchorage order form.)

Resource Inventory

LaBau, V.J.; Mead, B.R.
2001. Phytomass associated with the spruce beetle (*Dendroctonus rufipennis* Kirby) epidemic on Kenai Peninsula and other Alaska studies. In: Alden, J.N., tech. ed. Reforestation needs and opportunities for carbon sequestration in Alaska: Proceedings of the Alaska Reforestation Council. Misc. Publ. 2001-2. Fairbanks, AK: University of Alaska Fairbanks, Agricultural and Forestry Experiment Station: 21-30.

The study used a two-phase (double) sampling design. A total of 1,078 photo plots was sampled, and 40 ground plots were classified within strata derived from USDA Forest Service and State and Private Forestry aerial maps prepared between 1991 and 1995 that document the effect of bark beetle on forests of Alaska. Only areas within 6

miles of roads were included in the sample, because funding was not available for full helicopter support. Tables and graphs show biomass distribution within four beetle impact zones: high, moderate, low, and none.

Keywords: Phytomass, Kenai Peninsula, Alaska, spruce bark beetle.

(See Anchorage order form.)

Silviculture

Deal, R.L.; Tappeiner, J.C.
2002. The effects of partial cutting on stand structure and growth of western hemlock-Sitka spruce stands in southeast Alaska. Forest Ecology and Management. 159: 173-186.

The effects of partial cutting on species composition, new and residual-tree cohorts, tree size distribution, and tree growth were evaluated on 73 plots in 18 stands throughout southeast Alaska. These partially cut stands were harvested 12 to 96 years ago, when 16 to 96 percent of the former stand basal area was removed. Partial cutting maintained stand structures similar to uncut old-growth stands, and the cutting had no significant effects on tree species composition. The establishment of new-tree cohorts was positively related to the proportion of basal area cut.

Keywords: Partial cutting, stand structure, residual trees, regeneration, Sitka spruce, western hemlock, southeast Alaska.

(See Juneau order form.)

Social Science

Alexander, A.G.; Alexander, S.J.
2002. Native U.S. plants in honey and pollen production. In: Jones, E.T.; McLain, R.J.; Weigand, J. Nontimber forest products in the United States. Lawrence, KS: University Press of Kansas: 223-236.

Honeybees have been important throughout history as pollinators and for their honey. Honey is frequently mentioned as a nontimber forest product. Beekeeping is not a large industry, but the products and services provided by bees and beekeepers are an integral part of American agriculture. Pollination of agricultural crops results in increases in product yield and value. There are a number of native bees in the United States, and although none of them produces a harvestable honey crop, they are important pollinators of native and agricultural plants. This paper lists native or widely naturalized plants that are important pollen and nectar sources for honeybees and includes native plants with pollen or nectar toxic to honeybees or humans, or both.

Keywords: Honeybee, honey, pollination.

(See Corvallis order form 1.)

Soil

Heninger, R.; Scott, W.; Dobkowski, A. [and others]
2002. Soil disturbance and 10-year growth response of coast Douglas-fir on nontilled and tilled skid trails in the Oregon Cascades. Canadian Journal of Forest Research. 32: 233-246.

We (1) quantified effects of skidder yarding on soil properties and seedling growth in a portion of western Oregon, (2) determined if tilling skid trails improved tree growth, and (3) compared results with those from an earlier investigation in coastal Washington. Douglas-fir seedlings were hand planted at eight recent clearcuts in skid ruts in either nontilled or tilled trails, in adjacent soil berms, and in adjacent logged-only portions. Four and five years after skidding, rut depths averaged 15 centimeters below the original soil surface; mean fine-soil bulk density below ruts of nontilled trails exceeded that on logged-only portions by 14 percent. Height growth on

nontilled trails averaged 24 percent less than on logged-only portions in year 4 after planting and decreased to 6 percent less in year 7. For years 8 through 10, mean height growth was similar for all treatments. Reduced height growth lasted for about 7 years compared with 2 years for coastal Washington. Ten years after planting, trees in skid-trail ruts averaged 10 percent shorter with 29 percent less volume than those on logged-only portions. Tillage improved height and volume growth to equal that on logged-only portions. Generalizations about negative effects of skid trails on tree growth have limited geographic scope.

Keywords: Soil disturbance, tree growth, bulk density, skidder yarding, tillage, clearcutting.

(See Olympia order form.)

Threatened, Endangered, and Sensitive Species

Aubry, K.B.; Raley, C.M.
2002. Selection of nest and roost trees by pileated woodpeckers in coastal forests of Washington. Journal of Wildlife Management. 66(2): 392-406.

Providing adequate habitat for the pileated woodpecker (*Dryocopus pileatus*) is a key component of federal forest management plans in the Pacific Northwest, yet information on trees selected by pileated woodpeckers for nesting or roosting in coastal forests is extremely limited. The objectives of our study were to investigate characteristics of both individual trees and sites selected for nesting and roosting in coastal forests, and evaluate the efficacy of current harvest prescriptions for maintaining populations of pileated woodpeckers in managed forests.

Keywords: Pileated woodpecker, Dryocopus pileatus*, Pacific Northwest, western hemlock, Pacific silver fir, western redcedar, nests, roosts, decadent trees, snags, forest management.*

(See Olympia order form.)

Raphael, M.G.; Holthausen, R.S.
2002. Using a spatially explicit model to analyze effects of habitat management on northern spotted owls. In: Scott, J.M.; Heglund, P.J.; Morrison, M.J. [and others]. Predicting species occurrences: issues of scale and accuracy. Washington, DC: Island Press: 701-712. Chapter 62.

We analyzed likely patterns of distribution and persistence of northern spotted owls on the Olympic Peninsula in the state of Washington. We used a spatially explicit population simulation model for the analysis and also reviewed current information on demographics and likely owl population numbers on the peninsula. Analysis focused on the effects of federal habitat under provisions of the Northwest Forest Plan. We concluded that the retention of nonfederal habitat would make a biologically significant contribution to the maintenance of the population on the peninsula.

Keywords: Demographics, land management, northern spotted owl, simulation model, Olympic Peninsula, population dynamics, spatially explicit population model.

(See Olympia order form.)

Watershed Management

Post, D.A.; Jakeman, A.J.
1999. Predicting the daily streamflow of ungauged catchments in S.E. Australia by regionalising the parameters of a lumped conceptual rainfall-runoff model. Ecological Modelling. 123: 91-104.

In this study, a lumped conceptual, rainfall-runoff model was applied at a daily timestep to 16 small (less than 1 square kilometer) catchments in the Maroondah region of Victoria, Australia. The six parameters of this model characterize the daily streamflow of the catchments effectively and efficiently.

Keywords: Hydrology, hydrology modeling.

(See Corvallis order form 2.)

Wildlife

Bull, E.L.; Hayes, M.P.
2002. Overwintering of Columbia spotted frogs in northeastern Oregon. Northwest Science. 76(2): 141-147.

We studied behavior and locations of overwintering *Rana luteiventris* in northeastern Oregon. We monitored 66 radio-tagged frogs in overwintering sites during 1997-2000. Frogs used a diversity of overwintering sites, but all sites had an aquatic component. Of these 66 frogs, most overwintered in ice-covered ponds (44 percent), partially frozen ponds (29 percent), and in creeks and rivers (23 percent); few (4 percent) overwintered in temporary backwaters and seeps. The distance between the original point of frog capture in August to September and the overwintering site varied greatly (15 to 1200 meters). At overwintering sites in ponds, frogs were at sites with significantly higher water temperatures and higher levels of dissolved oxygen than occurred at fixed locations. Most frogs overwintering in ponds were active all winter and remained in shallow water within 1 meter of the shore.

Keywords: Columbia spotted frogs, overwintering.

(See La Grande order form.)

Jones, L.L.C.; Ovaska, K.; Raphael, M.G.
2001. Courtship behavior of the western red-backed salamander. Northwestern Naturalist. 82: 123-125.

The first two accounts of courtship by western red-backed salamanders in nature are described from observations in western Washington. The species exhibits a tail-straddle walk, typical of other plethodontid salamanders. The same courtship was witnessed during laboratory observations. None of our observations suggests other behaviors to deliver pheromones from the mental gland, as seen in some Eastern United States plethodontids.

Keywords: Western red-backed salamander, Plethodon vehiculum*, courtship, behavior, reproduction.*

(See Olympia order form.)

Wilson, S.M.; Carey, A.B.
2001. Small mammals in oak woodlands in the Puget Trough, Washington. Northwest Science. 75(4): 342-349.

We surveyed 22 Oregon white oak ecotones to determine small mammal community structure and population abundance. Study areas were located on the Fort Lewis Military Reservation, Washington, within the Puget Trough physiographic province and the western hemlock vegetation zone. Small mammals were sampled at each site with paired live-trap lines for four nights, July and August 1999. In order of decreasing abundance, the deer mouse, vagrant shrew, Trowbridge's shrew, and creeping vole were the most abundant and consistently trapped species in oak ecotones. The dusky shrew and the southern red-backed vole were

infrequently captured in oak ecotones but were abundant in nearby managed Douglas-fir forest. The relative influence of prairie and Douglas-fir forest in oak ecotones determines understory plant conditions and local small mammal species occurrence. Abundant vagrant shrews and few dusky shrews in oak ecotones suggest that soil food webs and organic matter accumulation differ between oak ecotones and Douglas-fir forest. This study is the first to sample small mammal communities in Puget Trough oak ecotones.

Keywords: Quercus garryana*, Oregon white oak, Puget Trough, Washington, small mammals.*

(See Olympia order form.)

Wood Utilization

Nicholls, D.; Richard, T.; Micales, J.A. 2002. Wood and fish residuals composting in Alaska. BioCycle. (April): 32-34.

Composting of wood wastes in Alaska has become increasingly important in recent years as wood processors and other industrial waste managers search for environmentally sound and profitable outlets for their waste materials. In this paper, a comparison of the industrial opportunities for composting in southeast and south-central Alaska has been made, as well as a review of key issues identified at recent wood-fish composting workshops in Alaska.

Keywords: Composting, southeast Alaska, south-central Alaska, wood waste.

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