



United States  
Department of  
Agriculture

Forest Service

Pacific Northwest  
Research Station



# Recent Publications of the Pacific Northwest Research Station, Second Quarter 2000



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

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Olympia, WA 98512-9193

### Portland

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

### Seattle

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

### Sitka

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

### Wenatchee

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Wenatchee, WA 98801

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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.

### 00-069

#### Bibliographies

Pacific Northwest Research Station  
2000. Recent publications of the Pacific Northwest Research Station, fourth quarter 1999. 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 format at [www.fs.fed.us/pnw/pubs.htm](http://www.fs.fed.us/pnw/pubs.htm).)

#### Economics

### 99-103

Alig, Ralph J.; Zheng, Daolan; Spies, Thomas A.; Butler, Brett J.

2000. Forest cover dynamics in the Pacific Northwest west side: regional trends and projections. Res. Pap. PNW-RP-522. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 22 p.

The objectives of this paper were to (1) analyze recent rates of transitions among forest cover types on private timberland, (2) identify differences by ownership class, and (3) project future changes under different scenarios related to current policy issues in the Pacific Northwest. Timber harvests are the dominant class of disturbance on private timberland in western Oregon and Washington. Net changes in forest type areas depend on the relative mix of natural and human-related forces. Transitions among forest types after harvest may be planned, as in conversion of red alder (*Alnus rubra* Bong.) to the commercially preferred Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco), or stochastic successional changes, such as reversion of disturbed areas to red alder in the absence of intervention. Projected areas of Douglas-fir and red alder were

notably different under a scenario without harvests versus a scenario in which the rate of partial harvesting is increased. Areas of Douglas-fir were projected to increase under selected scenarios for both industrial and nonindustrial private ownerships. Conversely, areas of red alder are projected to decrease under selected scenarios and for both ownerships.

*Keywords: Forest type transitions, forest land management, temporal analyses, periodic surveys.*

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

### 99-306

Christensen, Harriet H.; Raettig, Terry L.; Sommers, Paul, tech. eds.

1999. Northwest Forest Plan: outcomes and lessons learned from the Northwest economic adjustment initiative: Proceedings of a forum; 1997 July 29-30; Portland, OR. Gen. Tech. Rep. PNW-GTR-484. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 103 p. In cooperation with: Northwest Policy Center, Institute for Public Policy and Management, University of Washington.

This collection of papers examines implementation of the Northwest Forest Plan economic adjustment initiative (NWEAI). Experiences in the three states (California, Oregon, and Washington) are reviewed. Related research, key economic development issues, and potential of using the NWEAI model elsewhere also are discussed.

*Keywords: Northwest Forest Plan, Northwest economic adjustment initiative, Pacific Northwest, community development, economic development.*

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

**99-257**

Crone, Lisa K.; Haynes, Richard W.  
 1999. Revised estimates for direct-effect recreational jobs in the interior Columbia River basin. Gen. Tech. Rep. PNW-GTR-483. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 29 p.

This paper reviews the methodology used to derive the original estimates for direct employment associated with recreation on Federal lands in the interior Columbia River basin (the basin), and details the changes in methodology and data used to derive new estimates. The new analysis resulted in an estimate of 77,655 direct-effect jobs associated with recreational activities on Federal lands in the basin. This estimate is a little over one-third of the previous estimate. The new estimated direct-effect recreational jobs in the basin amount to 4.48 percent of the total estimated jobs in 1994. This is still slightly larger than the estimated percentage of jobs in ranching, mining, and lumber and wood products combined (3.53 percent) in the basin. The intent of the original analysis is clarified, limitations of the data are brought forward, a cross-sectional analysis is conducted, and suggestions for future research are provided.

*Keywords: Recreation, employment, Columbia River basin.*

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

**98-386**

Raettig, Terry L.; Christensen, Harriet H.  
 1999. Timber harvesting, processing, and employment in the Northwest economic adjustment initiative region: changes and economic assistance. Gen. Tech. Rep. PNW-GTR-465. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 16 p.

The Northwest economic adjustment initiative (NWEAI) provides economic assistance to a region including western Washington, western Oregon, and northern California. Timber harvests have fallen markedly in this region since 1990. The forest products industry is the largest

manufacturing sector in the region, and employment had followed the downward trend in timber harvest. There are important differences in the declines in timber harvest, employment, and the importance of the forest products industry at the county level. The NWEAI is a significant initiative designed to coordinate and manage Federal economic assistance efforts in the region.

*Keywords: Timber harvest, employment, economic assistance, Northwest economic adjustment initiative.*

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

**Ecosystem Structure and Function****97-319**

Bate, Lisa J.; Garton, Edward O.; Wisdom, Michael J.  
 1999. Estimating snag and large tree densities and distributions on a landscape for wildlife management. Gen. Tech. Rep. PNW-GTR-425. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 76 p.

This publication provides efficient and accurate methods for sampling snags and large trees on a landscape to conduct compliance and effectiveness monitoring for wildlife in relation to the habitat standards and guidelines on National Forests. Included online are the necessary spreadsheets, macros, and instructions to conduct all surveys and analyses pertaining to estimation of snag and large tree densities and distributions at the subwatershed scale. The methods focus on optimizing sampling effort by choosing a plot size appropriate for the specific forest conditions encountered. Two methods are available for density analysis. Method one requires sampling until a desired precision level is obtained for a density estimate. Method two is intended for use in areas that have low snag densities compared to the Forest plan targeted densities. After taking a minimum of 60 samples, one may test for a significant difference between the estimated and targeted densities. In addition, data can be used to calculate a distribution index. The value obtained from the distribution

index indicates whether the current distribution of target snags and large trees across a subwatershed is adequate to meet the habitat needs of territorial cavity nesters and other wildlife species. Wildlife use also may be evaluated.

*Keywords: Density, distribution, foraging, nesting, monitoring, sampling technique, snag, large tree, woodpecker, wildlife management, wildlife use.*

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

### 98-033

Hessburg, Paul F.; Smith, Bradley G.; Kreiter, Scott D. [and others]

1999. Historical and current forest and range landscapes in the interior Columbia River basin and portions of the Klamath and Great Basins. Part 1: Linking vegetation patterns and landscape vulnerability to potential insect and pathogen disturbances. PNW-GTR-458. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 357 p.

This study characterizes recent historical and current vegetation composition and structure of 337 subwatersheds selected by stratified random draw on all ownerships within the interior Columbia River basin. Landscape structure and composition, patterns, and vulnerability of forests to 21 major insect and pathogen disturbances were compared. Historical and current vegetation maps were derived from interpretations of 1932-66 and 1981-93 aerial photographs, respectively. Results of change analyses are reported for province-scale ecological reporting units.

*Keywords: Landscape characterization, ecological assessment, vegetation patterns, interior Columbia River basin, Klamath Basin, Great Basin, ecosystem health, vegetation pattern-disturbance process interactions, insect and disease disturbance, landscape ecology, ecosystem processes, potential natural vegetation modeling, vegetation change, fire effects.*

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

### 99-166

Wurtz, Tricia L.

2000. Interactions between white spruce and shrubby alders at three boreal forest sites in Alaska. Gen. Tech. Rep. PNW-GTR-481. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 29 p.

To document possible soil nitrogen mosaics before timber harvesting on three boreal forest sites in Alaska, maps of the distribution of understory green (*Alnus crispa* (Ait.) Pursh) and Sitka alder (*A. sitchensis* (Reg.) Rydb.) stems were made. Understory alders were regularly distributed throughout the northernmost site (Standard Creek) and very irregularly distributed at the southernmost site (Cooper Landing). No consistent relations existed between alder stem location and total soil nitrogen. In undisturbed forest, soils collected beneath alders tended to have more nitrogen than soils without alder, but after the sites were harvested, soil chemistry differed. To examine the interactions of alder and white spruce (*Picea glauca* (Moench) Voss) on secondary successional sites, mixed plantations of white spruce and alder were established after each site was harvested. Despite good survival, the planted alder grew poorly. No differences were found between nursery-grown alder seedlings and wildlings in either growth or survival. Although fifth-year survival and growth of white spruce were excellent on all sites, they were not related to either the preharvest distribution of naturally occurring alder or to alders planted in the mixed plantations. Locational information and site maps are provided for future evaluation of these plantations.

*Keywords: White spruce, green alder, Sitka alder, boreal forest, interior Alaska, mixed-species plantations, nitrogen fixation, alder wildlings, long-term ecosystem productivity.*

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

### 98-333

Quigley, Thomas M.; Gravenmier, Rebecca A.; Arbelbide, Sylvia J. [and others]

1999. The Interior Columbia River Basin Ecosystem Management Project: scientific assessment. Station Misc. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. [CD-ROM]. (Quigley, Thomas M., tech. ed. Interior Columbia River Basin Ecosystem Management Project: scientific assessment).

This CD-ROM contains digital versions (Adobe Acrobat Portable Document Files [PDF]) of the major scientific documents prepared for the Interior Columbia River Basin Ecosystem Management Project (ICBEMP). "A Framework for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basins" describes a general planning model for ecosystem management. The "Highlighted Scientific Findings of the Interior Columbia Basin Ecosystem Management Project" provides an overview of the science information. The "Status of the Columbia Basin: Summary of Scientific Findings" summarizes the scientific findings from ICBEMP. "An Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basins" links landscape, aquatic, terrestrial, social, and economic characterizations to describe biophysical and social systems. The "Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins" provides detailed information about current conditions and trends for the biophysical and social systems within the basin.

*Keywords: Columbia basin, ecosystem assessment, ecosystem management, ecosystem principles, ecosystem integrity, risk analysis.*

## Landscape Ecology

### 97-163

Hessburg, Paul F.; Smith, Bradley G.; Miller, Craig A. [and others]

1999. Modeling change in potential landscape vulnerability to forest insect and pathogen disturbances: methods for forested

watersheds sampled in the midscale interior Columbia River basin assessment. Gen. Tech. Rep. PNW-GTR-454. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 56 p.

In the interior Columbia River basin (the basin) midscale ecological assessment, historical and current vegetation composition and structure of 337 randomly sampled subwatersheds were mapped, including portions of the Klamath and Great Basins. Landscape patterns, vegetation structure and composition, and landscape vulnerability to 21 major forest insect and pathogen disturbances were compared. This paper reports on methods used to characterize historical and current patch and subwatershed vulnerability to each of the disturbance agents.

*Keywords: Ecological assessment, interior Columbia River basin, ecosystem health, insect disturbance, pathogen disturbance, vegetation vulnerability, ecosystem processes, succession processes.*

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

### 98-337

Reynolds, Keith M.

1999. EMDS users guide (version 2.0): knowledge-based decision support for ecological assessment. Gen. Tech. Rep. PNW-GTR-470. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 63 p.

The USDA Forest Service Pacific Northwest Research Station in Corvallis, Oregon, has developed the ecosystem management decision support (EMDS) system. The system integrates the logical formalism of knowledge-based reasoning into a geographic information system (GIS) environment to provide decision support for ecological landscape assessment and evaluation. The knowledge-based reasoning schema of EMDS uses an advanced object- and fuzzy logic-based propositional network architecture for knowledge representation. The basic approach has several advantages over more traditional

forms of knowledge representations and facilitates evaluation of complex, abstract topics. Modern ecological and natural resource sciences have developed numerous mathematical models to characterize relations among ecosystem states and processes, but it is more typical that knowledge of ecosystems is more qualitative in nature. Approximate reasoning, as implemented in fuzzy logic, extends the capability to reason with the types of imprecise information typically found in natural resource science.

*Keywords: Ecosystem management, ecological assessment, knowledge base, decision support, geographic information system, economic analysis, ecosystem states, ecosystem processes.*

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

### **98-338**

Reynolds, Keith M.

1999. NetWeaver for EMDS user guide (version 1.1): a knowledge base development system. Gen. Tech. Rep. PNW-GTR-471. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 75 p.

This guide describes use of the NetWeaver knowledge base development system. Knowledge representation in NetWeaver is based on object-oriented fuzzy-logic networks that offer several significant advantages over the more traditional rule-based representation. Compared to rule-based knowledge bases, NetWeaver knowledge bases are easier to build, test, and maintain because the underlying object-based representation makes them modular, which allows designers to gradually evolve complex knowledge bases from simpler ones. Modularity also allows interactive knowledge base debugging at any and all stages of knowledge base

development. Fuzzy knowledge provides a formal and complete calculus for knowledge representation that is less arbitrary than the confidence factor approach used in rule-based systems and much more parsimonious than bivalent rules.

*Keywords: NetWeaver, knowledge base, fuzzy logic, decision support.*

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

## **Plant Ecology**

### **99-191**

Mead, Bert R.

2000. Phytomass in southwest Alaska. Res. Pap. PNW-RP-523. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 164 p.

Phytomass tables are presented for southwest Alaska. The methods used to estimate plant weight and occurrence in the river basin are described and discussed. Average weight is shown for each sampled species of tree, shrub, grass, forb, lichen, and moss in 19 forest and 48 nonforest vegetation types. Species frequency of occurrence and species constancy within the type are presented. Comparisons are made with the results of similar inventories of the Tanana River basin and the southeast Alaska archipelago.

*Keywords: Alaska, southwest, phytomass, biomass, inventory, plant ecology, Alaska Peninsula, Kuskokwim Census Division, Bristol Bay Census Division, Bethel Census Division, Nunivak, Togiak, Katmai, Lake Clark, Yukon Delta, Iliamna, Alaska vegetation classification system, species composition.*

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



## Social Science

### 99-081

Carroll, Matthew S.; Findley, Angela J.; Blatner, Keith A. [and others]

2000. Social assessment for the Wenatchee National Forest wildfires of 1994: targeted analysis for the Leavenworth, Entiat, and Chelan Ranger Districts. Gen. Tech. Rep. PNW-GTR-479. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 114 p.

A purposive social assessment across three communities explored reactions of local residents to wildfires in the Wenatchee National forest in north-central Washington. Research concentrated on identifying the diversity of fundamental beliefs and values held by local residents about wildlife and forest management. Semistructured interviews were conducted with people representing a diverse set of values, attachments to the National Forest, and beliefs about forest management. For each of the three communities, an indepth discussion described social dynamics relative to fire recovery in the National Forest by juxtaposing value orientations and beliefs across 15 fire recovery issues. Conclusions targeted improved public involvement processes in the aftermath of severe ecological disturbances and traumatic human experiences.

*Keywords: Social assessment, qualitative methodology, value orientations, natural resource conflict, public involvement processes, collaborative learning, Wenatchee National Forest.*

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

### 97-230

Galliano, Steven J.; Loeffler, Gary M.

1999. Place assessment: how people define ecosystems. Gen. Tech. Rep. PNW-GTR-462. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 31 p.

Understanding the concepts of place in ecosystem management may allow managers to more actively inventory and understand the meanings that people attach to the lands and resources

within their command. Because place assessment has not been used operationally in past large-scale evaluations and analyses, it was necessary for the interior Columbia basin to apply theories based on available literature. These theories were used within two large test areas inside the project boundaries. From the test area experiences, it was apparent that the most appropriate scale for place assessment was at the community level.

*Keywords: Place assessment, place themes, place concepts.*

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

### 97-231

Galliano, Steven J.; Loeffler, Gary M.

2000. Scenery assessment: scenic beauty at the ecoregion scale. Gen. Tech. Rep. PNW-GTR-472. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 30 p.

Scenic quality is an important amenity on public lands in the interior Columbia basin. People's interests in and expectations about ecosystems can help establish desired aesthetic conditions for the different landscapes found in the basin. This paper, a portion of the social science assessment for the Interior Columbia Basin Ecosystem Management Project, explains the procedures used to inventory scenic quality throughout the basin by using two primary indicators: landscape character and scenic condition. Most landscapes in the basin are forests and shrub-grasslands having a predominantly natural appearance. Urban and rural developments visually dominate few of the basin's landscapes, although they are highly visible where they do occur. The overall scenic integrity of landscapes in the basin remains at a relatively high level with over 80 percent dominated by natural-appearing views.

*Keywords: Scenery assessment, landscape character, scenic integrity, landscape themes, scenic beauty.*

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

## Silviculture

### 99-019

Stein, William I.

1999. Six-year growth of Douglas-fir saplings after manual or herbicide release from coastal shrub competition. Res. Pap. PNW-RP-500. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 55 p.

Survival and growth of planted Douglas-fir (*Pseudotsuga menziesii*) saplings and associated shrubs were observed for 6 years after seven release treatments had been applied, side by side, on four areas in the Coast Range of Oregon. Four times as much Douglas-fir volume as in the control was produced by one manual cutting of shrubs, which also represented the best economic return. Diversity of competing species temporarily increased after the release treatments.

*Keywords: Reforestation, Pacific Northwest, Coast Ranges, manual release, herbicide release, Douglas-fir, red alder, seedling survival, seedling growth, glyphosate, fosamine, competing vegetation, salmonberry, thimbleberry, red elder, sword-fern.*

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

## Special Forest Products

### 98-092

von Hagen, Bettina; Fight, Roger D.

1999. Opportunities for conservation-based development of nontimber forest products in the Pacific Northwest. Gen. Tech. Rep. PNW-GTR-473. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 18 p.

The contribution of the nontimber forest products industry in the Pacific Northwest is described and analyzed from economic, social, and ecological perspectives. The promise of replacement for declining timber harvests has been largely unmet. On the other hand, nontimber forest products harvesting provides opportunities to people with the fewest options—recent immigrant groups and residents of economically distressed communities. In addition, the current economic contribution of nontimber forest products may be considerably less than the future potential gain under management regimes that emphasize both timber and nontimber products.

*Keywords: Nontimber forest products, special forest products, community development, employment, income.*

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

## Publications Available Elsewhere

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

### Economics

Mauldin, Thomas E.; Plantinga, Andrew J.; Alig, Ralph J.

1999. Determinants of land use in Maine with projections to 2050. *Northern Journal of Applied Forestry*. 16(2): 82-88.

Regression analysis was used to estimate relations between land use in Maine and determinants of land use, such as land use rents and soil characteristics. The fitted models were used to project changes in Maine land to 2050. Declines in private timberland areas are projected, although the losses are small on a percentage basis. Increases in population and urban land area are projected to continue.

*Keywords: Land use, Maine.*

(See Corvallis order form.)

Waggener, Thomas R.; Fight, Roger D.

1999. Clearwood quality and softwood lumber prices: What's the real premium? *Western Journal of Applied Forestry*. 14(2): 73-79.

Because second-growth clear lumber looks different than old-growth clear lumber, there is a concern about users being willing to pay the current price premiums in the future. This is of concern to foresters who may be considering investments in management practices to increase the yield of clear lumber. An analysis of recent trends in price premiums provides little or no evidence that these premiums are declining.

*Keywords: Clearwood, prices, lumber, lumber prices, Douglas-fir, ponderosa pine, southern pine.*

(See Portland order form.)

### Ecosystem Structure and Function

Bailey, John Duff; Liegel, Leon H.

1998. Pacific yew (*Taxus brevifolia* Nutt.) growth and site factors in western Oregon. *Northwest Science*. 72(4): 283-292.

Data from 11 intensively measured 2-hectare plots of Pacific yew (*Taxus brevifolia*) confirm and refine some early qualitative observations of tree size and age distributions in three forested subregions of western Oregon. These distributions show a general lack of regeneration in the 20<sup>th</sup> century, which should be of some concern to land managers given the contribution of Pacific yew to late-successional stand structure. Most plots demonstrated a weak but consistent relation between size and age, and yew tree size and age distributions were relatively consistent within subregions. There were substantial differences, however, in diameter growth rates among subregions.

*Keywords: Taxus brevifolia, Pacific yew, taxol, old growth.*

(See Corvallis order form.)

Carey, Andrew B.; Calhoun, John M.; Dick, Bob [and others]

1999. Reverse technology transfer: obtaining feedback from managers. *Western Journal of Applied Forestry*. 14(3): 153-163.

Forestry policy, planning, and practice changed rapidly in the 1990s. A major change was implementation of ecosystem management by federal, state, tribal, and private agencies. Implementation entails new concepts, terminology, and management approaches. A colloquium of natural resource management practitioners was convened to assess the state of the ecosystem. A recent interagency modeling exercise

was used to formulate six concepts and questions to present to small working groups of practitioners and listening groups of a scientist, regulator, and conservation group member. Additional research and technology transfer needs were identified.

*Keywords: Ecosystem management, new forestry, biological legacies, systems thinking.*

(See Olympia order form.)

Everett, Richard L.; Lehmkuhl, John F.  
1999. Restoring biodiversity on public forest lands through disturbance and patch management irrespective of land-use allocation. In: Baydack, Richard K.; Campa, Henry, III; Hauffer, Jonathan B., eds. Practical approaches to the conservation of biological diversity. Washington, DC: Island Press: 87-105. Chapter 6.

Critical elements of biodiversity in heterogeneous forest environments may be distributed in patches over large landscapes. The landscapes themselves are mosaics of private and public land-use allocations designed to meet numerous public expectations that may or may not be compatible with biodiversity conservation. Such allocations of land administratively fragment the landscape and make management and conservation efforts complex. Differences in vegetation structure arising from differing standards of use also result in ecologically fragmented landscapes. Although objectives of specific allocations may be met, large-scale biodiversity objectives may be jeopardized by fragmentation of habitats, the boundary effects of fragmented habitats, and the disruption of disturbance and recovery processes across large landscapes.

*Keywords: Biodiversity, land-use allocations, disturbance management, ecosystem management, inherent disturbance regimes, ecosystem integrity, reserve areas, whole-unit management.*

(Available in bookstores and libraries.)

Hessburg, Paul F.; Smith, Bradley G.; Salter, R. Brion

1999. Detecting change in forest spatial patterns from reference conditions. *Ecological Applications*. 9(4): 1232-1252.

The authors grouped 343 forested subwatersheds on the eastern slope of the Cascade Range in Washington into ecological subregions by similarity of areas in potential vegetation and climate attributes. Spatially continuous historical (1938-56) and current (1985-93) vegetation maps were built for 48 randomly selected subwatersheds from aerial photo interpretations. From remotely sensed attributes, cover types, structural classes, and potential vegetation, types were classified and attributed to individual patches. The results of this approach give land managers a tool to compare characteristics of present day managed landscapes with reference conditions to reveal significant pattern departures and identify specific pattern characteristics that might be modified through management.

*Keywords: Ecosystem management, restoration, reference conditions, reference variation, natural range of variability, historical range of variability, change detection, spatial patterns, disturbance, biological diversity.*

(See Wenatchee order form.)

Landers, Peter B.; Morgan, Penelope; Swanson, Frederick J.

1999. Overview of the use of natural variability concepts in managing ecological systems. *Ecological Applications*. 9(4): 1170-1188.

Natural variability concepts provide a framework for improved understanding of ecological systems and the changes occurring in these systems and for evaluating the consequences of proposed management actions. Understanding the history

of ecological systems, their past composition and structure, their spatial and temporal variability, and the principal processes that influenced them helps managers set goals that are more likely to maintain and protect ecological systems and meet the social values desired for an area.

*Keywords: Disturbance history, landscape dynamics, landscape management, landscape ecology, landscape planning.*

(See Corvallis order form.)

Pipp, Andrea Kirn

1998. Effects of forest age versus forest structure on epiphytic lichen biomass and diversity. Missoula, MT: University of Montana. 84 p. M.S. thesis.

Forest age and forest structure were compared as indicators of lichen biomass, richness, and community composition. Forest structure explained more variance in lichen biomass and richness, whereas age explained more variance in community composition. The structural variables important for predicting lichen biomass differed from those predicting lichen richness. In mature forests, structure may be a better indicator of biological diversity than forest age.

*Keywords: Forest age, forest structure, lichens.*

(Available only through library or interlibrary loan.)

Rózycki, H.; Dahm, H.; Strzelczyk, E.; Li, C.Y.

1999. Diazotrophic bacteria in root-free soil and in the root zone of pine (*Pinus sylvestris* L.) and oak (*Quercus robur* L.). *Applied Soil Ecology*. 12: 239-250.

Occurrence and identity of nitrogen-fixing bacteria in soil and the root zones of Scots pine (*Pinus sylvestris* L.) and common oak (*Quercus robur* L.) were studied. Nitrogen fixers were more numerous in the soil and root zone of oak than in those of pine, and the majority of them belonged to *Pseudomonas* and *Bacillus*. Biotin, *p*-aminobenzoic acid, and yeast extract, separately and in combination, stimulated nitrogen-fixation activity of three selected nitrogen fixers.

*Keywords: Rhizosphere, belowground processes, pine, nitrogen fixation.*

(See Corvallis order form.)

U.S. Department of Agriculture, Forest Service  
1999. Natural areas report: natural areas news and information exchange: the future of RNAs. RNA Rep. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 8 p.

This last issue of the Natural Areas Report looks at the future of the research natural area program in Washington and Oregon. Sarah Greene, long-term coordinator in the Pacific Northwest, reflects on her 20 years, and several natural area veterans respond with their thoughts about the future of the program.

*Keywords: Research natural areas, newsletter, conservation biology.*

(See Corvallis order form.)

## Fire

Weisberg, Peter J.

1998. Fire history, fire regimes, and development of forest structure in the central western Oregon Cascades. Corvallis, OR: Oregon State University. 256 p. Ph. D. dissertation.

This study addresses the questions (1) What are the error and uncertainty inherent in different procedural steps of fire history reconstruction and description processes, and how should fire history methodology be adapted to study both objectives and fire regime characteristics? (2) What have been the temporal and spatial patterns of fire in the Blue River study area, and how are they associated with climatic and topographic variability? and (3) What have been the influences of fire history and environmental variability on forest stand structures, particularly as stand structure relates to the development of old-growth characteristics in the western Cascades?

*Keywords: Disturbance history, fire history, climate change.*

(Available only through library or interlibrary loan.)

## Fish

Cray, David C.

1999. The influence of geomorphology on fish assemblages of Ohio River embayments.

Columbus, OH: Ohio State University. 254 p. M.S. thesis.

The fish assemblages of six embayments along the Ohio River exhibiting similar characteristics to backwaters were examined. Owing to its modification for transportation, the Ohio River has lost much of its original backwater areas and side channels. What originated as a predictable flow regime within the river has been changed to a highly regulated and unpredictable system, which has implications for fish assemblages. Geomorphology was assessed by developing digital elevation models. The differences in fish assemblage characteristics resulted from differing habitat and upstream land use practices. Managers should work to maintain both embayment types, thereby providing opportunities for different species.

*Keywords: Disturbance, geomorphology, large river, fish communities.*

(Available only through library or interlibrary loan.)

## Forest Management

Chan, Samuel S.; Bailey, Margaret David;

Karnes, Daniel [and others]

1997. The role of silviculture in the active management of riparian zone vegetation in the Oregon Coast Range: a partnership between researchers and managers. In: Communicating the role of silviculture in managing the National Forests: Proceedings of the national silviculture workshop; 1997 May 19-22; Warren, PA. Gen. Tech. Rep. NE-238. Radnor, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station: 190-197.

Riparian plant communities are extremely diverse. Their structure and composition can affect fish and wildlife habitat, while trees and

associated vegetation can provide sustainable sources of forest products. Management of riparian vegetation can greatly affect these values. Little information exists, however, about the consequences of actively managing riparian areas to develop desirable habitat characteristics and enhance function versus setting aside areas as passively managed reserves. Management options are limited in riparian areas because of concerns for the protection of values provided by these sensitive areas.

*Keywords: Riparian zone, riparian management, silviculture, Oregon Coast Range.*

(A limited supply of this publication is still available. You may email requests to [afancis@fs.fed.us](mailto:afancis@fs.fed.us) or write the Northeastern Research Station at USDA Forest Service, 11 Campus Boulevard Suite 200, Newton Square, PA 19073.)

## Genetics

Johnson, Randy

2000. Breeding programs for "other" species are underway. Northwest Woodlands.

Winter: 14-15.

A short review is presented of tree improvement programs in the Pacific Northwest that deal with commercial species other than Douglas-fir and western hemlock. The purpose was to make small woodland owners aware of the types of genetically improved seed that may be available.

*Keywords: Woodland owners, tree improvement.*

(See Corvallis order form.)

Sorensen, Frank C.

1999. Relationship between self-fertility, allocation of growth, and inbreeding depression in three coniferous species. *Evolution*. 53(2): 417-425.

In a comparison of Douglas-fir, ponderosa pine, and noble fir, Douglas-fir had the highest rate of selfing at fertilization, the greatest inbreeding depression in embryo, nursery, and field survival, and least inbreeding depression in height. Noble fir was opposite for all traits, and ponderosa pine

intermediate. By age 26, cumulative inbreeding depression ranged from 83 percent to 98 percent, and there seemed little chance of selfs contributing to the reproductive adult population, even in well-tended plantations.

*Keywords:* *Pseudotsuga menziesii*, *Douglas-fir*, *Pinus ponderosa*, *ponderosa pine*, *Abies procera*, *noble fir*, *mixed mating*, *natural selfing*, *inbreeding*.

(See Corvallis order form.)

## Geomorphology and Hydrology

Jones, Julia A.; Swanson, Frederick J.; Wemple, Beverley C.; Snyder, Kai U.

2000. Effects of roads on hydrology, geomorphology, and disturbance patches in stream networks. *Conservation Biology*. 14(1): 76-85.

We propose that road network effects on flood flows and debris flows modify disturbance patch dynamics in stream and riparian networks in mountain landscapes. We outline a view of how road networks interact with stream networks at the landscape scale and illustrate with examples from recent and current research how these interactions might affect biological and ecological processes in stream and riparian systems. We speculate that effects of road network on the spatial pattern of disturbance may influence the rates and patterns of survival and recovery of disturbed patches in stream networks, thereby affecting ecosystem resilience, and we outline an approach for detecting such effects.

*Keywords:* *Roads*, *landscape ecology*, *stream habitat*, *disturbance*.

(See Corvallis order form.)

## Invertebrates

Gerson, Elizabeth A.; Kelsey, Rick G.; Ross, Darrell W.

1999. Pupal diapause of *Coloradia pandora* Blake (Lepidoptera: Saturniidae). *Pan-Pacific Entomologist*. 75(3): 170-177.

Pupae of the pandora moth, *Coloradia pandora* Blake, were collected in central Oregon and stored at 5 °C for 8 to 24 weeks, then incubated at 25 °C. The minimum cold storage time

required to break diapause was 12 weeks, but emergence rates were highest (87.5 percent) between 14 and 18 weeks. In a separate experiment, 1,000 pupae were maintained in field enclosures for 3 years while soil temperature was monitored. Seventy-two percent of these pupae emerged in the first year. Soil temperature fell below 5 °C for 21.7, 22.9, and 25.1 weeks over the three consecutive winters, and the minimum soil temperature was -2 °C. In the lab, 22 weeks or more at 5 °C limited emergence to less than 40 percent; therefore, mortality from duration of cold could be considerable in winters such as year 3. Prolonged diapause was observed in only 0.6 percent of the sample population. Together, these studies provide (1) a methodology for rearing *C. pandora* pupae and breaking diapause more rapidly than in nature and (2) information about environmental conditions that could promote extended diapause or winter mortality in *C. pandora*.

*Keywords:* *Coloradia pandora*, *pandora moth*, *pupae*, *diapause*, *phenology*, *rearing*, *adult emergence*, *winter mortality*.

(See Corvallis order form.)

## Land Use

Kline, Jeffrey; Wichelns, Dennis

1998. Public preferences regarding the goals of farmland preservation programs: reply. *Land Economics*. 74(4): 566-69.

In response to an article in a journal, it was suggested that the authors oversimplified the land preservation issue by ignoring the role that private institutions play in preserving land in the United States. Although the authors agree that private institutions may be providing a desired public service efficiently while serving the goals of their members, they also argue that it has become apparent that public farmland preservation programs may not be targeting the benefits sought by the public through these programs. As

a result, public programs may not be maximizing the values generated through the expenditure of public funds to preserve farmland and open space.

*Keywords: Farmland preservation, land use policy.*

(See Corvallis order form.)

## Landscape Ecology

Wimberly, Michael C.; Spies, Thomas A.; Long, Colin J.; Whitlock, Cathy

2000. Simulating historical variability in the amount of old forests in the Oregon Coast Range. *Conservation Biology*. 14(1): 167-180.

The objectives of this study were to build a model of historical fire regimes that could be parameterized with available data, use the model to characterize variability in old forests over a range of spatial and temporal scales, evaluate the sensitivity of model predictions to uncertainties in the parameter estimates, and based on these results, assess the implications of using the range of historical variability in forest management.

*Keywords: Disturbance, fire history, ecosystem dynamics, landscape modeling.*

(See Corvallis order form.)

## Mycology

Massicotte, Hugues B.; Melville, Lewis H.; Peterson, R. Larry; Molina, Randy

1999. Biology of the ectomycorrhizal fungal genus, *Rhizopogon*. *New Phytologist*. 142: 355-370.

The morphology and anatomy of ectomycorrhizas of *Rhizopogon arctostaphyli*, *R. ellena*, *R. flavofibrillosus*, *R. occidentalis*, *R. rubescens*, *R. smithii*, *R. subcaerulescens*, and *R. truncates*, synthesized with spore slurries on ponderosa pine in greenhouse conditions, are described and compared.

*Keywords: Rhizopogon, Pinus ponderosa.*

(See Corvallis order form.)

## Plant Ecology

Busing, R.; Rimar, K.; Stolte, K.W.; Stohlgren, T.J.

1999. Forest health monitoring—vegetation pilot field methods guide: vegetation diversity and structure, down woody debris, fuel loading. Research Triangle Park, NC: National Forest Health Monitoring Program; [U.S. Department of Agriculture, Forest Service], [Southern Research Station]: [Irregular pagination].

Field methods are presented to quantify number and abundance of forest-dependent species, quantify number of native and exotic species, and determine the vertical structure of vegetation. Current methods were modified because the total area sampled was too small and the single-scale approach was inadequate to evaluate plant diversity in patchy and heterogeneous habitats (i.e., most habitats on Earth). The proposed methodology is being tested on forest health monitoring plot sites, and a revised methodology will be implemented nationwide.

*Keywords: Species richness, structural diversity, exotic species, woody debris, fire fuels.*

(See Corvallis order form.)

Busing, Richard T.

1998. Composition, structure and diversity of cove forest stands in the Great Smoky Mountains: a patch dynamics perspective. *Journal of Vegetation Science*. 9: 881-890.

Cove forests of the Great Smokey Mountains are North American examples of old-growth temperate forests. Ecological attributes of seven stands were studied by using one 0.6- to 1.0-hectare plot per stand. All stands had a mixture of deciduous canopy species. When all species were combined, juveniles showed aggregation, and adults often were hyperdispersed. Analyses for individual species confirmed that the mosaic



of canopy species is influenced by nonrandom spatial processes. A diverse patchwork resulted despite the fact that many species did not exhibit segregation of adults and juveniles. Further understanding of patch dynamics and the potential for compositional steady state in cover forests requires long-term study with spatial data.

*Keywords: Species richness, structural diversity, community structure, canopy gaps.*

(See Corvallis order form.)

## Plant Pathology

Tinnin, Robert O.; Parks, Catherine G.; Knutson, Donald M.

1999. Effects of Douglas-fir dwarf mistletoe on trees in thinned stands in the Pacific Northwest. *Forest Science*. 45(2): 359-365.

Growth of 450 Douglas-fir in thinned stands was assessed for 20 years. Many of the trees were infected with dwarf mistletoe. We measured bole diameter, height, and infection level over the course of the study and sampled radial growth and tree vigor at the conclusion of the study. The effect of dwarf mistletoe on host growth at any one site depended on which measure of growth was used. Trees in the Malheur National Forest, Oregon, showed somewhat different responses to infection than trees in the Okanogan National Forest, Washington. Diameter growth at breast height was affected more at the Malheur, whereas height growth was affected more at the Okanogan. Less than 3 percent of our sample trees died in 20 years, with no clear indication of increased mortality owing to dwarf mistletoe.

*Keywords: Arceuthobium douglasii, Pseudotsuga menziesii, intensification, growth, vigor.*

(See La Grande order form.)

## Regeneration

Harrington, Constance A.; McGrath, M.M.; Kraft, Joseph M.

1999. Propagating native species: experience at the Wind River nursery. *Journal of Applied Forestry*. 14(2): 61-64.

Propagation information developed at the USDA Forest Service Wind River nursery in Carson, Washington, is provided for nine hardwood tree and 20 shrub species native to the Pacific Northwest. This includes information on seed collection, extraction, stratification, and storage; timing of collection and propagation techniques for cuttings; and a summary of propagation experience (planting media and container used, specialized methods, and type of stock produced). Most species were propagated from seed, some from stem and root cuttings, and some from both seed and cuttings. Some species were very difficult or impossible to propagate at the nursery.

*Keyword: Propagation, native plants.*

(See Olympia order form.)

Randall, William; Johnson, G.R.

1998. The impact of environment and nursery on survival and early growth of Douglas-fir, noble fir, and white pine—a case study. *Western Journal of Applied Forestry*. 13(4): 137-143.

Survival and third-year height were examined for 2,383 reforestation units to determine which factors impact reforestation success. The most significant effect was the nursery that provided the seedlings. Other factors important for Douglas-fir, noble fir, white pine, or a combination of these species were seedling size, seed origin, planting month, protection, shading, aspect, administrative area, and the length of time between lifting and planting.

*Keywords: Regeneration, nursery, survival, genetics.*

(See Corvallis order form.)

## Regional Assessments

Haynes, Richard W.; Reyna, Nicholas E.; Allen, Stewart D.

1998. Social and economic systems. *Journal of Forestry*. October: 28-32.

The social and economic assessments conducted for the Interior Columbia River Basin Ecosystem Management Project characterized social and economic conditions and trends in the basin. The basin has a robust economy that is growing and diversifying and reducing the importance of traditional resource industries. Even so, many places in the basin either are not experiencing this prosperity or are being unsettled by the changes in traditional rural lifestyles that growth brings.

*Keywords: Social assessment, economic assessment, interior Columbia River basin.*

(See Portland order form.)

Quigley, Thomas M.; Graham, Russell T.; Haynes, Richard W.

1999. Interior Columbia River Basin Ecosystem Management Project: case study. In: Johnson, K. Norman; Swanson, Frederick; Herring, Margaret; Greene, Sarah, eds. *Bioregional assessments: science at the crossroads of management and policy*. Washington, DC: Island Press: 270-287.

The scientific assessment of the interior Columbia River basin is one outcome of the continuing debate over the management of Forest Service- and Bureau of Land Management-administered lands within the basin. To fully understand this debate and the implications associated with it, an understanding of the biophysical, social, and economic components of the ecosystems for the total land area, public and private, is needed. Such an examination is designed to develop an understanding that will disclose conditions, trends, and potential outcomes associated with natural resource management in the basin.

*Keywords: Ecosystem management, integrated resource analysis.*

(Available in bookstores and libraries.)

Quigley, Thomas M.; Haynes, Richard W.; Hann, Wendel J. [and others]

1998. Using an ecoregions assessment for integrated policy analysis. *Journal of Forestry*. October: 33-38.

Integrating across ecological and socioeconomic resources for all ownerships within the interior Columbia River basin provides the context for making decisions at a very broad perspective within a hierarchy where risks and opportunities are partitioned among scales. Maintaining integrity and resiliency of resources for present and future generations will depend on understanding both how society values these resources and how the natural and human processes function.

*Keywords: Regional assessment, natural resource policy.*

(See La Grande order form.)

## Remote Sensing

Cohen, Warren B.; Fiorella, Maria

1998. Comparison of methods for detecting conifer forest change with thematic mapper imagery. In: Lunetta, Ross S.; Elvidge, Christopher D., eds. *Remote sensing change detections: environmental methods and applications*. Chelsea, MI: Ann Arbor Press: 89-102. Chapter 6.

Theoretical descriptions are provided for two remote-sensing change-detection algorithms: change-vector analysis and image differencing. The algorithms also are compared for their effectiveness in mapping vegetation cover changes in a conifer forest environment.

*Keywords: Remote sensing, change vector analysis, image differencing.*

(Available at bookstores and libraries.)

Kennedy, Robert E.; Cohen, Warren B.; Takao, Gen

1998. A BRDF-related brightness gradient in AVIRIS imagery: lessons from an empirical compensation method. In: Green, Robert O., ed. Summaries of the seventh JPL airborne Earth science workshop: Volume 1. AVIRIS workshop; 1998 January 12-15; [Location of workshop unknown]. JPL Publ. 97-21. Pasadena, CA: National Aeronautics and Space Administration, Jet Propulsion Laboratory, California Institute of Technology: 225-231.

A brightness gradient was observed in the cross-track dimension of 1994 AVIRIS imagery acquired over a densely forested study area in Oregon's Cascade Range. The character of the brightness gradient may affect common analysis techniques of AVIRIS imagery such as classification, multi-image matching, and endmember selection.

*Keywords: Airborne imagery, AVIRIS, spectral properties.*

(See Corvallis order form.)

## Silviculture

Cascade Center for Ecosystem Management  
1998. Residual stand damage from thinning: young stand thinning and diversity study. Corvallis, OR: Oregon State University; [U.S. Department of Agriculture, Forest Service], Pacific Northwest Research Station; [U.S. Department of Agriculture, Forest Service], Willamette National Forest, Blue River Ranger District. 2 p.

This two-page summary talks about the young stand thinning and diversity study designed to evaluate the effectiveness of alternative thinning, underplanting, and snag creation practices. This study was a collaborative effort of scientists and managers from the Willamette National Forest, Oregon State University, and the Pacific Northwest Research Station.

*Keywords: Silviculture, thinning, roots, disturbance, timber harvest.*

(See Corvallis order form.)

## Soil

Remillard, Suzanne Marie

1999. Soil carbon and nitrogen in old-growth forests in western Oregon and Washington. Corvallis, OR: Oregon State University. 121 p. M.S. thesis.

Soil organic carbon is an important component in evaluating global carbon stores. The nitrogen cycle is closely linked to carbon, and understanding its role is important. Contents and distributions of soil organic carbon and nitrogen in soil profiles, to 1-meter depths, were estimated from 79 soil pits in old-growth forests in seven physiographic provinces in western Oregon and Washington. The results of this study, and of other studies assessing the effects of site and climatic characteristics on factors controlling soil organic matter accumulation, suggest the relations are regionally specific.

*Keywords: Carbon storage, deep soil carbon, aggregates.*

(Available only through library or interlibrary loan.)

## Special Forest Products

Vance, Nan C.; Thomas, Jane, eds.

1997. Special forest products: biodiversity meets the marketplace. Gen. Tech. Rep. GTR-WO-63. Washington, DC: U.S. Department of Agriculture, Forest Service. 163 p.

Although North American forests traditionally have been viewed as a source of wood and paper, a variety of profitable products are being discovered that come not only from trees but from nonwoody plants, lichens, fungi, algae, and microorganisms. These products are referred to as secondary, specialty, special, or nontimber forest products. A seminar was held in Corvallis, Oregon, in fall 1995 to stimulate new and continuing dialogue concerning future sustainability of forest resources as they evolve along with other societal and economic trends into the 21<sup>st</sup>

century. This proceedings is an outcome of the seminars given by 11 experts who, with first-hand knowledge, offered new creative approaches for developing, managing, and conserving nontimber forest products.

*Keywords: Special forest products, nontimber forest products, biodiversity, medicinal plants, CITES, sustainable forestry, forest communities, forest management, American Indians, forest plants, mushrooms.*

(This publication is available **only** in electronic format at <http://www.fs.fed.us/pnw/pubs.htm>.)

## Wildlife

Bishop, Mary A.; Warnock, Nils

1998. Migration of western sandpipers: links between their Alaskan stopover areas and breeding grounds. *Wilson Bulletin*. 110(4): 457-462.

The authors report on the migration of 32 radio-marked western sandpipers (*Calidris mauri*) banded as far south as San Francisco, California, and monitored for over 4000 kilometers to stopover and breeding areas west of the Copper River Delta, Alaska. A link between coastal and inland stopover sites was documented for western sandpipers migrating from San Francisco and Honey Lake, California, north to suspected breeding grounds around the Mulchatna River, Alaska, area and known breeding grounds on the Yukon-Kuskokwim Delta of western Alaska. The study suggested that birds departing from the Copper River Delta migrated directly to their breeding areas with only a few stopping at intermediate coastal areas.

*Keywords: Calidris mauri, migration, radiotelemetry, western Great Basin, range extension.*

(See Juneau order form.)

Bishop, Mary A.; Yanling, Song; Zhouma, Canjue; Binyuan, Gu

1997. Bar-headed geese *Anser indicus* wintering in south-central Tibet. *The Wildfowl and Wetlands Trust*. 48: 118-126.

During six winters, 1990-91 through 1995-96, information was collected on the status and distribution of bar-headed goose (*Anser indicus*) and ruddy shelduck (*Tadorna ferruginea*) in south-central Tibet, People's Republic of China. There were estimates of 13,000 to 14,500 bar-headed geese wintering in south-central Tibet, representing at least 25 percent of the estimated world population. About 70 percent of the bar-headed geese winter in two areas: Shigatse, around the confluence of the Nyang and Yarlung Rivers, and Penbo River valley, northeast of Lhasa. The distribution of ruddy shelduck overlapped with bar-headed geese in all areas surveyed.

*Keywords: Anser indicus, bar-headed geese, Tadorna ferruginea, ruddy shelduck, Tibet.*

(See Juneau order form.)

Hanley, Thomas A.; Barnard, Jeffrey C.

1998. Red alder, *Alnus rubra*, as a potential mitigating factor for wildlife habitat following clearcut logging in southeastern Alaska. *Canadian Field-Naturalist*. 112(4): 647-652.

Within-stand variation in understory species composition and biomass was studied in 16 even-aged stands of mixed red alder-Sitka spruce-western hemlock forest. The sites were upland sites, and the stands were 28-39 years old. Understory was studied within three categories of microsite types: red alder-dominated, conifer-dominated, and mixed alder-conifer. The results illustrate two important conclusions regarding current understanding of secondary succession following clearcutting in southeastern Alaska: (1) inclusion of red alder in the regenerating stand may result in much greater understory

biomass than occurs in pure conifer stands; and (2) extrapolation of data from small, uniform, fully stocked research stands to the landscape level may underestimate understory biomass from poorly stocked patches. Both conclusions have important implications for wildlife habitat in terms of understory food and cover.

*Keywords: Red alder, Sitka spruce, western hemlock, secondary succession, understory, biomass, forests, wildlife habitat.*

(See Juneau order form.)

Jacoby, Michael E.; Hilderbrand, Grant V.; Servheen, Christopher [and others]

1999. Trophic relations of brown and black bears in several western North American ecosystems. *Journal of Wildlife Management*. 63(3): 921-929.

Stable-isotope analysis was used to examine the historical and current diets of grizzly/brown and black bears in several ecosystems to understand the importance of milk to grizzly cubs and yearlings, and of meat to grizzlies by age and sex class, relative to black bears. Milk consumed by grizzly cubs and yearlings provided 31 percent and 23 percent of their nourishment in the Yellowstone ecosystem and 82 percent and 19 percent in Glacier National Park, respectively. Dietary meat content of grizzlies differed extensively among individuals and age and sex classes but averaged 51 percent for subadult and adult males and females in the Yellowstone ecosystem and 11 percent in Glacier National Park and surrounding areas. Within each ecosystem, adult male grizzlies were consistently more carnivorous than any other age or sex class. Grizzlies with access to easily obtained, abundant meat sources (e.g., carcass dumps, salmon) had dietary meat contents generally exceeding 70 percent. The meat-to-plant ratios in the diets of current-day bears were very similar to those of bears dating as far back

as 1000 years ago. Sympatric black bears in Wyoming, Montana, and Idaho had dietary meat-to-plant ratios similar to all grizzly age and sex classes except adult males. Alaska black bears made extensive use of salmon when brown bears were not present but were excluded from salmon when sympatric with brown bears.

*Keywords: Brown bear, black bear, grizzly bear, diet composition, food habits, salmon, stable isotopes, Yellowstone National Park, Glacier National Park.*

(See Juneau order form.)

Leonard, Norman E.

1998. Variations in the trophic ecology and densities of *Ascaphus truei* in two streams with different timber management histories. Athens, GA: University of Georgia. 20 p. B.S. thesis.

The autoecology of tailed frogs (*Ascaphus truei*), the effects of clearcutting on downstream populations of *Ascaphus*, and its food resources were studied in the Cascade Range in western Oregon during July and August 1998.

*Keywords: Trophic relations, stream habitat, amphibians.*

(Available only through library or interlibrary loan.)

Raphael, Martin G.

1999. Use of Pacific madrone by cavity-nesting birds [Use of *Arbutus menziesii* by cavity-nesting birds]. In: *The decline of Pacific madrone (Arbutus menziesii Pursh): current theory and research directions: Proceedings of a symposium held at the Center for Urban Horticulture; 1995 April 28; Seattle, WA. [Place of publication unknown]: Ecosystems Database Development and Research: 17-24.*

As part of a larger study of wildlife habitat associations in northwestern California Douglas-fir forests, characteristics were recorded of nest sites used by 16 species of cavity-nesting birds.

Pacific madrone contributed only 8 percent of the basal area of the stands studied, but 24 percent of all cavity nests were in madrone. Although nests were distributed among 17 tree species, only madrone was used by birds at a rate greater than predicted from availability. About 75 percent of available madrone trees were less than 30 centimeters in diameter at breast height, but only 11 percent of the nests were in these smaller trees. Larger than average madrones seemed to be an important habitat component for cavity-nesting birds in these forests. Madrone also is a prime fuelwood species; thus, a potential conflict exists between commercial use of madrone and its value for wildlife. The importance of Pacific madrone as nesting habitat is well known. The objective of this study was to evaluate the use of madrone as a nesting substrate for cavity-nesting birds.

*Keywords: Pacific madrone, foraging, frugivore, cavity-nesting.*

(See Olympia order form.)

Smith, Winston Paul; Twedt, Daniel J.  
1999. Temporal differences in point counts of bottomland forest landbirds. *Wilson Bulletin*. 111(1): 139-143.

During the winters and breeding seasons of 1991 and 1992, 3,523 point counts were conducted in 3-hour periods after sunrise and before sunset. During each season, five to seven visits were made to 100 stations distributed among bottomland and hardwood sites in west-central Mississippi. Seasonal averages of species richness, total number of birds, and relative abundance of

selected species between morning and evening counts were compared by using paired t-tests. There were more birds in morning counts during both winter and breeding season; species richness was greater in morning counts during breeding season but not during winter. Abundance of individual species varied among seasons. Three of eleven species during winter and 10 of 21 species in the breeding season were more abundant during morning counts than evening counts. Summer tanager (*Piranga rubra*) was the only species more abundant during evening counts than morning counts. Significant variation between morning and evening counts of individual species was positively correlated with higher detection possibilities during the breeding season but not during winter.

*Keywords: Evening, forest landbirds, monitoring, morning, point counts, season.*

(See Juneau order form.)

Warnock, Nils; Bishop, Mary Anne  
1998. Spring stopover ecology of migrant western sandpipers. *The Condor*. 100: 456-457.

Stopover ecology is described for 132 migrant, radiomarked western sandpipers (*Calidris mauri*) banded at two coastal and one interior site and later relocated repeatedly along the Pacific flyway of North America. Eighty-eight percent of radiomarked birds were detected at one to five sites north of their banding sites. Mean length of stays at seven sites other than banding sites ranged from 1.1 to 3.3 days and were not significantly affected by sex of bird, year of study, or banding location. Length of stay of male western sandpipers at the Copper River Delta, Alaska, became significantly shorter later in the migration period, but no such relation was found for females.

*Keywords: Body condition, Calidris mauri, western sandpiper, Great Basin, length of stay, Pacific flyway, radiotelemetry, shorebirds, stopover ecology.*

(See Juneau order form.)

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- \_\_\_\_\_ R. Busing, K. Rimar, K.W. Stolte, and T.J. Stohlgren  
Forest health monitoring–vegetation pilot field methods guide: vegetation diversity and structure, down woody debris, fuel loading
- \_\_\_\_\_ Richard T. Busing  
Composition, structure and diversity of cove forest stands in the Great Smokey Mountains: a patch dynamics perspective
- \_\_\_\_\_ Cascade Center for Ecosystem Management  
Residual stand damage from thinning: young stand thinning and diversity study
- \_\_\_\_\_ Elizabeth A. Gerson, Rick G. Kelsey, and Darrell W. Ross  
Pupal diapause of *Coloradia pandora* Blake (Lepidoptera: Saturniidae)
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