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Pacific Northwest
Research Station

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July 2001

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Pacific Northwest Research Station Publications

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Bibliographies

01-170

Pacific Northwest Research Station
2001. Recent publications of the Pacific Northwest Research Station, first quarter 2001. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 18 p.

Keywords: Bibliographies (forestry).

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

Fire

99-036

Reinhardt, T.E.; Ottmar, R.D.; Hanneman, A.J.S.
2000. Smoke exposure among firefighters at prescribed burns in the Pacific Northwest. Res. Pap. PNW-RP-526. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 45 p.

Smoke exposure measurements among firefighters during prescribed burns in the Pacific Northwest between 1991 and 1994 showed that a small but significant percentage of workers experienced exposure to carbon monoxide and respiratory irritants that exceeded occupational exposure limits. This most often was caused by unfavorable winds or fire behavior and occurred mostly among workers involved in maintaining the fire within the prescribed boundaries. Smoke exposure in such peak exposure situations was up to three times above recommended limits. Exposure to acrolein, benzene, formaldehyde, and respirable particulate matter could be predicted from measurements of carbon monoxide. Electronic dosimeters were the best tool to assess smoke exposure routinely, so long as quality assurance concepts were included in the monitoring program.

Keywords: Smoke hazards, firefighters, health effects, pollutants, Pacific Northwest.

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

Insects

00-183

Holsten, E.H.; Burnside, R.E.; Seybold, S.J.
2000. Attractant semiochemicals of the engraver beetle, *Ips perturbatus*, in south-central and interior Alaska. Res. Pap. PNW-RP-529. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 9 p.

From 1996 through 1999, field tests of various *Ips perturbatus* semiochemicals were conducted in south-central and interior Alaska. The addition of 97 percent -(—)-ipsenol to ipsdienol and cis-verbenol was more attractive than the binary combination alone. Racemic ipsenol dispersed from bubble caps did not prevent *I. perturbatus* from colonizing fresh logging debris. Thus, ipsenol was found to function as an attractant rather than as an antiaggregant, as previously shown.

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

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

Regional Assessments

99-192

Haynes, R.W.; Perez, G.E., tech. eds.
2000. Northwest Forest Plan research synthesis. Gen. Tech. Rep. PNW-GTR-498. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 130 p.

This document synthesizes research accomplishments initiated and funded under the Northwest Forest Plan (hereafter referred to as the Forest Plan) since its inception in 1994. Three major parts in this document cover the context for this effort, eight Forest Plan research accomplishments, and a synthesis.

Keywords: Northwest Forest Plan, ecosystem management, conservation, land management, alternative silviculture, landscape ecology, adaptive management.

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

Recreation

00-292

Kline, J.D.
2001. Tourism and natural resource management: a general overview of research and issues. Gen. Tech. Rep. PNW-GTR-506. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 19 p.

In recent years, growing awareness among tourism researchers of the relations between tourism and natural resources management has resulted in a substantial body of academic literature examining tourism issues under a relatively new set of tourism concepts. This paper discusses the concepts of nature-based tourism, ecotourism, and sustainable tourism; provides a general overview of research and issues; and suggests potential areas for future research. The intent is to provide a general overview of existing literature to serve as a primer for researchers and policymakers initiating more thorough investigations of tourism and natural resource management.

Keywords: Nature-based tourism, ecotourism, sustainable development, outdoor recreation.

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

Resource Inventory

01-019

van Hees, W.W.S.
2001. Summary estimates of forest resources on unreserved lands of the Ketchikan inventory unit, Tongass National Forest, southeast Alaska, 1998. Resour. Bull. PNW-RB-233. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 8 p.

Summary estimates are presented of forest resource area, timber volume, and growth and mortality of timber on unreserved national forest land in the Ketchikan inventory unit of the Tongass National Forest. Pacific Northwest Research Station, Forest Inventory and Analysis, crews collected inventory data from 1995 to 1998. Productive forest land area (timberland) was estimated at 1,405 thousand acres, cubic-foot volume on timberland at 7,294 million cubic feet, and net annual growth and mortality at 14,158 and 49,568 thousand cubic feet, respectively.

Keywords: Forest surveys, timber resources, statistics (forest), Alaska (southeast), Ketchikan.

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

01-018

van Hees, W.W.S.

2001. Summary estimates of forest resources on unreserved lands of the Stikine inventory unit, Tongass National Forest, southeast Alaska, 1998. Resour. Bull. PNW-RB-232. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 8 p.

Summary estimates are presented of forest resource area, timber volume, and growth and mortality of timber on unreserved national forest land in the Stikine inventory unit of the Tongass National Forest. Pacific Northwest Research Station, Forest Inventory and Analysis, crews collected inventory data from 1995 to 1998. Productive forest land area (timberland) was estimated at 1,085 thousand acres, cubic-foot volume on timberland at 5,438 million cubic feet, and net annual growth and mortality at 3,722 and 36,938 thousand cubic feet, respectively.

Keywords: Forest surveys, timber resources, statistics (forest), Alaska (southeast), Stikine.

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

Social Sciences

98-183

Harris, C.; McLaughlin, W.; Brown, G.; Becker, D.R.

2000. Rural communities in the inland Northwest: an assessment of small rural communities in the interior and upper Columbia River basins. Gen. Tech. Rep. PNW-GTR-477. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 120 p. (Quigley, Thomas M., ed.; Interior Columbia Basin Ecosystem Management Project: scientific assessment).

As assessment of small rural communities in the interior and upper Columbia River basin was conducted for the Interior Columbia Basin Ecosystem Management Project. The characteristics and conditions of the rural communities in this region, which are complex and constantly changing, were examined. The research also assessed the resilience of the region's communities, which was defined as a community's ability to respond and adapt to change in the most positive, constructive ways possible for mitigating the impacts of change on the community. The study found that a town's population, size, autonomy, economic diversity, quality of life, and experience with change were all factors related to the town's resiliency and the extent to which it was changing and preparing for change.

Keywords: Rural communities, forest communities, resource dependence, community assessment, ecosystem assessment, social impact assessment, resiliency, Columbia basin.

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

Publications Available Elsewhere

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

Aquatic/Riparian Systems

Huang, Y.S.; Chen, S.H.; Chen, S.S.N.
2000. Restoration of forest watersheds impacted by the powerful 1999 earthquake in Taiwan. In: International conference on riparian ecology and management in multi-land use watersheds. [Place of publication unknown]: American Water Resources Association: 393-398.

A 7.3 magnitude earthquake struck Taiwan on September 21, 1999, and created permanent physiographic changes to over 11 297 hectares of forest watersheds (nearly 0.31 percent of the island's land area) in central Taiwan. Soil liquefaction and massive landslides followed, and torrential rains have further aggravated the disturbance by causing mud and debris flows that are still actively reshaping the geomorphology of many riverine systems. These major disturbances have affected the habitability of many cities and the ecology of the landscape. The Taiwan Forestry Bureau (TFB) is the lead agency responsible not just for managing the forest watersheds but also mitigating and minimizing the potential for further damages to human life, property, and water resources within the watersheds. The TFB is assessing the impacts of the earthquake on forest plant communities, fauna, and water-riverine-riparian systems. Watershed restoration efforts have already started in some areas that are critical to human use (e.g., dams and reservoirs). Developing a restoration plan in an evolving landscape that is both economically viable and ecologically credible is a major challenge that the TFB has undertaken.

Keywords: Regeneration methods, ecological factors, habitat development, silvicultural systems, management options, Taiwan.

(See Corvallis order form 1.)

Olson, D.H.; Chan, S.S.; Weaver, G. [and others]
2000. Characterizing stream, riparian, upslope habitats and species in Oregon managed headwater forests. In: Wigington, P.J.; Beschta, R.L., eds. Riparian ecology and management in multi-land use watersheds. Middleburg, VA: American Water Resources Association: 83-88.

A synthesis of early findings from four companion studies is presented, characterizing spatial patterns of habitats and species within managed forest stands, ages 30 to 70 years, in headwater subdrainages. The integrated results provide longitudinal and latitudinal profiles, relative to headwater streams, of ecological resources and conditions within managed forests. The four studies focus on (1) microsite and microclimate conditions from streamside to upslope; (2) headwater stream habitat conditions, instream amphibians and fishes, and upslope amphibians; (3) arthropods both within and perpendicular to streams; and (4) upslope lichens and bryophytes. These taxonomic and habitat profiles provide needed information to forest managers balancing multiple resource protection with wood production.

Keywords: Riparian management, headwaters, intermittent streams, microclimate, amphibians, arthropods, lichens.

(See Corvallis order form 2.)

Shively, D.R.; Baker, C.; Reeves, G.H. [and others]
1997. Changes in channel characteristics and fish habitat in Fish Creek and Roaring River, two principal tributaries to the Clackamas River: comparisons between the 1964 and 1996 flood events. In: Laenen, A., ed. The Pacific Northwest floods of February 6-11, 1996: Proceedings of the Pacific Northwest water issues conference. St. Paul, MN: American Institute of Hydrology: 225-257.

We determined changes in channel characteristics and fish habitat in Fish Creek and Roaring River, tributaries of the upper Clackamas River, Oregon, following two 100-year floods. Each system had a 100-year flood in 1964 and 1996. Evaluations of the 1964 flood were based on qualitative evaluations by the Oregon Fish Commission. In 1964, habitat features in both systems changed. The area of pool habitat decreased twofold in Fish Creek and fourfold in Roaring River. The amount of spawning habitat also decreased in each system. In 1996, there was little change in habitat composition of either system. The amount of wood in Fish Creek was similar before and after the flood. In contrast, the amount of large wood in Roaring River, which did not have many landslides or debris flows, decreased 69 percent. Fish production following the 1996 flood was the lowest on record in Fish Creek, which had been monitored since 1982.

Keywords: 100-year floods, fish habitat, fish populations, large wood.

(See Corvallis order form 2.)

Atmosphere

Ferguson, S.A.; Sandberg, D.V.; Ottmar, R.
2000. Modelling the effect of landuse [sic] changes on global biomass emissions. In: Innes, J.L.; Beniston, M.; Verstraete, M.M., eds. Biomass burning and its inter-relationships with the climate system. Dordrecht, The Netherlands: Kluwer Academic Publishers: 33-50.

The rate and magnitude of emissions from prescribed burns and wildfires in wildland areas throughout the world are related to biomass consumption. Consequently, land-use practices play a crucial role in estimating the rate and magnitude of smoke production from biomass burning. The variability of land use and its relation to the magnitude and rate of smoke production, however, usually are not considered when estimating biomass emissions. In this work, an emission production model is used to show the difference in emission magnitudes and rates for prescribed fires in rain forests of Washington state and the Brazilian Amazon and in dry forests of Oregon and the Brazilian cerrado.

Keywords: Wildland fire, biomass burning, global change, emissions.

(Available in bookstores and libraries.)

Malcolm, J.R.; Markham, A.; Neilson, R.
2001. Can species keep up with climate change? Conservation Biology in Practice. 2(2): 2-3.

The rate of future climate change is expected to be far greater than the potential rate of species migrations for many species. Output from two models of global vegetation distribution (MAPSS and BIOME3), given several potential future climates (14 model-by-scenario combinations), was examined to determine the rate of migration that would be required to keep pace with the inferred redistribution of vegetation zones by the end of the 21st century. On average, 16 percent of

the terrestrial land surface could require migration rates as high as 1 to 10 kilometers per year, and 1 percent of the land surface could require rates from 10 to 100 kilometers per year, rates rarely observed in the fossil record. Most of these high rates were concentrated in high latitudes, where warming is projected to be the greatest. Some weedy species have exhibited rates close to 20 kilometers per year, suggesting rapidly moving species could colonize "migration stressed" regions before the slower moving species could move in.

Keywords: Global change, biodiversity, species migration, MAPSS, BIOME3, climate change.

(See Corvallis order form 2.)

Economics in Forest Management

Fried, J.S.; Winter, G.J.; Gilless, J.K.
1999. Assessing the benefits of reducing fire risk in the wildand-urban interface: a contingent valuation approach. International Journal of Wildland Fire. 9(11): 9-20.

Wildland-urban interface residents in Michigan were interviewed by using a contingent valuation protocol to assess their willingness to pay (WTP) for incremental reductions in the risk of losing their homes to wildfire. A probability model, which segmented the risk of structure loss into "public" and "private" components, was used to elicit the willingness to pay. Most respondents expressed positive WTP for publicly funded risk reduction activities. These respondents were characterized by tolerance for property taxes, perception of significant risk, high ranking of fire risk relative to other hazards, and high objective estimates of existing risk, and their WTP amounts were positively correlated with income and property value. Given that 97 percent of the respondents were insured against property loss, the large number of WTP responses suggested that substantial nonmarket and unreimbursed losses are experienced when structures are destroyed by wildfires.

Keywords: Nonmarket values, willingness to pay, contingent valuation protocol.

(See Portland order form.)

Haynes, R.W.; Stevens, J.A.; Barbour, R.J.
2000. Criteria and indicators for sustainable forest management at the U.S.A. national and regional levels. In: Krishnapillay, B.; Soepadmo, E.; Arshad, N.L. [and others], eds. Forests and society: the role of research. [Place of publication unknown]: International Union of Forestry Research Organizations: 238-250.

The purpose of this paper is to use readily available information to describe several broad-scale measures that can be used to both describe the state of ecological and social conditions and discuss joint consequences of various management actions. We developed an index of timberland integrity that is a combination of six measures of forest condition and status. We used growing stock value as a measure of the various economic and social criteria. These broad-scale composite measures helped us to look at the notion of tradeoffs, compatible production, and the integrative nature of ecosystems. Our experience suggests that scientists can contribute to development of individual broad-scale measures and composite indexes and to the process for aggregation to higher spatial scales, thus making the discussion about sustainable forest management more productive.

Keywords: Sustainable forest management.

(See Portland order form.)

Robertson, G.
1999. Employment impact multipliers and the economic role of timber in the small forest communities of southeast Alaska. In: Yoshimoto, A.; Yukutake, K., eds. Global concerns for forest resource utilization. Dordrecht, The Netherlands: Kluwer Academic Publishers: 123-135.

Recent harvest declines in the Western United States have focused attention on the question of economic impacts at the community level. This paper uses community-specific, time series employment data to estimate linear employment impact multipliers resulting from exogenously

induced changes in timber employment and other basic employment in small, semi-isolated communities of southeast Alaska. Estimates were derived for each of 14 communities. When viewed as a whole, the study results provide no evidence for the existence of positive relations between changes in basic employment and other employment at the community level; changes in timber employment had no impact on other employment in southeast Alaska communities. Although contrary to common perceptions on the workings of small-scale economies, these results were not consistent with standard economic theory. They highlight, however, the need to consider the broader economic context within which economic impacts occur and the need to assess the validity of simplifying assumptions commonly used in models designed to estimate economic impacts at smaller spatial scales.

Keywords: Economic impacts, employment multipliers, input-output models, small-area economics, timber sector, southeast Alaska.

(Available in bookstores and libraries.)

Shaw, C.G., III; Everest, F.H.; Swanston, D.N.
2000. Working with knowledge at the science/policy interface: a unique example from developing the Tongass Land Management Plan. Computers and Electronics in Agriculture. 27: 377-387.

Management solutions that meet the diversity of society's emerging expectations for the Tongass National Forest, from recreation and subsistence to timber production and mining, while also being sustainable for all resources (consumptive and nonconsumptive) have represented significant challenges to land management planners. To help meet these challenges, we served as scientists on the team that revised the controversial Tongass Land Management Plan. We were asked to assure that credible, value-neutral, scientific information was developed independently without reference to management decision. We also displayed options and the likely levels of risk to resources and society associated with various decisions without advocating any particular outcome. Consistent with advocating use of the best available scientific information in making management decisions, we examined how managers used scientific information in the plan and evaluated whether the decisions were consistent with the available information. The paper discusses some management and policy implications of this approach of engaging scientists in land management planning.

Keywords: Science policy, forest planning, resource decisionmaking, science consistency.

(See Juneau order form.)

Ecosystem Structure and Function

Santiago, L.S.; Goldstein, G.; Meinzer, F.C. [and others]
2000. Transpiration and forest structure in relation to soil waterlogging in a Hawaiian montane cloud forest. Tree Physiology. 20: 673-681.

Transpiration, leaf characteristics, and forest structure in *Metrosideros polymorpha* Gaud. stands growing in east Maui, Hawaii, were investigated to assess physiological limitations associated with flooding as a mechanism of reduced canopy leaf area in waterlogged sites. Whole-tree sap flow, stomatal conductance, microclimate, soil oxidation-reduction potential, stand basal area, and leaf area index were measured on moderately sloped, drained sites with closed canopies and on level, waterlogged sites with open canopies. Whole-tree transpiration was lower at level sites with waterlogged soils but was similar or higher for trees on level sites when normalized by leaf area. Trees on level sites had a smaller leaf area per stem diameter than trees on sloped sites, thereby

suggesting that soil oxygen deficiency may reduce leaf area. However, transpiration per unit of leaf area did not differ substantially, so leaf-level physiological behavior was conserved, regardless of differences in tree leaf area.

Keywords: Evapotranspiration, leaf area index, Metrosideros polymorpha*, redox potential, stomatal conductance.*

(See Corvallis order form 2.)

Stratton, L.; Goldstein, G.; Meinzer, F.C. 2000. Stem water storage capacity and efficiency of water transport: their functional significance in a Hawaiian dry forest. Plant, Cell, and Environment. 23: 99-106.

We investigated the contribution of internal water storage and efficiency of water transport to the maintenance of water balance in six evergreen tree species in a Hawaiian dry forest.

Keywords: Capacitance, hydraulic architecture, water relations, wood properties.

(See Corvallis order form 2.)

Strzelczyk, E.; Li, C.Y. 2000. Bacterial endobionts in the big non-mycorrhizal roots of Scots pine (*Pinus sylvestris* L.). Microbiological Research. 155: 1-4.

This paper describes the occurrence of siderophore-producing bacteria within big nonmycorrhizal, suberized roots of 15- to 20-year-old Scots pine (*Pinus sylvestris* L.) growing on sand dunes near the coastal Baltic Sea of Poland.

Keywords: Pinus sylvestris*, bacteria, root endophytes, endobiont.*

(See Corvallis order form 2.)

Fire

McIver, J.; Youngblood, A.; Niwa, C. [and others] [2000]. Alternative fuel reduction methods in Blue Mountain dry forests: an introduction to the Hungry Bob project. In: Proceedings of the Joint Fire Science Conference. [Moscow, ID]: [University of Idaho]: [pages unknown].

In Blue Mountain dry forests of Oregon and Washington, over 80 years of fire suppression and harvest of large-diameter ponderosa pine have resulted in fuel levels that set the stage for unusually severe wildfire, especially in the pine-dominated dry forests. Although the tools currently used to reduce fuels–prescribed fire and thinning/removal– are well established, forest managers lack comparative knowledge on their economic feasibility and environmental effects. The goal of the current study at Hungry Bob is to provide information to forest managers on the systematic interactions shaping the operational feasibility, economics, and environmental effects of alternative fuel reduction methods. Hungry Bob also is part of a proposed national network of fuel reduction studies in which the same experimental design will be applied to at least 11 other sites in the continental United States, all featuring high risk of severe wildfire.

Keywords: Prescribed fire, thinning, fire regimes, Pinus ponderosa*, pondersoa pine.*

(See La Grande order form.)

Reinhardt, T.E.; Ottmar, R.D.; Castilla, C. 2001. Smoke impacts from agricultural burning in a rural Brazilian town. Air and Waste Management Association. 51: 443-450.

Ambient air quality was measured in Theobroma, a small town in Rondonia, Brazil, during one week of the open burning period of 1995 to supplement air quality data and foster public awareness of impacts of widespread fires.

Personal sampling equipment was used to measure ambient levels of formaldehyde, acrolein, carbon monoxide, benzene, and respirable particulate matter in outdoor air. The data obtained were compared with established Brazilian and U.S. ambient air quality guidelines. Ambient levels of respirable particulate matter averaged 191 micrograms per cubic meter, formaldehyde averaged 12.8 parts per billion, carbon monoxide averaged 4.2 parts per million, and benzene averaged 3.2 parts per billion. Almost all acrolein samples were less than the detection limit of 1 part per billion. The results showed that the public may be exposed to relatively high levels of pollutants under the burning period strategy of smoke management. The results also demonstrate the feasibility of using personal exposure monitoring equipment for low-cost surveys of ambient air quality in polluted regions.

Keywords: Smoke, prescribed fires, community exposure, air quality.

(See Seattle order form.)

Veblen, T.T.; Kitzberger, T.; Donnegan, J. 2000. Climatic and human influences on fire regimes in ponderosa pine forests in the Colorado Front Range. Ecological Applications. 10(4): 1178-1195.

We conducted a study of fire history along an elevational gradient in ponderosa pine forests of the northern Colorado Front Range. Fire scar dates were determined, and fire frequencies and fire intervals were analyzed in relation to changes in human activities and interannual climatic variability. Warmer and drier spring-summers are strongly associated with years of widespread fire. Years of widespread fire also tend to occur 2 to 4 years after wetter than average springs. Alternation of wet and dry periods over periods of 2 to 5 years is conducive to fire spread and is strongly linked to El Niño-Southern Oscillation (ENSO) events. The 1600-1920 fire scar record indicates that individual years during which high percentages of the 41 sample sites synchronously recorded fire have occurred at least several times per century. The association of these years of widespread fire with very strong ENSO events demonstrates the importance of ENSO-related climatic variability in creating extreme fire hazards at a landscape scale.

Keywords: Climatic variation, Colorado, El Niño-Southern Oscillation, fire regime, forest dynamics, forest health, Pinus ponderosa*, ponderosa pine.*

(See Portland order form.)

Fish

Bryant, M.D.; Frenette, B.J.; McCurdy, S.J. 1999. Colonization of a watershed by anadromous salmonids following the installation of a fish ladder in Margaret Creek, southeast Alaska. North American Journal of Fisheries Management. 19(4): 1129-1136.

We evaluated the colonization of a watershed blocked by a 7-meter falls following the installation of an Alaska steep-pass fish ladder to provide access for anadromous salmonids. Coho salmon (*Oncorhynchus kisutch*), pink salmon (*O. gorbuscha*), and chum salmon (*O. keta*) were present below the falls. Fry of sockeye salmon (*O. nerka*) were stocked into Margaret Lake once in 1988 and annually from 1990 through 1994. Pink salmon were the most numerous species to colonize habitat above the falls. Coho salmon moved up the ladder during all years; however, progeny from 25,000 coho salmon presmolts stocked in 1991 formed the greatest proportion of returns in 1992, 1994, and 1996. During the study, only 1,595 sockeye salmon returned of the more than 1.4 million that were stocked. The rapidity of colonization by naturally occurring anadromous salmonids, including cutthroat trout

(*O. clarki*), Dolly Varden (*Salvelinus malma*), and steelhead (*O. mykiss)* underscores a life history strategy of exploiting newly accessible habitat as it becomes available. Although anadromous salmonids successfully colonized the watershed, effects of interbreeding among stocked and natural runs of coho salmon may not be observed for several generations.

Keywords: Salmonids, fish ladders, Alaska.

(See Juneau order form.)

Wipfli, M.S.; Hudson, J.P.; Chaloner, D.T.; Caouette, J.P.

1999. Influence of salmon spawner densities on stream productivity in southeast Alaska. Canadian Journal of Fisheries and Aquatic Sciences. 56: 1600-1611.

We conducted this study to determine the relation between salmon spawner abundance and stream biofilm and benthic macroinvertebrate abundance in southeast Alaska. Experiments took place in outdoor artificial and natural streams. All response variables (biofilm ash-free dry mass [AFDM], chlorophyll *a*, and macroinvertebrates) significantly increased in response to carcass additions in both types of streams. The results indicated that increased spawner densities increased lower trophic level abundance until a trophic capacity was reached. Salmon escapement goals should consider food web effects, especially on trophic levels that support juvenile salmonids that ultimately affect freshwater salmon production.

Keywords: Stream productivity, southeast Alaska, salmon spawners, salmonids.

(See Juneau order form.)

Forest Management

Carey, A.B.

2000. Maintaining biodiversity in forest ecosystems. Forest Science. 46(1): 147-148.

This article is a review of a book edited by Malcolm L. Hunter, Jr., titled “Maintaining Biodiversity in Forest Ecosystems.”

Keywords: Conservation biology, island biogeography, managed forests.

(See Olympia order form.)

Christensen, G.A.; Barbour, J.; Johnston, S.; Malinick, T.

1999. Simulating the volume and quality of wood produced under an ecologically sustainable landscape management plan in the Oregon Cascade mountains. In: Nepveu, G., ed. Proceedings of the 3rd workshop–connection between silviculture and wood quality through modeling approaches and simulation softwares. Nancy, France: Institut Nationalde la Recherche Agronomique: 611-620.

The objective of this study was to determine wood production and quality from a landscape management plan developed to meet ecological objectives based on past disturbance cycles. This required extending stand level techniques for simulating quality and quantity of wood for 980 stands in the Blue River watershed of western Oregon. Silviculture prescriptions included a range of thinning intensities and frequencies combined with extended rotation ages. Study results include the range of products that might be manufactured under different silvicultural alternatives and evaluate the volume as well as the quality of primary and secondary products.

Keywords: Wood quality, landscape scale planning, sustainable management, Cascade Range, Oregon.

(See Portland order form.)

Donoghue, E.M.
2000. Elements of support in community-based forest management strategies: contract NGOs in the Philippines. In: Constituting the commons: crafting sustainable commons in the new millennium; 2000 May 31-June 4; Bloomington, IN. [Place of publication unknown]: [Publisher unknown]. 28 p. http://129.79.82.27/IASCP/Papers/donoghuee041200.pdf. (04/28/01).

Contract nongovernmental organizations (NGOs) in the Philippines are examined in terms of their effectiveness at assisting community-based forest management groups. The focus is on the abilities of contract NGOs to provide services, use participatory methods, and build the capacity of community groups. The analysis is based on data from four community-based forest management sites in the Philippines. Delivering services and building capacity contribute differently to the effectiveness of community-based forest management groups. Although providing services such as training courses may improve the ability of community groups to manage forest resources, assistance that builds leadership skills, networks with other institutions and norms within the community of resource users may contribute more to the resiliency of community-based forest management groups. The findings suggest that community groups are in need of greater levels of assistance to develop collective interests in forest resource management and to build the capacity to satisfy programmatic requirements in a long-term and sustainable method.

Keywords: Community-based forest management, Philippines, community forestry, nongovernmental organizations.

(See Portland order form or Web site.)

Graham, R.T.; Jain, T.B.; Haynes, R.L.[W.] [and others]
1999. Assessments for ecological stewardship. In: Sexton, W.T.; Malk, A.J.; Szaro, R.C.; Johnson, N.C., eds. Ecological stewardship: a common reference for ecosystem management. Oxford, England: Elsevier Science Ltd.: 535-549. Vol. 3.

Assessments supply data and information to address relevant policy questions and to help make decisions. If properly executed, assessment processes can draw conclusions and make recommendations on how to manage natural resources.

Keywords: Resource conditions, assessments, scale, Southern Appalachian Assessment, Interior Columbia River Basin Assessment.

(Available in bookstores and libraries.)

Tappeiner, J.C.; Olson, D.H.; Thompson, C.R.
2000. Density management studies of western Oregon. In: Proceedings of the Society of American Foresters 1999 national convention. Bethesda, MD: Society of American Foresters: 556-557.

The U.S. Department of the Interior, Bureau of Land Management, has begun density management studies, which were developed to fill one of the foremost research information needs: the ecology and management of biodiversity in young stands. These studies comprise a set of integrated investigations intended to test a key assumption of the Northwest Forest Plan, that the silvicultural manipulation of early-successional forests will accelerate the development of late-successional forest structure, which may in turn result in functional habitat for species associated with late-successional and old-growth forest conditions.

Keywords: Forest density management, thinning, alternative silviculture, sustainable forestry, riparian management, riparian buffers.

(See Corvallis order form 2.)

Genetics

Copes, D.L.

1999. Breeding graft-compatible Douglas-fir rootstocks (*Pseudotsuga menziesii* (Mirb.) Franco). Silvae Genetica. 48(3-4): 188-193.

A study encompassing 24 years was conducted to determine if a breeding program could produce highly graft-compatible rootstocks. Twenty-seven trees of apparent high graft compatibility were selected and crossed to produce 226 control-pollinated families. Seedlings were grown, field planted, and grafted with test scions. Graft unions from field tests were evaluated anatomically for internal symptoms of incompatibility. Average compatibility of progeny from the 226 crosses was 90.6 percent, compared with 65 percent in native populations. In addition to field tests for graft compatibility, nursery tests of seedlings from 124 crosses were evaluated for second-year vegetative bud flush and seedling height. It was possible, while maintaining adequately high levels of graft compatibility, to breed for both resistance to spring frost damage and increased seedling height.

Keywords: Incompatibility, grafting, seed orchards, understocks, graft rejection.

(See Corvallis order form 1.)

Copes, D.L.; Randall, W.K.; O'Rourke, D.

[N.d.]. Removing Douglas-fir cones with a lower-crown branch shaker. Tree Planters' Notes. 49(3): 51-55.

A new type of branch shaker was developed to remove cones up to 25 feet above the ground. In 1997 and 1998, the lower-crown branch shaker removed 64.5 percent and 76 percent of the cones from trees that averaged 28 feet and 40 feet, respectively. The shaker was most effective in removing cones when the energy bar was inserted 3 to 5 feet into the interior of the crown and was powered to complete 1.5 to 2.0 oscillations per second. Shaking a 15-foot-high zone around each tree required an average of 5.3 minutes, whereas shaking from 0 to 25 feet required an average of 11.1 minutes.

Keywords: Cones, Douglas-fir, branch shaker.

(See Corvallis order form 1.)

Geographical Information Systems

Fried, J.S.

2000. Geospatially enabled information systems supporting forest decisions at the millenium: a U.S. perspective. In: Forestry information systems 2000. [Helsinki, Finland]: [Finnish Forest and Park Service]: [Pages unknown]. http://www.metsa.fi/eng/tat/jointweek/presentations.htm.

In a combined expert opinion and survey approach, 20 key informant interviews were conducted with forest inventory system practitioners responsible for specifying, designing, implementing, and using spatially referenced information systems intended to support decisions about the management of forests in the United States.

Keywords: Geographical information systems, decisionmaking, forest inventory.

(See Portland order form.)

Geomorphology and Hydrology

Faustini, J.M.

2000. Stream channel response to peak flows in a fifth-order mountain watershed. Corvallis, OR: Oregon State University. 339 p. Ph.D. dissertation.

This investigation explored how the magnitude, style, and frequency of channel adjustments vary spatially and over time within a fifth-order mountain watershed. The study had two major parts, both drawing on historical datasets available at the H.J. Andrews Experimental Forest on the west side of the Cascade Range of Oregon and supplemented by additional field investigation. The first part focused on two adjacent, contrasting stream reaches to examine the influence of large woody debris on channel morphology and channel response to peak flows in a third-order stream. The second part examined the dynamics of channel response to peak flows over two decades, and to two particularly large floods during that period, in different portions of the channel network.

Keywords: Channel geomorphology, sedimentation, woody debris.

(Available only through library or interlibrary loan.)

Fried, J.S.; Brown, D.G.; Zweifler, M.O.; Gold, M.A.
2000. Mapping contributing areas for stormwater discharge to streams using terrain analysis. In: Wilson, J.P.; Gallant, J.C., eds. Terrain analysis: principles and applications. [New York]: John Wiley and Sons: 183-203. Chapter 7.

An approach was evaluated that delineates riparian areas contributing stormwater discharge to perennial streams. From publicly available data and software, four variable-width investigative buffer models were constructed by using cumulative cost distance calculated over fuzzy set combinations of watershed-relative wetness and stream power for a 20-kilometer first-order Michigan stream. These models were compared to assess the sensitivity of buffer delineation to choice of dynamic versus static wetness index, variable versus uniform soil properties, and flow routing algorithm. These models were grounded in the assumption that riparian segments receiving the greatest discharge have upslope contributing areas dominated by saturated soils and have sufficient stream power for saturated flow to reach the stream. The implications of these models for targeting water pollution remediation efforts are discussed.

Keywords: Riparian bufferstrip siting, spatial modeling, terrain analysis.

(Available from bookstores and libraries.)

Grant, G.
2000. Wolman receives 2000 Robert E. Horton medal. Eos. 81(31): 351.

M. Gordon Wolman of Johns Hopkins University was awarded the Robert E. Horton medal in the American Geophysical Union spring meeting honors ceremony, which was held on June 2, 2000, in Washington, DC. The medal recognizes outstanding contributions to the geophysical aspects of hydrology.

Keywords: Geomorphology, hydrology.

(See Corvallis order form 1.)

Post, D.A.; Jones, J.A.; Grant, G.E.
2000. Datasets from long-term ecological research (LTER) sites and their use in ecological hydrology. Water Resources IMPACT. 1(4): 37-40.

A general framework for linking ecology and hydrology is presented that relies on long-term datasets generated from long-term ecological research or similar sites. Insights from these datasets provide the basis for developing and testing hypotheses on the strengths of ecological controls on hydrologic processes and vice versa.

Keywords: Hydrology, small watershed studies, streamflow, aquatic habitat, water demand.

(See Corvallis order form 2.)

Invertebrates

DeBarr, G.L.; Hanula, J.L.; Niwa, C.G.; Nord, J.C.
2000. Synthetic pheromones disrupt male *Dioryctria* spp. moths in a loblolly pine seed orchard. The Canadian Entomologist. 132: 345-351.

Synthetic sex pheromones released in a loblolly pine (*Pinus taeda* L. (Pinaceae)), seed orchard interfered with the ability of male coneworm moths, *Dioryctria* Zeller spp. (Lepidoptera: Pyralidae), to locate traps baited with sex pheromones or live females. Pherocon 1C traps baited with synthetic pheromones or live conspecific females were hung near the center of two 1.2-hectare circular plots during emergence of *D. amatella* (Hulst), *D. disclusa* (Heinrich), and *D. merkeli* (Mutuura and Munroe). In a paired design, trap catches for the mating-disruption treatment with synthetic pheromone dispensers consisting of three polyvinyl chloride rods placed in every tree were compared with the control treatment. Trap catches of *D. amatella* were reduced by 91 percent when plots were treated with 2.5 grams per hectare of Z-11-hexadencenyl acetate. Catches were reduced by 99. 5 percent for *D. disclusa* and by 97 percent for *D. merkeli* when plots were treated with 12.5 grams per hectare of Z-9-tetradecenyl acetate, whereas catches of *D. amatella* were unaffected by this

mating-disruption treatment. These data suggest it may be feasible to prevent mating of *Dioryctria* spp. in pine seed orchards by using synthetic pheromones for mating disruption, but large-scale tests will be required to demonstrate cone protection.

Keywords: Dioryctria*, loblolly pine, seed orchards, pheromones, mating disruption.*

(See Corvallis order form 1.)

Land Use Economics

Ahn, S.; Plantinga, A.J.; Alig, R.J.
2000. Predicting future forestland area: a comparison of econometric approaches. Forest Science. 46(3): 363-376.

We tested the ability of econometric land use models to accurately forecast forest area. We constructed a panel data set for Alabama consisting of county and time-series observations for 1964 to 1992. We found that the dummy variables model produced more accurate forecasts at the county and state level than the other model specifications because of the ability of the dummy variables model to more completely control for cross-sectional variation in the dependent variables. This suggests that the estimated model parameters better capture the temporal relation between forest area and economic variables.

Keywords: Land use, forest land base, land-use change.

(See Corvallis order form 1.)

McCarl, B.A.; Adams, D.M.; Alig, R.J. [and others]
2000. Effects of global climate change on the US forest sector: response functions derived from a dynamic resource and market simulator. Climate Research. 15(3): 195-205.

A multiperiod, regional, mathematical programming economic model was used to evaluate the potential economic impacts of global climatic change on the U.S. forest sector. Various scenarios for the biological response of forests to climate change were developed, ranging from small to large changes in forest growth rates. These scenarios were simulated in the economic forest sector model and results summarized in response functions that may be used instead of rerunning the model as improved or altered biological response scenarios arise. The response functions were used to characterize broad impacts of climate change on the sector. We found aggregate impacts to be relatively small but that producers' income and future welfare 20 to 40 years in the future are most at risk. The forest sector was found to have adjustment mechanisms that mitigate climate change impacts, including interregional migration of production, substitution in consumption, and altered stand management.

Keywords: Climate change, U.S. forest sector, response function.

(See Corvallis order form 2.)

Walsh, M.E.; Ince, P.J.; de la Torre Ugarte, D. [and others]
1999. Potential of short rotation wood crops as a fiber and energy source in the U.S. In: Proceedings of the 4th biomass conference of the Americas. Oxford, England: Elsevier Science, Ltd.: 63-68.

The U.S. Departments of Energy and Agriculture are working together to explore the economic potential of short-rotation woody crops to produce multiple coproducts such as higher value fiber uses (e.g., paper and pulp, veneers, engineered wood products) and lower valued energy uses. An agricultural sector model is being linked with forest sector models to estimate the potential demand and supply of fiber from short-rotation woody crops and associated quantities and prices. The linked models will assess potentials for switchgrass, hybrid poplar, and willow production activities. Additionally, we will assess if residue quantities from short-rotation woody crops may be available for energy.

Keywords: Fiber sources, land base, hybrid poplar.

(See Corvallis order form 2.)

Monitoring

Hemstrom, M.; Raphael, M.G.
2000. Late-successional forests and northern spotted owls: How effective is the Northwest Forest Plan? In: Hansen, M.; Burk, T., eds. Integrated tools for natural resources inventories in the 21st century: Proceedings of the IUFRO conference. Gen. Tech. Rep. NC-212. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station: 283-291.

This paper describes the late-successional and old-growth forest and the northern spotted owl effectiveness monitoring plans for the Northwest Forest Plan. The effectiveness monitoring plan for late-successional and old-growth forests will track changes in forest spatial distribution, and within-stand structure and composition, and it will predict future trends. If these models are successful, we will reduce the demographic studies and rely on model predictions based on habitat condition.

Keywords: Strix occidentalis*, northern spotted owl, late-successional forests, old growth.*

(See Olympia order form. To order the complete technical report, write to Publications, North Central Research Station, 1992 Folwell Ave., St. Paul, MN 55108 and reference GTR-NC-212.)

Liegel, L.H.
1999. How forest health monitoring (FHM) was done in the West region, 1999. In: Jones, S.M.; Adams, D.H.; Rios, J.E., eds. Proceedings, 48th annual meeting of the California Forest Pest Council. Sacramento, CA: California Department of Forestry and Fire Prevention: 6-9.

By the end of summer 1999, 100 percent of forest health monitoring (FHM)1992-95 California baseline plots and 50 percent of 1997 Oregon and Washington baseline plots had been remeasured. National and regional FHM reports now emphasize identification of ecosections that have lower probability of sustainability because of greater vulnerability to natural or human stressors.

Keywords: Forest health monitoring, forest inventory, sustainability.

(See Corvallis order form 2.)

Mycology

Castellano, M.A.; Verbeken, A.; Walleyn, R.; Thoen, D.
2000. Some new or interesting sequestrate Basidiomycota from African woodlands. Karstenia. 40: 11-21.

Five new or interesting sequestrate Basidiomycotina from the Zambezian miombo woodlands of central Africa are described or reported: *Aroramyces radiatus* gen. and comb. nov., *Corditubera bovonei*, *Mackintoshia percica*, *Mycoamaranthus congolensis* comb. nov., and *Octavianina ivoryana* sp. nov. In addition, one recombination, *Aroramyces gelatinosporus*, of a fungal species from tropical North Queensland, Australia, is presented.

Keywords: Ectomycorrhizal fungi, hypogeous fungi, miombo woodland, taxonomy.

(See Corvallis order form 1.)

Crawford, R.H.; Floyd, M.; Li, C.Y.
2000. Degradation of serpentine and muscovite rock minerals and immobilization of cations by soil *Penicillium* spp. Phyton. 40(2): 315-322.

Two *Penicillium* species were isolated from two seed orchards in the Siskiyou National Forest in southwest Oregon where magnesium-rich serpentine rock mineral is abundant. One was isolated from soil of Douglas-fir rhizosphere, the other from the nonrhizosphere soil. They were

tested for their ability to degrade serpentine and muscovite. Both isolates degraded serpentine, thereby releasing silicone and magnesium. The two fungal isolates also degraded muscovite, releasing aluminum, potassium, and silicone and immobilizing limited quantities of the released cations into their mycelial tissues.

Keywords: Penicillium *spp., soil fungi, soil weathering.*

(See Corvallis order form 1.)

Giachini, A.J.; Oliveria, V.L.; Castellano, M.A.; Trappe, J.M.
2000. Ectomycorrhizal fungi in *Eucalyptus* and *Pinus* plantations in southern Brazil. Mycologia. 92(6): 1166-1177.

The occurrence of ectomycorrhizal fungi (EMF) was assessed during four seasons (1 year) in 10 plantations of *Eucalyptus* spp. and *Pinus* spp. in the state of Santa Catarina, southern Brazil. Fifty presumed EMF species representing nine orders and 12 families were identified, including epigeous and sequestrate series. Many are first reports for South America, and four are new species. The results show that richness of EMF in Brazil is higher than previously thought.

Keywords: Mycology, sequestrate fungi, truffles, biodiversity, rare fungi.

(See Corvallis order form 1.)

Lebel, T.; Castellano, M.A.
1999. Australasian truffle-like fungi. IX: History and current trends in the study of the taxonomy of sequestrate macrofungi from Australia and New Zealand. Australian Systematic Botany. 12: 803-817.

Australian sequestrate macrofungi have not been studied extensively until recently, even though their presence in Australia was recognized over 120 years ago in connection with mycophagy by marsupials. By 1895 approximately 2,000 species of fungi had been recorded from Australia, 32 being sequestrate. Recent intensive efforts in limited habitats have expanded our knowledge considerably, with more than 600 new species of sequestrate fungi recorded over the past 7 years. Problems associated with collecting and naming of sequestrate Australian and New Zealand fungi are illustrated with sequestrate russuloid taxa.

Keywords: Basidiomycotina, ascomycotina, zygomycotina, biodiversity.

(See Corvallis order form 1.)

Trappe, J.M.; Castellano, M.A.
2000. New sequestrate ascomycota and basidiomycota covered by the Northwest Forest Plan. Mycotaxon. 75: 153-179.

One new genus and 11 new species of sequestrate fungi are described from late-successional forests in the range of the northern spotted owl: *Fevansia aurantiaca* gen. & sp. nov., *Gastroboletus vividus*, *Gastrosuillus umbrinus*, *Gymnomyces abietis, G. nondistincta*, *Hydnotrya inordinata*, *H. subnix*, *Octavianina cyanescens, Rhizopogon ellipsosporus*, *Thaxterogaster pavelekii*, and *Tuber pacificum*. These are listed in the Northwest Forest Plan as rare.

Keywords: Mycology, sequestrate fungi, truffles, biodiversity, rare fungi.

(See Corvallis order form 2.)

Nontimber Forest Products

Alexander, S.J.; McLain, R.J.; Kim, Y.; Johnson, R.
1999. Recreational harvest of wild foods on the Gifford Pinchot National Forest: resources and issues. In: Pioneering new trails: Proceedings of the Society of American Foresters 1999 national convention. [Bethesda, MD]: [Society of American Foresters]: 180-185.

People with diverse backgrounds harvest berries and mushrooms for personal use, for commercial sale, for subsistence, and for cultural use. These various goals often overlap. Although some management for these products has occurred, loss of habitat for these foods is becoming a problem. Survey information from the Gifford

Pinchot National Forest in Washington and other studies in Michigan, France, and Finland demonstrate the importance of wild foods to many people. Policies intended to regulate harvest of these products may have unintended consequences if the various uses and users are not recognized.

Keywords: Wild foods, nontimber forest products, public policy.

(See Corvallis order form 1.)

Plant Ecology

Walker, L.W.
2000. St. John's wort (*Hypericum perforatum* L. Clusiaceae): biochemical, morphological, and genetic variation within and among wild populations of the northwestern United States. Portland, OR: Portland State University. 162 p. M.S. thesis.

Biochemical, morphological, and genetic variability within and among several wild populations of *Hypericum perforatum* in the northwestern United States were experimentally assessed. The history of the species as both medicinal herb and noxious weed also was researched and reported. Six biochemical characteristics were measured and analyzed. Analyses of leaf measurements suggested that the *H. perforatum* plants conformed morphologically to the narrow-leaf variety. Genetic variability analysis was conducted by using randomly amplified polymorphic DNA-polymerase chain reaction protocol. Six sites sampled in a fire-treated area of central Oregon were heavily invaded by *H. perforatum* within three seasons of a prescribed burn. The data suggest that this central Oregon population arose from an extensive seed bank produced by a relatively small number of founding individuals.

Keywords: Medicinal plants, weed, plant ecology, Hypericum perforatum*, St. John's wort.*

(Available only through library or interlibrary loan.)

Plant Pathology

Hennon, P.E.; McWilliams, M.G.
1999. Decline symptoms do not develop with grafting from dying yellow-cedar. Canadian Journal of Forest Research. 29(12): 1985-1988.

Branchlets from dying yellow-cedar trees were grafted on healthy saplings in a preliminary attempt to determine if agents transmissible through grafts are associated with the widespread yellow-cedar decline in Alaska. A total of 216 branchlets were removed from 72 mature yellow-cedar trees that were apparently healthy, in early stages of dying, or nearly dead. These scions were grafted on 72 saplings and monitored for 5 years. The survival of grafted scions was reduced to 33 percent after 5 years. All surviving scions that were off-color when grafted became green. Grafting treatment failed to transmit symptoms proximally in branches or generally in any of the saplings. Grafting treatment produced no detectable effect on height or diameter growth of the recipient saplings. This preliminary study produced no evidence that a graft-transmissible agent is associated with yellow-cedar decline.

Keywords: Chamaecyparis nootkatensis*, Alaska-cedar, yellow-cedar, forest decline, graft, virus, phytoplasm.*

(See Juneau order form.)

Roth, L.F.; Shaw, C.G., III; Rolph, L.
2000. Inoculum reduction measures to control *Armillaria* root disease in a severely infested stand of ponderosa pine in south-central Washington: 20 year results. Western Journal of Applied Forestry. 15(2): 92-100.

A stand of ponderosa pine (*Pinus ponderosa*) severely impacted by *Armillaria* root disease was treated with five different levels of sanitation through root removal in an attempt to reduce losses to root disease in the regenerating stand. Treatments included (1) trees pushed out, maximum removal of roots by machine, visible

remaining roots picked out by hand; (2) trees pushed out, maximum removal of roots by machine; (3) trees pushed out, no further removal of roots; (4) trees pushed out, large stumps left, otherwise maximum removal of roots by machine; and (5) completely logged, sod scalped between the stumps, stumps retained. After 20 years there was a general reduction in mortality with improved sanitation, although treatment 3 was less effective than expected. In each type of stand regeneration (thinned, unthinned, and planted), only treatment 1 consistently expressed less mortality than the other treatments. These results do not necessarily indicate that logging by pushing is ineffective, but rather they show that after trees and intact stumps have been pushed out, further cleaning is needed to reach the satisfactory sanitation level achieved in treatment 1. Hand cleaning as done in treatment 1 would certainly be cost prohibitive.

Keywords: Armillaria*,* Pinus ponderosa*, ponderosa pine, root disease.*

(See Juneau order form.)

Plant Physiology

Joseph, G.; Kelsey, R.K.
1999. Growth of Douglas-fir and ponderosa pine seedlings with foliar applications of methanol and ethanol. Western Journal of Applied Forestry. 14(4): 183-185.

To test whether either methanol or ethanol stimulated growth of Douglas-fir and ponderosa pine seedlings, we sprayed concentrations of 1 to 10 percent on the foliage twice a week for 13 weeks during the growing season. Foliar applications of these alcohols did not significantly stimulate or inhibit growth, and there were no signs of damage at these concentrations.

Keywords: Pseudotsuga menziesii*,* Pinus ponderosa*, methanol, ethanol, alcohol, foliar application, growth.*

(See Corvallis order form 1.)

Joseph, G.; Kelsey, R.K.
2000. Physiology and growth of Douglas-fir seedlings treated with ethanol solutions. Plant Science. 150: 191-199.

Periodic applications of 1-, 5-, 10-, and 20-percent solutions of ethanol to the roots of Douglas-fir were deleterious to seedling growth and physiology. Ethanol moved up the stems and into needles, producing concentrations in the stems that were nine times higher than in needles. Ethanol concentrations of 10 percent or higher were lethal within a week of treatment initiation, and the 5-percent solution was lethal to seedlings at about 8 weeks. After 1 week of treatment, net photosynthesis, stomatal conductance, and transpiration declined as ethanol concentration increased. High ethanol concentrations (greater than 1 percent) may damage membranes involved in photosynthesis and stomatal function, thereby causing the observed decline in net photosynthesis and stomatal conductance.

Keywords: Douglas-fir, Pseudotsuga menziesii*, ethanol, toxicity, gas exchange, water relations.*

(See Corvallis order form 2.)

Kesley, R.G.; Joseph, G.
1999. Ethanol and ambrosia beetles in Douglas-fir logs exposed or protected from rain. Journal of Chemical Ecology. 25(12): 2793-2809.

Logs from the base of Douglas-fir trees cut in October were randomly assigned to treatments groups: (1) wet logs—cut from the fallen tree and left exposed to rain; (2) dry logs—cut from the fallen tree, placed on blocks, and protected from rain under a plastic tent; and (3) crown logs—left attached to the fallen tree with its branches intact and exposed to rain. The following May, ethanol concentrations were highest in the phloem and sapwood of wet logs. Ethanol levels in tissues from dry and crown logs were similar to each other, but significantly lower than in wet logs. Rain absorbed by the outer bark of wet logs probably created a barrier to gas exchange

between living tissues and the atmosphere facilitating the development of hypoxic conditions necessary for ethanol synthesis. Branches reduced ethanol accumulation in tissues of crown logs exposed to rain. By early September, attack densities of *Gnathotrichus* spp. were high on wet logs and low on dry logs or crown logs, which indicates a preference for logs with higher ethanol concentrations. Starch concentrations decreased by 100 percent in most tissues and soluble sugar concentrations dropped 52 to 95 percent from October to May.

Keywords: Pseudotsuga menziesii*,* Gnathothrichu*s spp., ethanol, host selection, anaerobic respiration, fermentation, Coleoptera, Scolytidae.*

(See Corvallis order form 1.)

Range Management

Clark, P.E.; Krueger, W.C.; Bryant, L.D.; Thomas, D.R.

2000. Livestock grazing effects on forage quality of elk winter range. Journal of Range Management. 53(1): 97-105.

The quality of native forages is commonly below maintenance levels for wintering elk. Late-spring livestock grazing was tested as a means for improving winter range forage quality. Winter levels of crude protein in bluebunch wheatgrass, Idaho fescue, and elk sedge and in vitro dry matter digestibility in bluebunch wheatgrass were enhanced by late-spring grazing. Late-spring livestock grazing can produce substantial forage quality improvement on native winter range that will benefit the nutritional status of elk and other winter grazers.

Keywords: Agropyron spicatum*, bluebunch wheatgrass,* Carex geyeri*,* Cervus elaphus*, elk sedge,* Festuca idahoensis*, Idaho fescue, forage conditioning, nutrition, phenology, reproductive culms.*

(See La Grande order form.)

Regeneration

Hummel, S.

2000. Coppice spouts in *Cordia alliodora*. Journal of Tropical Forest Science. 12(3): 552-560.

Coppice treatments were applied in 5-year-old experimental plots of *Cordia alliodora* to investigate whether (1) sprouts were produced more often by retaining a stump (consistence), (2) more sprouts were produced on a stump (profusion), and (3) sprout production is related to the diameter of the “parent” tree. In each of three replicated plots, eight trees were cut with a 0.5-meter stump retained and eight trees were cut flush to the ground. The 48 treatment trees were inspected for sprouts after 136 days. All 24 trees with 0.5-meter stumps sprouted, but only 8 of the 24 flush-cut stumps sprouted. The 0.5-meter stumps averaged 16.33 sprouts, and the flush-cut sites averaged only 0.71 sprout per tree. The diameter of the “parent” tree was not strongly associated with sprout production or with the mean number of sprouts. Results of this study confirm that *C. alliodora* is a facultative sprouter and suggest that silvicultural treatments to coppice *C. alliodora* should retain a stump rather than cutting trees flush to the ground. Trees such as *C. alliodora* that sprout facultatively can be useful for reforestation of severely disturbed sites.

Keywords: Vegetative reproduction, silviculture, Costa Rica, laurel, Cordia alliodora*.*

(See Portland order form.)

Remote Sensing

Reutebuch, S.E.; Ahmed, K.M.; Curtis, T.A. [and others]

2000. A test of airborne laser mapping under varying forest canopy. In: ASPRS 2000 proceedings: launching the geospatial information age. Bethesda, MD: American Society for Photogrammetry and Remote Sensing: [pages unknown].

The accuracy of two digital terrain models (DTMs) was assessed. The DTMs were generated from two different airborne laser missions flown with the same sensor. Ground elevations from the airborne laser DTMs were compared to 350 ground survey points in a mountainous, heavily forested test site. The RMSE of the 1999 DTM was 2.4 feet with an average error of 0.0 feet. The RMSE of the 1998 DTM was 3.8 feet with an average error of +1.3 feet. The 1999 airborne laser DTM also was compared to spot heights measured photogrammetrically from 1:12,000 aerial photos. The average difference from the 1999 LIDAR DTM was 0.0 feet (n=992) with a standard deviation of 6.0 feet.

Keywords: Laser mapping, forest canopy, digital terrain models.

(See Seattle order form.)

Thomlinson, J.R.; Bolstad, P.V.; Cohen, W.B.

1999. Coordinating methodologies for scaling landcover classifications from site-specific to global: steps toward validating global map products. Remote Sensing of the Environment. 70: 16-28.

The MODIS sensor to be launched on the EOS-AM platform will be the most important sensor for global vegetation mapping. Among the programmatic goals for the MODIS sensor are assessing and tracking changes in land use and land cover, leaf area index, and net primary productivity. This paper presents a review of some of the problems facing a regional- to global-scale validation effort and presents strategies for coordinating the land cover classification process across multiple sites.

Keywords: Land cover classification, global mapping, MODIS.

(See Corvallis order form 2.)

Warner, W.S.; Reutebuch, S.E.

1999. Application and accuracy of two fixed base camera systems. Photogrammetric Record. 16(93): 423-432.

This paper discusses the application of two fixed base nonmetric camera systems. The first is a helicopter supported system used to measure individual tree characteristics. The second is a portable dual camera system designed for mapping microtopography. Accuracy and advantages of each system are presented.

Keywords: Fixed base photography, photogrammetry.

(See Seattle order form.)

Weyermann, D.; Fassnacht, K.

2000. The interagency vegetation mapping project: estimating certain forest characteristics using Landsat TM data and forest inventory plot data. In: Greer, J.D., ed. Remote sensing and geospatial technologies for the new millennium: Proceedings of the 8th Forest Service remote sensing applications conference. [Bethesda, MD]: American Society of Photogrammetry and Remote Sensing: [Pages unknown].

The interagency (U.S. Department of Agriculture, U.S. Department of the Interior) vegetation mapping project is producing maps of certain forest characteristics (percentage of vegetation cover, conifers and hardwoods, average tree size, and stand structure) across all forested lands in western Oregon and western Washington to comply with the effectiveness monitoring requirements of the Northwest Forest Plan. Maps are produced by using a regression modeling technique that combines Landsat 5 imagery,

existing forest inventory field data, and photo-interpreted data taken at plot locations. Maps are inclusive of all land ownerships. We provide an overview of methods used to produce the maps and a summary of lessons learned in the process.

Keywords: Vegetation mapping, Northwest Forest Plan, forest inventory.

(See Portland order form.)

Resource Inventory

Azuma, D.

2000. Moving to an annual inventory in the Pacific Northwest. In: McRoberts, R.E.; Reams, G.A.; Van Deusen, P.C., eds. Proceedings of the 1st annual forest inventory and analysis symposium. Gen. Tech. Rep. NC-213. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station: 5-7.

The process of moving toward an annual forest inventory in the Pacific Coast states began with educating the individual states as to what might be involved in an annual system. The states and some industry groups voiced concerns about inventorying unproductive or reserved lands annually. The states were concerned, in particular, about the ability to estimate periodic change with an annual system. The discussion presents these concerns and other possible problems that the Pacific Northwest may face when moving to an annual inventory system.

Keywords: Pacific Northwest, annual inventory.

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Silviculture

Maas-Hebner, K.G.; Chan, S.

1999. Thinning and underplanting to enhance diversity of young Douglas-fir stands in the Oregon Coast Range: four years at Cataract. In: Cook, J.E.; Oswald, B.P., comps. First biennial North American forest ecology workshop. Bethesda, MD: Society of American Foresters: 177-184.

A history of fire-related disturbances and the extensive application of even-aged management systems on private and public lands have established vast acreages of early successional Douglas-fir (*Pseudotsuga menziesii*) dominated stands in the Oregon Coast Range. Our study examined the processes and effects of commercial thinning and underplanting to promote the development of structurally diverse stands for both biodiversity and wood fiber production goals. The study design included two underplanting treatments (planted and unplanted) installed as split plots under four overstory densities. The herbaceous plants increased in cover and number of species after thinning, while shrubs were damaged by the thinning and have not reached pretreatment condition after 3 years. Planted seedlings died quickly in the unthinned stand. Seedlings planted under the thinned overstories are beginning to show differences in the fourth year relative to overstory density but are still minimal.

Keywords: Stand structure, regeneration, canopy openings, understory, density management.

(See Corvallis order form 2.)

Supply and Demand

Skog, K.E.; Ince, P.J.; Haynes, R.W.
[N.d.]. Wood fiber supply and demand in the United States. In: Proceedings of the forest products study group workshop. [Madison, WI]: [Forest Products Society]: 73-89.

The USDA Forest Service is preparing a national assessment of supply and demand for wood fiber resources in the United States. Based in part on preliminary results of this assessment and partly on our 1993 assessment, this paper outlines trends and gives an outlook for demand and trade for timber and fiber products, changes in technology, and wood fiber resource supply. Demand for solid wood products and paper and paperboard products will be driven by growth in population, gross domestic product, and personal disposable income.

Keywords: Supply and demand, wood fiber resources, trends.

(See Portland order form.)

Threatened, Endangered, and Sensitive Species

Bayrakci, R.T.
1999. A reevaluation of the status of the western gray squirrel (*Sciurus griseus*) in Washington state, emphasizing the Puget Sound Trough population. Olympia, WA: The Evergreen State College. 101 p. M.S. thesis.

The western gray squirrel has been designated as threatened within Washington. Throughout much of its range, western gray squirrels are an oak-obligate species, with the squirrel dependent on the oak for its survival. The current distribution of western gray squirrels in Washington is restricted to three populations, one of them the Puget Sound Trough population centered on the Fort Lewis Military Reservation. At the request of the U.S. Army, we conducted a study of the Oregon white oak woodland system on the reservation in 1998 and 1999. Our data on the Puget Sound Trough population and other state populations partially justify the recommendation that the western gray squirrel be upgraded to state-endangered. Evidence of long-term population declines and ongoing risks threatening at least two of three Washington populations of western gray squirrels supports the need to reevaluate the legal status of the squirrel.

Keywords: Western gray squirrel, threatened, Washington state, Oregon white oak, Fort Lewis.

(Available only through library or interlibrary loan.)

Wildlife

Bull, E.L.
2001. Survivorship of pileated woodpeckers in northeastern Oregon. Journal of Field Ornithology. 72(1): 131-135.

Knowledge of the survival of the pileated woodpecker is essential in managing populations of the species. Probability of survival of adult pileated woodpeckers was 0.60 at 6 months, 0.47 at 12 months, and 0.35 at 18 months. Of 13 juveniles radio-tagged as nestlings, 23 percent to 38 percent survived 3.5 months. Of three juveniles captured in late summer or fall, two survived to breed the next year. This low rate of adult survivorship suggests that one or more of the study areas may function as a population sink.

Keywords: Dryocopus pileatus*, pileated woodpecker, mortality, survivorship.*

(See La Grande order form.)

Creighton, J.H.; Lehmkuhl, J.F.; Baumgartner, D.M.; Loggers, C.O.
2001. Wildlife considerations for private landowners from the management of overstocked, small-diameter forest stands in eastern Washington. EB1905. Pullman, WA: Washington State University. 11 p.

The potential effects on wildlife of harvesting small-diameter forest stands as part of the creating opportunities (CROP) program at the Colville National Forest are described in this extension bulletin for a general audience of private nonindustrial landowners. Goals and objectives of the CROP program are described. The important role of private lands in wildlife

conservation is discussed from a landscape and population viability perspective. General habitat considerations are discussed relative to plant succession, habitat fragmentation, edge creation, and population effects. Potential effects of CROP harvest treatments are described for snowshoe hares, lynx, marten, red squirrels, forest birds, elk, and deer.

Keywords: Thinning, wildlife, private lands.

(To order this publication, contact the Washington State University Bulletin office at 1-800-723-1763 or online at `http://pubs.wsu.edu`.)

Johnson, B.K.; Kern, J.W.; Wisdom, M.J. [and others]

2000. Resource selection and spatial separation of mule deer and elk during spring. Journal of Wildlife Management. 64(3): 685-697.

Mule deer are sympatric with elk across large areas of North America. In many of these areas, populations of mule deer have declined while elk populations have increased, thus sparking debate about whether interspecific competition is operating. To investigate this issue, we monitored the distributions of 45 mule deer and 85 elk in spring from 1992 through 1996 at Starkey Experimental Forest and Range in northeastern Oregon. Resource selection functions built from these distributions showed that elk selection was a strong predictor of mule deer selection and that distribution of each species suggested strong spatial segregation. Results suggested that mule deer selection may be strongly influenced by an avoidance of elk. Manipulative experiments are needed to evaluate the effects of these patterns of population performance.

Keywords: Resource selection, mule deer, elk, competition.

(See La Grande order form.)

Olson, D.H.

1999. Standardized survey protocols to detect rare terrestrial salamanders in managed federal forests of the U.S. Pacific Northwest. In: Monitoring salamanders: Proceedings of a workshop. North Bay, ON: Ontario Ministry of Natural Resources and Nipissing University: 45-52.

Monitoring of terrestrial salamanders is a topic gaining international attention. In the U.S. Pacific Northwest, survey approaches have been adopted to inventory the forested landscape to provide distribution and range information and to identify localities for salamander management. The approach for salamanders under the survey and manage portion of the Northwest Forest Plan is described.

Keywords: Salamander, inventory and monitoring, survey methods, Plethodontid.

(See Corvallis order form 2.)

Wood Utilization

Christensen, G.; Barbour, R.J.

1999. Veneer recovery from small diameter logs. In: Pioneering new trails: Proceedings of the Society of American Foresters 1999 convention. Bethesda, MD: Society of American Foresters: [Pages unknown].

Veneer yields are strongly related to the small-end diameter (SED) of peeler blocks. As block SED increases from 6 to 12 inches, the percentage of block volume lost to roundup and the core as low-value pulp chips drops from 48 percent to 24 percent. Over the same diameter range, the percentage of block volume manufactured into

the highest value product (full veneer sheets) increases from 33 percent to 63 percent. This has a dramatic impact on the product mix that a veneer mill can manufacture and the gross product value of the mill's production. Other block characteristics that influence product yield and value include block shape, defects, and branching characteristics. These were considered in a qualitative, not quantitative, sense in this example.

Keywords: Small-diameter logs, veneer recovery, veneer yield, Douglas-fir.

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Rocky Mountain Research Station has a large supply of the publication below and asked us to include it in our quarterly list. To order copies, email Richard Schneider at rschneider@fs.fed.us or write to Publications, Rocky Mountain Research Station, 324 25th Street, Ogden, UT 84401.

Winward, A.H.
2000. Monitoring the vegetation resources in riparian areas. Gen. Tech. Rep. RMRS-GTR-47. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 49 p.

This document provides information on three sampling methods used to inventory and monitor vegetation resources in riparian areas. The vegetation cross-section method evaluates the health of vegetation across a valley floor. The greenline method provides a measurement of streamside vegetation. The woody species regeneration method measures the density and age class structure of any shrub or tree species present in the sampling area. Together these three sampling procedures can provide an evaluation of the health of all vegetation in a given riparian area.

Keywords: Riparian sampling, vegetation cross-section, greenline, woody regeneration.

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