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Aquatic/Riparian Systems

06-224

Everest, F.H.; Reeves, G.H.

2007. Riparian and aquatic habitats of the Pacific Northwest and southeast Alaska: ecology, management history, and potential management strategies. Gen. Tech. Rep. PNW-GTR-692. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 130 p.

Management of riparian habitats is controversial because land use policies have historically emphasized economic values (e.g., timber production) at the expense of ecological and social values. Attempting to manage these valuable resources to attain the greatest combination of benefits has created a long-term controversy that continues to the present. Our analysis indicates that at mid to large spatial scales, healthy riparian ecosystems and land management activities are not mutually exclusive, but the degree of compatibility is determined by policy decisions based on competing demands and pressing timelines as well as available scientific knowledge. Current management schemes on federal lands in the Pacific Northwest and Alaska are appropriately addressing large spatial scales and incorporating the principles of disturbance ecology. We found no scientific evidence that either the default prescriptions or the options for watershed analysis in the Northwest Forest Plan and Tongass Land Management Plan provide more protection than necessary to meet stated riparian management goals. We believe that additional alternative riparian management strategies could be implemented and evaluated in concert to shorten the time needed to realize effective strategies that fully meet riparian management goals.

Keywords: Riparian ecosystems, management, dynamics, Northwest Forest Plan, Tongass Land Management Plan.

http://www.treesearch.fs.fed.us/pubs/27434

Bibliographies

07-196

Pacific Northwest Research Station.

2007. Recent publications of the Pacific Northwest Research Station, fourth quarter 2006.

Keywords: Bibliographies (forestry).

Forest Management

07-116

Zhou, X.; Mills, J.R.; Haynes, R.W.

2007. Projecting other public inventories for the 2005 RPA Timber Assessment Update. Gen. Tech. Rep. PNW-GTR-717. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 31 p.

This study is an overview of the current inventory status and projections of future forest inventories on other public timberland. Other public lands are lands administered by state, local, and federal government but excluding National Forest System lands. These projections were used as part of the 2005 USDA Forest Service Resource Planning Act Timber Assessment Update. Though the projected inventory volume varies across regions, both softwood and hardwood inventories on other public timberlands in the United States are projected to increase 60 percent during the next 50 years.

Keywords: Other public timberlands. inventory projection, yield function, forest structure.

http://www.treesearch.fs.fed.us/pubs/27435

Invasive Plants and Animals

07-249

Harrington, T.B.; Reichard, S.H.

2007. Meeting the challenge: invasive plants in Pacific Northwest Ecosystems. Gen. Tech. Rep. PNW-GTR-694. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 166 p.

During September 19-20, 2006, a scientific conference was held at the University of Washington with the title "Meeting the Challenge: Invasive Plants in Pacific Northwest Ecosystems." This proceedings includes 27 papers based

on oral presentations at the conference plus a synthesis paper that summarizes workshop themes, discussions, and related information. Topics include early detection and rapid response; control techniques, biology, and impacts; management approaches; distribution and mapping of invasive plants; and partnerships, education, and outreach.

Keywords: Invasive plant species, exotics, aliens, weeds, early detection/rapid response, vegetation management.

http://www.treesearch.fs.fed.us/pubs/27652

Plant Ecology

06-480

Powell, D.C.; Johnson, C.G.; Crowe, E.A.; Wells, A.; Swanson, D.K.

2007. Potential vegetation hierarchy for the Blue Mountains section of northeastern Oregon, southeastern Washington, and west-central Idaho. Gen. Tech. Rep. PNW-GTR-709. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 87 p.

The work described in this report was initiated during the Interior Columbia Basin Ecosystem Management Project (ICBEMP). The ICBEMP produced a broad-scale scientific assessment of ecological, biophysical, social, and economic conditions for the interior Columbia River basin and portions of the Klamath and Great basins. The broad-scale assessment made extensive use of potential vegetation (PV) information. This report (1) discusses certain concepts and terms as related to PV, (2) describes how a PV framework developed for the broad-scale ICBEMP assessment area was stepped down to the level of a single section in the national hierarchy of terrestrial ecological units, (3) describes how fine-scale potential vegetation types (PVTs) identified for the Blue Mountains section were aggregated into the midscale portion of the PV hierarchy, and (4) describes the PVT composition for each of the midscale hierarchical units (physiognomic class, potential vegetation group, plant association group).

Keywords: Potential vegetation, Blue Mountains, potential vegetation hierarchy, plant ecology, potential vegetation type, plant association group, physiognomic class, potential vegetation group.

http://www.treesearch.fs.fed.us/pubs/27598

Pollution

07-153

Campbell, S.J.; Wanek, R.; Coulston, J.W.

2007. Ozone injury in west coast forests: 6 years of monitoring. Gen. Tech. Rep. PNW-GTR-722. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 53 p.

Six years of monitoring for ozone injury by the PNW Forest Inventory and Analysis Program are reported. The methods used to evaluate injury, compute an injury index and estimate risk are described. Extensive injury was detected on ozone biomonitoring sites for all years in California, with ponderosa and Jeffrey pines, mugwort, skunkbush, and blue elderberry showing injury. Little or no injury was detected in Oregon and Washington. The relation of observed injury to ambient ozone levels is discussed. The areas with the highest modeled risk of ozone injury are the area east of Los Angeles, the southern Sierra Nevada, and portions of the central coast.

Keywords: Ozone, biomonitoring, indicator species, forest health monitoring, plant injury.

http://www.treesearch.fs.fed.us/pubs/27926

Recreation

07-238

Kruger, L.E.; Mazza, R.; Lawrence, K.

2007. Proceedings: National Workshop on Recreation Research and Management. Gen. Tech. Rep. PNW-GTR-698. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 230 p.

Given increasing need and decreasing capacity, the Forest Service outdoor recreation research program must strategize how best to address current and future priorities. The papers compiled here were presented at the national workshop on recreation research and management held in Portland, Oregon, February 8-10, 2005. Papers are organized around four themes: understanding forest recreation visitors, recreation planning and monitoring, recreation management, and special issues in recreation.

Keywords: Recreation, visitors, planning, monitoring, forest management.

http://www.treesearch.fs.fed.us/pubs/27600

Regional Assessments

06-375

Kay, W.H.; Donoghue, E.M.; Charnley, S.; Stuart, C.; Moseley, C.

2007. Northwest Forest Plan, the first 10 years: socioeconomic monitoring of the Mount Hood National Forest and three local communities. Gen. Tech. Rep. PNW-GTR-701. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 97 p.

This report examines socioeconomic changes that took place between 1990 and 2040 on and around lands managed by the Mount Hood National Forest in Oregon to assess the effects of the Northwest Forest Plan (the Plan) on rural economies and communities there. Three case communities were studied: the Greater Estacada Area, the Upper Hood River Valley, and the Villages of Mount Hood from Brightwood to Rhododendron. The report characterizes the region and its history, discusses management changes on the forest under the Plan and how they were perceived, describes socioeconomic change in the communities and how they were linked to the Plan, and evaluates how well the Plan socioeconomic goals were met in the Mount Hood National Forest case.

Keywords: Socioeconomic monitoring, Northwest Forest Plan, forest communities, rural development, Mount Hood National Forest.

http://www.treesearch.fs.fed.us/pubs/27716

Resource Inventory

07-013

Christensen, G.A.; Dunham, P.; Powell, D.C.; Hiserote, B.

2007. Forest resources of the Umatilla National Forest. Resour. Bull. PNW-RB-253. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 38 p.

Current resource statistics for the Umatilla National Forest, based on two inventories conducted in 1993-96 and in 1997-2002, are presented in this report. Currently on the Umatilla National Forest, 89 percent of the land area is classified as forest land. The predominant forest type is grand fir (26 percent of forest-land acres) followed by the interior Douglas-fir (25 percent) and ponderosa pine (17 percent) types. The majority of net wood volume (55 percent) comes from trees ranging in size from 11 to 23 inches diameter at breast height. The most commonly recorded cause of tree death was bark beetle attack, with over half of the mortality volume attributed to these insects.

Keywords: Umatilla National Forest, forest inventory, Blue Mountains, current vegetation survey.

http://www.treesearch.fs.fed.us/pubs/27656

Silviculture

06-251

Curtis, R.O.; DeBell, D.S.; Miller, R.E.; Newton, M.; St. Clair, J.B.; Stein, W.I.

2007. Silvicultural research and the evolution of forest practices in the Douglas-fir region. Gen. Tech. Rep. PNW-GTR-696. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 172 p.

Reviews history of research in silviculture and related topics in the Douglas-fir region from circa 1900 to the present, concomitant changes in forest practices, and influence of research on these practices. Discusses some current problems and associated changes in research emphasis.

Keywords: Silviculture, forest history, Douglas-fir, Pseudotsuga menziesii.

http://www.treesearch.fs.fed.us/pubs/27615

07-086

Poage, N.J.; Anderson, P.D.

2007. Large-scale silviculture experiments of western Oregon and Washington. Gen. Tech. Rep. PNW-GTR-713. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 44 p.

We review 12 large-scale silviculture experiments (LSSEs) in western Washington and Oregon with which the Pacific Northwest Research Station of the USDA Forest Service is substantially involved. We compiled and arrayed information about the LSSEs as a series of matrices in a relational database, which is included on the compact disc published with this report and available online. The LSSEs are both spatially and temporally large scale, with experimental treatment units between 5 and 100 acres and proposed study durations of 20 to 200 years. A defining characteristic of the LSSEs is that a broad range of response variables are measured in order to characterize the response of forest ecosystems to experimental treatments. We discuss the general value and limitations of the LSSEs and highlight some possible roles that can be played by the LSSEs in addressing management issues emerging at the beginning of the 21st century.

Keywords: Silviculture, large-scale experiment, LSSE, Oregon, Washington, Pacific Northwest.

http://www.treesearch.fs.fed.us/pubs/27436

Social Sciences

07-123

Olsen, C.S.; Shindler, B.A.

2007. Citizen-agency interactions in planning and decisionmaking after large fires. Gen. Tech. Rep. PNW-GTR-715. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 37 p.

This report reviews the growing literature on the concept of agency-citizen interactions after large wildfires. Because large wildfires have historically occurred at irregular intervals, research from related fields has been reviewed where appropriate. This issue is particularly salient in the West where excessive fuel conditions indicate that the large wildfires occurring in many states are expected to continue to be a major problem for forest managers in the coming years. This review focuses the five major themes that emerge from prior research: contextual considerations, barriers and obstacles, uncertainty and perceptions of risk, communication and outreach, and bringing communities together. It offers ideas on how forest managers can interact with stakeholders for planning and restoration activities after a large wildfire. Management implications are included.

Keywords: Post-fire, citizen-agency interactions, public involvement, federal forests, communication strategies, risk and uncertainty, context.

http://www.treesearch.fs.fed.us/pubs/27295

Threatened, Endangered, Sensitive Species

07-006

Olson, D.H.; Van Norman, K.J.; Huff, R.D.

2007. The utility of strategic surveys for rare and little-known species under the Northwest Forest Plan. Gen. Tech. Rep. PNW-GTR-708. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 48 p.

We compiled and evaluated the effectiveness of strategic survey projects conducted for the federal survey and management program of the Northwest Forest Plan to advance the program's adaptive management. We found 96 projects were initiated and direct costs were almost $5 million. Significant advances to rare species management resulted, and lessons learned from our evaluation can refine future implementation effectiveness.

Keywords: Rare species, conservation, inventory, adaptive management.

http://www.treesearch.fs.fed.us/pubs/27294

Publications Available Elsewhere

The following publications are available through interlibrary loan, by writing to the locations indicated, or by using the form indicated. Many journal articles are available on our Web site at http://www.fs.fed.us/pnw/publications/nonstation.shtml.

Aquatic/Riparian Systems

Anderson, P.D.; Larson, D.J.; Chan, S.S.
2007. Riparian buffer and density management influences on microclimate of young headwater forests of western Oregon. Forest Science. 53(2): 254–269.

We investigated the influences of buffer width and upslope density management treatments on riparian microclimates of headwater streams of western Oregon. Spatial variation in stand density, canopy cover and microclimate were monitored along transects from stream center upslope into thinned or unthinned stands, and with riparian buffers ranging in width from 7 m to 65 m. Three to five years after thinning, summer air and soil temperatures increased and relative humidity decreased with upslope distance from stream. Gradients were strongest within 10 m of stream center. In thinned stands, afternoon air temperature was 1 to 4 °C greater and relative humidity up to 18 percent less, than unthinned stands. With retention of buffers 15 m or wider, air temperatures at stream center differed by less than 1 °C and relative humidity differed by less than 5 percent from that for unthinned stands. Buffers of all but the narrowest widths maintained stream-center microclimate similar to that for unthinned stands.

Keywords: Riparian reserves, density management, edge effects, Douglas-fir.

(see Corvallis lab order form.)

Bigelow, P.E.; Benda, L.E.; Miller, D.J.; Burnett, K.M.
2007. On debris flows, river networks, and the spatial structure of channel morphology. Forest Science. 53(2): 220–238.

In this paper, we examine the influence of debris-flow deposits and fans on channels and habitat characteristics in small to intermediate-size watersheds in the Oregon Coast Range. We evaluate: (1) the proportion of stream length bordered by debris fans and the spacing between fans, (2) the recurrence interval of debris flows in unmanaged watersheds, (3) the proportion of wood recruited to streams by debris flows, and (4) how various habitat parameters (boulder deposits, large wood, sediment, and pools) vary by distance from debris-flow fans. Based on our analysis and related papers, we propose several attributes of erosion relevant to aquatic habitats for consideration in natural resource management, using debris flows and timber harvest as an example.

Keywords: Debris flow, large wood, fish habitat, erosion, Oregon Coast Range.

(see Corvallis lab order form.)

Burnett, K.M.; Miller, D.J.
2007. Streamside policies for headwater channels: an example considering debris flows in the Oregon coastal province. Forest Science. 53(2): 239–253.

Headwater streams differ in susceptibility to debris flows and thus in importance as wood and sediment sources for larger rivers. Identifying and appropriately managing the most susceptible headwater streams is of interest. We developed and illustrated a method to delineate alternative aquatic conservation emphasis zones (ACEZs) considering probabilities for traversal by debris flows from headwater to fish-bearing streams. When ACEZs were substituted for currently prescribed riparian-management zones on non-fish-bearing streams, the total area decreased on federal lands but increased on other ownerships. Landscape-level outcomes, including wood delivery, can be evaluated over broad spatial extents under different policies using ACEZs.

Keywords: Intermittent streams, riparian management, riparian buffers, debris flows, aquatic conservation.

(see Corvallis lab order form.)

Burnett, K.M.; Reeves, G.H.
2006. Comparing riparian and catchment influences on stream habitat in a forested, montane landscape. American Fisheries Society Symposium. 48: 175–197.

The goal of this study was to understand relationships between salmon habitat and landscape characteristics, summarized at multiple spatial scales, in a montane basin where forestry is the dominant land use. Specific study objectives were to (1) examine differences among spatial scales for landscape characteristics described with relatively coarse-resolution data, (2) compare the proportion of variation in stream habitat features explained by landscape characteristics summarized within and among different spatial scales, and (3) assess regression residuals for spatial autocorrelation.

Keywords: Land use and streams, large wood, multiscale analysis, riparian protection, salmon habitat conservation.

(see Corvallis lab order form.)

Frady, C.; Johnson, S.; Li, J.

2007. Stream macroinvertebrate community responses as legacies of forest harvest at the H.J. Andrews Experimental Forest, Oregon. Forest Science. 53(2): 281–293.

This study examined benthic and emergent macroinvertebrate communities in streams flowing through basins 20 to 40 years following forest harvest and compared them to communities in streams flowing through old-growth forests. The objectives were to determine (1) if benthic or emergent taxa richness, benthic densities, shredder densities, and emergent abundances were higher in streams where the surrounding conifer forest had been harvested two to four decades ago and (2) if benthic or emergent community composition differed between forest types. Given that headwater streams undergo physical and biological changes seasonally, this study also explored how taxa richness, densities/abundances, and community composition differed among seasons.

Keywords: Aquatic ecosystems, species richness, young stands, aquatic invertebrates, stream ecology.

(see Corvallis lab order form.)

Olson, D.H.; Anderson, P.D.; Frissell, C.A.; Welsh, H.H.; Bradford, D.F.

2007. Biodiversity management approaches for stream-riparian areas: perspectives for Pacific Northwest headwater forests, microclimates, and amphibians. Forest Ecology and Management. 246: 81–107.

New science insights are redefining stream riparian zones, particularly relative to headwaters, microclimate conditions, and fauna such as amphibians. We synthesize data on these topics, and propose management approaches to target sensitive biota at reach to landscape scales.

Keywords: Riparian buffers, riparian patch reserves, amphibians, microclimate, connectivity.

(see Corvallis lab order form.)

Olson, D.H.; Rugger, C.

2007. Preliminary study of the effects of headwater riparian reserves with upslope thinning on stream habitats and amphibians in western Oregon. Forest Science. 53(2): 331–342.

We examined the response of headwater stream habitats and vertebrates to riparian buffers with upslope thinning. We found trends for increased stream intermittency posttreatment, and at some sites bank salamander abundances were altered. Instream faunal abundances were not affected; however, power to detect a change was an issue.

Keywords: Riparian buffers, headwaters, intermittent streams, thinning.

(see Corvallis lab order form.)

Olson, D.H.; Weaver, G.

2007. Vertebrate assemblages associated with headwater hydrology in western Oregon managed forests. Forest Science. 53(2): 343–355.

We characterized headwater stream habitats, fish, and amphibian fauna, in and along 106 headwater stream reaches at 12 study sites within managed forest stands 40 to 70 years old in western Oregon. Headwater stream types in our sample included perennial, spatially intermittent, and dry reaches. We captured 454 fish of three species groups and 1,796 amphibians of 12 species. Using canonical correlation, nonmetric multidimensional scaling ordination, and generalized linear models, we identified species and assemblages associated with reach hydrologic type (e.g., perennial, intermittent, dry), stream size, gradient, and substrate composition. Our findings of torrent salamander occurrences in spatially intermittent streams, and patchy and infrequent occurrences of *Cottus* fish (sculpins) and coastal tailed frogs suggests these taxa warrant consideration during headwater management for retention of locally distinct biotic resources

Keywords: Spatially intermittent streams, amphibians, trout, streambank, torrent salamanders, cottid fishes, tailed frogs.

(see Corvallis lab order form.)

Wondzell, S.M.; Hemstrom, M.A.; Bisson, P.A.

2006. Simulating riparian vegetation and aquatic habitat dynamics in response to natural and anthropogenic disturbance regimes in the upper Grande Ronde River, Oregon, USA. Landscape and Urban Planning. 80(3): 193–197.

This study explored the use of state and transition models (STMs) to evaluate the effects of natural disturbances and land-use practices on aquatic and riparian habitats. The probability of stand-replacing wildfires, underburns, grazing, floods, and debris flows were were used to define historical and current disturbance regimes. Model runs illustrated dramatic changes in riparian vegetation, channel conditions, and habitat suitability for anadromous salmonids resulting from changes in disturbance regimes following Euro-American settlement. Limitations in the use of STMs and their potential utility for integrating complex temporal dynamics of riparian and aquatic ecosystems are discussed.

Keywords: Mountain streams, state and transition models, riparian zones, salmon habitat, disturbance.

(see Olympia lab order form.)

Biodiversity Management in Forests in the Pacific Northwest

Suzuki, N.; Olson, D.H.

2007. Options for biodiversity conservation in managed forest landscapes of multiple ownerships in Oregon and Washington, USA. Biodiversity Conservation. DOI 10.1007/s10531-007-9198-y.

We review the policies and management approaches used in U.S. Pacific Northwest planted forest to address biodiversity protection. We provide a case-study watershed design from southern Oregon, integrating various stand-to-landscape biodiversity-management approaches.

Keywords: Biodiversity, sensitive species, Siskiyou Mountains salamander, policy.

(see Corvallis lab order form.)

Biometrics

Temesgen, H.; Hann, D.W.; Monleon, V.J.

2006. Regional height-diameter equations for major tree species of southwest Oregon. Western Journal of Applied Forestry. 22(3): 213–219.

Selected tree height and diameter functions were evaluated for their predictive abilities for major tree species of southwest Oregon. The equations included tree diameter alone, or diameter plus alternative measures of stand density and relative position. Two of the base equations were asymptotic functions, and two were exponential functional forms. The inclusion of the crown competition factor in larger trees and basal area, which indicates the relative position of a tree and stand density, into the base height-diameter equations increased the accuracy of prediction for all species. On the average, root mean square values were reduced by 40.4 cm (19 percent improvement). Two equations are recommended for estimating tree heights for major tree species in southwest Oregon.

Keywords: Tree height estimation, tree competition, basal area.

(see Portland lab order form.)

Economics

Ince, P.J.; Kramp, A.; Spelter, H.; Skog, K.; Dykstra, D.

2006. FTM-West: fuel treatment market model for U.S. West. In: Chang, S.J.; Dunn, M.A., eds. Forestry: economics and environment. Proceedings of the 35th annual southern forest economics workshop. Baton Rouge, LA : Louisiana State University: 275–291.

This paper presents FTM-West, a partial market equilibrium model designed to project future wood market impacts of significantly expanded fuel treatment programs that could remove trees to reduce fire hazard on forest lands in the U.S. West. FTM-West was designed to account for structural complexities in marketing and utilization that arise from unconventional size distributions of trees and logs removed in fuel treatment operations as compared with conventional timber supply in the West. For example, tree size directly influences market value and harvest cost per unit volume of wood, whereas log size influences product yield, production capacity, and processing costs at saw mills and plywood mills. Market scenarios were projected by FTM-West for two hypothetical fuel treatment regimes that yield wood with divergent size class distributions, evaluated at two hypothetical levels of administrative cost or government subsidy. Results suggest that timber markets could economically utilize substantial volumes of wood from treatment programs, even without any subsidy. Given an optimistic overall market outlook, model results indicate potential for expansion of total wood harvest in the West if fuel treatment programs will permit significantly expanded wood supply from forest thinning, in which case fuel treatment programs could partially displace timber harvest from conventional supply sources (mainly state and private forest lands), reduce timber prices, and offset regional timber revenues, while expanding regional forest product output.

Keywords: Forest products, marketing, economic aspects, market surveys, fuel reduction, wildfire prevention, wildfires, prevention and control, fire prevention, fire management, statistics, prices, thinnings, fuel treatment model, FTM.

(see Portland lab order form.)

Patterson, T.

2007. The economic value of ecosystem services from and for wilderness. The Wild Planet Project. May: 24–27.

Creative experiments are bringing values of ecosystem services into the marketplace including carbon markets, wetland and habitat banking, water temperature credits, certifications, and tax incentives. Market values have

helped raise awareness for ecosystem service contributions to quality of life, and help harness funds for their protection. Achieving these outcomes for wilderness involves particular challenges. This article discusses four of these challenges.

Keywords: Ecosystem services, wilderness, valuation.

(see Juneau lab order form.)

White, E.M.; Leefers, L.A.

2007. Influence of natural amenities on residential property values in a rural setting. Society and Natural Resources. 20: 659–667.

Most hedonic pricing studies have been completed in suburban and urban communities rather than rural areas. The hedonic pricing study presented here includes developed residential parcel transactions occurring in a rural county in Michigan. We develop two hedonic pricing models using transactions data for two rural residential parcel types: developed parcels located in subdivisions and developed parcels not located in subdivisions. Proximity to lakes and subdivision open areas positively affected the values of some parcel types, while proximity to forested land, publicly owned streams, and a National Scenic River did not have a positive influence. Results found in this study completed in a rural setting contrast with the results of other studies completed in suburban and urban settings.

Keywords: Recreation spending, national visitor use monitoring, economic impact.

(see Corvallis lab order form.)

Ecosystem Structure and Function

Houlahan, J.E.; Currie, D.J.; Cottenie, K.; Cumming, G.S.; Ernest, S.K.M.; Findlay, C.S.; Fuhlendorf, S.D.; Stevens, R.D.; Willis, T.J.; Woiwod, I.P.; Wondzell, S.M.

2007. Compensatory dynamics are rare in natural ecological communities. Proceedings of the National Academy of Sciences. 104(9): 3273–3277.

Hubbell recently presented a theoretical framework, neutral models, for explaining large-scale patterns of community structure. This theory rests on the foundation of zero-sum ecological communities, that is, the assumption that the number of individuals in a community stays constant over time. If community abundances stay relatively constant, (i.e. approximating the zero-sum assumption) there is a key deductive prediction–that on average across the entire community there should be strong negative covariance among species. We have used measures of community covariance to test for zero-sum dynamics in 36 natural communities (at different scales and composed of different taxa) and find that few communities exhibit dynamics consistent with the zero-sum assumption.

Keywords: Neutral models, community dynamics, diversity, competition.

(see Olympia lab order form.)

Kumar, A.; Marcot, B.G.; Saxena, A.

2006. Tree species diversity and distribution patterns in tropical forests of Garo Hills. Current Science. 91(10): 1370–1381.

We analyzed phytosociological characteristics and diversity patterns of tree species of tropical forests of Garo Hills, western Meghalaya, northeast India. The main vegetation of the region included primary forests, secondary forests, and sal (*Shorea robusta*) plantations, with 162, 132, and 87 tree species, respectively. The Shannon-Wiener diversity index (H1) of trees within 21 1-ha belt-transects in primary forest was 4.27, which is comparable to the world's richest tropical forests. Statistical results revealed that primary forests were more tree-rich and diverse than were secondary forests or sal plantations. Results of the study will help forest managers in conservation planning of the tropical forest ecosystem of northeast India.

Keywords: India, tropical forest, tropical trees, forest diversity.

(see Portland lab order form.)

Marcot, B.G.

2007. Biodiversity and the lexicon zoo. Forest Ecology and Management. 246: 4–13.

Ecologists and natural resource managers struggle to define and relate biodiversity, biocomplexity, ecological integrity, ecosystem services, and related concepts; to describe effects of disturbance dynamics on biodiversity; and to understand how biodiversity relates to resilience, resistance, and stability of ecosystems and sustainability of resource conditions. To impart order on this lexicon zoo, a "concept map" framework is suggested for clearly defining biodiversity parameters and related terms, relating biodiversity to ecosystem services and sustainability, describing how disturbance affects biodiversity, and identifying biodiversity parameters for management and monitoring.

Keywords: Ecosystem management, biodiversity, disturbance, ecosystem services, monitoring.

(see Portland lab order form.)

Fire

Donovan, G.H.

2007. Comparing the costs of agency and contract fire crews. Fire Management Today. 67(1): 9–12.

This paper compares the cost of using Forest Service fire crews versus contract fire crews. Results suggest that if sufficient work is available to keep a Forest Service crew productively employed throughout a fire season, then the daily cost of a Forest Service type II crew is lower than the daily cost of a contract crew.

Keywords: Type II fire crew, contact fire crew, wildfire suppression, costs, Oregon, Washington.

(see Portland lab order form.)

Donovan, G.H.; Brown, T.C.

2007. Be careful what you wish for: the legacy of Smokey Bear. Frontiers in Ecology and the Environment. 5(2): 73–79.

Wildfire suppression expenditures and burned area have reached record levels in the last 5 years. This trend has been attributed to a number of factors including a buildup of fuels from a century of aggressive wildfire suppression. Current policy initiatives to address the fuels problem are discussed, problems with the current approach are identified, and alternative policy options are explored.

Keywords: Wildfire, suppression, policy.

(see Portland lab order form.)

Donovan, G.H.; Champ, P.A.; Butry, D.T.

2007. Measuring the efficacy of a wildfire education program in Colorado Springs. Journal of Emergency Management. 5(3): 33–37.

We examine an innovative wildfire risk education program in Colorado Springs, which rated the wildfire risk of 35,000 homes in the city's wildland urban interface. Evidence from home sales before and after the program's implementation suggests that the program was successful at changing homebuyer's attitudes toward wildfire risk, particularly preferences for flammable building materials.

Keywords: Hedonic, fire, Colorado Springs, spatial structure.

(see Portland lab order form.)

Donovan, G.H.; Champ, P.A.; Butry, D.T.

2007. Wildfire risk and housing prices: a case study from Colorado Springs. Land Economics. 83(2): 217–233.

Unlike other natural hazards such as floods, hurricanes, and earthquakes, wildfire risk has not previously been examined using a hedonic property value model. In this article, we estimate a hedonic model based on parcel-level wildfire risk ratings from Colorado Springs. We found that providing homeowners with specific information about the wildfire risk rating of their property has affected housing prices.

Keywords: Hedonic, fire, Colorado Springs, spatial statistics.

(see Portland lab order form.)

Thompson, J.R.; Spies, T.A.; Ganio, L.M.

2007. Reburn severity in managed and unmanaged vegetation in a large wildfire. Proceedings of the Natural Academy of Sciences. 104(25): 10743–10748.

Debate over the influence of postwildfire management on future fire severity is occurring in the absence of empirical studies. We used satellite data, government agency records, and aerial photography to examine a forest landscape in southwest Oregon that burned in 1987 and then was subject, in part, to salvage logging and conifer planting before it reburned during the 2002 Biscuit Fire. Areas that burned severely in 1987 tended to reburn at high severity in 2002, after controlling for the influence of several topographical and biophysical covariates. Areas unaffected by the initial fire tended to burn at the lowest severities in 2002. Areas that were salvage-logged and planted after the initial fire burned more severely than comparable unmanaged areas, suggesting that fuel conditions in conifer plantations can increase fire severity despite removal of large woody fuels.

Keywords: Wildfire, salvage-logging, plantations, reburn, Biscuit fire.

(see Corvallis lab order form.)

Fish

Burnett, K.M.; Reeves, G.H.; Miller, D.J.; Clarke, S.; Vance-Borland, K.; Christiansen, K.

2007. Distribution of salmon-habitat potential relative to landscape characteristics and implications for conservation. Ecological Applications. 17(1): 66–80.

The geographic distribution of stream reaches with potential to support high-quality habitat for salmonids has bearing on the actual status of habitats and populations over broad spatial extents. As part of the Coastal Landscape Analysis and Modeling Study, we examined how salmon-habitat potential was distributed relative to current and future (+100 years) landscape characteristics in the Coastal Province of Oregon.

Keywords: Steelhead, coho salmon, Coastal Landscape Analysis and Modeling Study, landscape characteristics, regional conservation planning, habitat modeling.

(see Corvallis lab order form.)

Ebersole, J.L.; Wigington, P.J.; Baker, J.P.; Cairns, M.A.; Church, M.R.

2006. Juvenile coho salmon growth and survival across stream network seasonal habitats. Transactions of the American Fisheries Society. 135: 1681–1697.

Our objectives for this study were to determine relative abundance and overwinter residency of individually tagged juvenile coho salmon within study locations, including extent of movement between mainstem and tributary habitats; characterize spatial variation in juvenile coho salmon seasonal growth and overwinter survival; relate variation in survival to environmental attributes of the stream network; compare growth rates and coho salmon smolt sizes to winter movement or residency patterns; and identify the relative contribution of fall size of juvenile coho salmon to smolt size and overwinter survival.

Keywords: Coho salmon, growth, survival, juvenile movement, tributaries.

(see Corvallis lab order form.)

Hood, E.; Fellman, J.; Edwards, R.T.

2007. Salmon influences on dissolved organic matter in a coastal temperate brown-water stream: an application of fluorescence spectroscopy. Limnology and Oceanography. 52(4): 1580–1587.

The annual return of spawning Pacific salmon (genus *Oncorhynchus*) can have a dramatic effect on the nutrient budgets of recipient freshwater ecosystems. We examined how spawning salmon affect streamwater concentrations of inorganic nitrogen and phosphorus and dissolved organic carbon (DOC) in Peterson Creek, a salmon stream in southeast Alaska. In the presence of spawning salmon, concentrations of ammonium (NH_4-N) increased by more than 100 times and concentrations of soluble reactive phosphorus (SRP) increased by more than an order of magnitude. In contrast, concentrations of nitrate (NO_3-N) increased by only 2 to 3 times during spawning and were not significantly higher than at an upstream control site with no salmon. Concentrations of DOC were significantly higher in the presence of salmon, and the influx of salmon-derived dissolved organic matter (DOM) altered the fluorescence properties of DOM in Peterson Creek. The fluorescence index, which has previously been used to distinguish between terrestrial and aquatic sources of DOM, increased significantly during the salmon run. Additionally, three-dimensional fluorescence excitation-emission matrices (EEMs) showed that salmon DOM was rich in protein compared to the DOM derived from the terrestrial portion of the watershed. These findings suggest that spawning salmon may be an important source of labile DOM in Peterson Creek and further that fluorescence spectroscopy is an effective tool for identifying and characterizing salmon DOM within the larger streamwater DOM pool.

Keywords: DOM, salmon, stream, fluorescence, EEMS, quality, nutrients.

(see Juneau lab order form.)

Wigington, P.J.; Ebersole, J.L.; Colvin, M.E.; Leibowitz, S.G.; Miller, B.; Hansen, B.; Lavigne, H.; White, D.; Baker, J.P.; Church, M.R.; Brooks, J.R.; Cairns, M.A.; Compton, J.E.

2006. Coho salmon dependence on intermittent streams. Frontiers in Ecology and Environment. 4(10): 513–518.

In this paper, we quantify the contributions of intermittent streams to coho salmon production in an Oregon coastal watershed. We provide estimates of (1) proportion of spawning that occurred in intermittent streams, (2) movement of juveniles into intermittent streams, (3) juvenile survival in intermittent and perennial streams during winter, and (4) relative size of smolts produced from intermittent and perennial streams. This effort is part of a larger study that is examining how coho use habitat in the whole stream network of an Oregon coastal watershed during their freshwater life cycle.

Keywords: Coho, intermittent streams, juvenile movement, juvenile survival.

(see Corvallis order form.)

Forest Management

Cline, M.; Harrington, C.

2007. Apical dominance and apical control in multiple flushing of temperate woody species. Canadian Journal of Forest Research. 37: 74–83.

In young plants of many woody species, the first flush growth in the spring may be followed by one or more flushes of the terminal shoot if growing conditions are favorable. The occurrence of these additional flushes may significantly affect crown form and structure. Apical dominance (AD) and apical control (AC) are thought to be important control mechanisms in this developmental response. A two-phase AD-AC hypothesis for the factors controlling a subsequent flush is presented and evaluated on the basis of currently known studies. The first, very early phase of this additional flush consists of budbreak and the very beginning of outgrowth of the newly formed current buds on the first flushing shoot. There is evidence that this response often involves the release of AD, which is significantly influenced by the auxin:cytokinin ratio as well as by other signals including nutrients and water. The first phase is immediately followed by a second phase,

which consists of subsequent bud outgrowth under the influence of AC. Although definitive data for hormone involvement in this latter process is sparse, there is some evidence suggesting nutritional mechanisms linked to possible hormone activity. Stem-form defects, a common occurrence in multiple-flushing shoots, are analyzed via the AD-AC hypothesis with suggestions of possible means of abatement.

Keywords: Shoot growth, apical dominance, multiple flushing, Douglas-fir.

(see Olympia lab order form.)

Devine, W.D.; Harrington, C.A.

2007. Influence of harvest residues and vegetation on microsite soil and air temperatures in a young conifer plantation. Agricultural and Forest Meteorology. 145: 125–138.

This study examines the effects of bole-only harvesting with and without vegetation control (BO+VC; BO-VC) and total-tree harvesting plus removal of legacy woody debris with vegetation control (TTP+VC) on microsite soil and air temperatures in a young Douglas-fir plantation. Mean soil temperature and the diurnal range in soil temperature during the growing season differed by forest floor microsite in the following sequence: exposed mineral soil > intact forest floor > decaying wood over soil > shade of stumps. Total annual soil degree-day accumulation was 25 to 37 percent greater in the TTP+VC treatment than in the BO+VC treatment; the greatest difference occurred in the year with the warmest springtime air temperature. Vegetation control treatments did not influence soil temperature in the BO harvest treatment. Air temperatures did not differ among microsites.

Keywords: Microclimate, microsite, soil temperature, harvest residue, vegetation.

(see Olympia lab order form.)

Devine, W.D.; Harrington, C.A.

2007. Release of Oregon white oak from overtopping Douglas-fir: effects on soil water and microclimate. Northwest Science. 81(2): 112–124.

Many former Oregon white oak woodland and savanna stands in the coastal Pacific Northwest have been invaded and subsequently overtopped by Douglas-fir during the past century. We examined soil water and microclimate conditions near overtopped oak trees and near oak trees that had been released from Douglas-fir. In each of the three study years, volumetric soil water content declined from ~25 percent to ~10 percent during the early-to-mid growing season near all trees, but this decline was delayed approximately one month in the released condition. Throughfall from May through July was increased by release, particularly during light rain events when Douglas-fir crowns intercepted a substantial fraction of total precipitation. Release from Douglas-fir also increased soil temperature, maximum air temperature, and maximum vapor pressure deficit.

Keywords: Quercus garryana*, Oregon white oak, release, soil water, throughfall, microclimate.*

(see Olympia lab order form.)

Devine, W.D.; Harrington, C.A.; Leonard, L.P.

2007. Post-planting treatments increase growth of Oregon white oak (*Quercus garryana* Dougl. ex Hook.) seedlings. Restoration Ecology. 15(2): 212–222.

The extent of Oregon white oak woodland and savanna ecosystems in the Pacific Northwest has diminished significantly during the past century, and planting of Oregon white oak seedlings is often necessary for restoring these plant communities. Our objective was to evaluate the effects of tree shelters, control of competing vegetation, fertilization, irrigation, and planting date on seedling growth and survival. Although survival rates were generally high, solid-walled tree shelters increased mean annual height growth. Plastic mulch increased soil water content and height growth. Controlled-release fertilizer did not increase seedling growth but weekly irrigation, when accompanied by mulch, increased first-year growth.

Keywords: Quercus garryana*, Oregon white oak, regeneration, restoration.*

(see Olympia lab order form.)

Haynes, R.W.

2007. Integrating concerns about wood production and sustainable forest management in the United States. In: Deal, R.L.; White, R.; Benson, G.L., eds. Sustainable forestry management and wood production in a global economy. Binghamton, NY: Haworth Food and Agricultural Products Press: 1-18. Published simultaneously in Journal of Sustainable Forestry. 24(1): 1–18.

The implementation of Sustainable Forest Management (SFM) in the United States is strongly influenced by U.S. forest products markets and the numerous management decisions made by individual landowners and managers. These decisions are influenced by a mix of market incentives and regulatory actions reducing predictability in assessing progress towards SFM and causing some proponents of SFM angst because prices might provide insufficient incentive for what they believe are necessary forest practices. At the same time, conservation proponents

are advocating forest management regimes that lead to reduced financial returns. These dual concerns are leading to new alliances and new approaches for forest-based conservation and management.

Keywords: Forest management, conservation, sustainability

(see Portland lab order form.)

Johnson, K.N.; Bettinger, P.; Kline, J.D.; Spies, T.A.; Lennette, M.; Lettman, G.; Garber-Yonts, B.; Larsen, T.

2007. Simulating forest structure, timber production, and socioeconomic effects in a multi-owner province. Ecological Applications. 17(1): 34–47.

In this study, we attempt to integrate two prevailing approaches to policy analysis (stand vegetative complexity and spatial landscape complexity) to assess forestry management trends and policy in a multiownership province in Oregon. Our major objectives are (1) to assess how the forest land base might change in the future because of rural and urban development; (2) to assess how recently enacted forest policies, designed to maintain or restore forest biodiversity, affect forest structures, timber harvest levels, and associated timber-related income and employment at the province scale; and (3) to evaluate the implications of alternatives to current forest policies that attempt to further enhance biodiversity.

Keywords: Landscape simulation, landowner behavior, policy effects.

(see Corvallis lab order form.)

Monserud, R.A.; Zhou, X.

2007. Changes in wood product proportions in the Douglas-fir region with respect to size, age, and time. Journal of Sustainable Forestry. 24(1): 59–83. Sustainable Forestry Management and Wood Production in a Global Economy. Deal, R.L.; White, R.; Benson, G.L., eds. Binghampton, NY: Haworth Press: 59–83.

We examine both the variation and the changing proportions of different wood products obtained from trees and logs in the Douglas-fir region of the Northwestern United States. Analyses are based on a large product recovery database covering over 40 years of recovery studies; 13 studies are available for Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco). Visual lumber grades were combined into four broad value classes. We used the multinomial logistic model to estimate the yield proportion of each value class as a function of age, diameter, and their interaction. We also examined changes in wood product proportions with respect to future projections of forest management, harvesting trends, and sustainability. We see a clear shift away from Appearance grades in the 1960s to Construction grades by the late 1980s. This corresponds to a concomitant shift from high-quality old-growth trees to young-growth plantations (age 50 to 60) of much smaller diameter. The projected relative proportions among the four product value classes is not expected to change much over current proportions, with Construction lumber a dominant 70 to 80 percent of the total. Thus, we expect to remain at this new equilibrium, where very little Appearance grade lumber is manufactured in the Douglas-fir region and price premiums have disappeared.

Keywords: Yield proportion, value class, Construction grades, multinomial logistic, Douglas-fir, Pseudotsuga menziesii.

(see Portland lab order form.)

Weiskittel, A.R.; Maguire, D.A.; Monserud, R.A.

2007. Modeling crown structural responses to competing vegetation control, thinning, fertilization, and Swiss needle cast in coastal Douglas-fir of the Pacific Northwest, USA. Forest Ecology and Management. 245: 96–109.

Crown structure is a key variable influencing stand productivity, but its reported response to various stand factors has differed. This can be partially attributed to lack of a unified study on crown response to intensive management or stand health. In this analysis of several Douglas-fir (*Pseudotsuga menziesii* var. *menziesii* [Mirb.] Franco) branch data sets, a significant treatment effect of fertilization, thinning, precommercial thinning, varying levels of vegetation control, and intensity of a foliar disease (Swiss needle cast, caused by *Phaeocryptopus gaeumannii* (T. Rohde) Petr.) were all found to influence several key crown structural attributes. Maximum branch size and total and non-foliated crown radii were found to be the crown variables most dynamic and sensitive to the various stand factors, as no treatment effects were found for the number of branches within an annual segment or branch angle. When the data sets were combined and used to develop a single predictive equation, treatment effects were largely accounted for by changes in bole and crown size, as mean bias was relatively low despite the large range in tree ages examined (4 to 450 years at breast height). Although crown structure is highly variable and sensitive to a variety of stand factors, general empirical equations perform quite well and should be better integrated into models of forest growth and yield.

Keywords: Fertilization, thinning, lumber grade, crown modeling, simulation.

(see Portland lab order form.)

Genetics

Lipow, S.R.; Vance-Borland, K.; St. Clair, J.B.; Henderson, J.A.; McCain, C.

2007. In situ gene conservation of six conifers in western Washington and Oregon. Western Journal of Applied Forestry. 22(3): 176–187.

A gap analysis was conducted to evaluate the extent to which genetic resources are conserved in situ in protected areas for six species of conifers in the Pacific Northwest. The gap analysis involved producing a geographic information system (GIS) detailing the location of protected areas and the distribution and abundance of tree species, as inferred from data on potential plant association groups, actual plant associations, and actual land cover type. The GIS also employed two schemes for stratifying the distribution of each species into genetic populations for analysis: seed zones and ecoregions. The results show that most seed zones and ecoregions contain at least 5,000 mature individuals in protected areas, indicating strong in situ conservation. Protection is less complete, however, for western white pine in the Puget lowlands, where populations are heavily impacted by urbanization and disease. These populations represent the highest priority for additional research into the adequacy of conserved genetic resources. Other species and areas warranting further evaluation include Sitka spruce in some parts of the Puget lowlands, remnant western white pine stands in the Oregon Coast range, and sugar pine within the white pine blister rust zone.

Keywords: Genetic resources, gene conservation, gap analysis, conservation planning.

(see Corvallis lab order form.)

Geomorphology and Hydrology

Clark, S.; Burnett, K.; Christiansen, K.

2003. Comparison of digital elevation models for aquatic data development. Photogrammetric Engineering and Remote Sensing. 69(12): 1267–1375.

Thirty-meter digital elevation models (DEMs) produced by the U.S. Geological Survey are widely available and commonly used for hydrologic modeling. However, these DEMs are of relatively coarse resolution, were inconsistently produced, and lack drainage enforcement. Such issues may hamper efforts to accurately model streams, delineate hydrologic units (HUs), and classify slope. Thus, the Coastal Landscape Analysis and Modeling Study (CLAMS) compared streams, HUs, and slope classes generated from sample 10-meter drainage-enforced (DE) DEMs and 30-meter DEMs. We found that (1) drainage enforcement improved the spatial accuracy of streams and HU boundaries more than did increasing resolution from 30 meters to 10 meters, (2) differences between Level 1 and 2 30-meter DEMs influenced the accuracy of stream and HU lines, and (3) the 10-meter DE-DEMs better represented both higher and lower slope classes.

Keywords: DEM, digital elevation model, stream, slope, hydrologic units, GIS.

(see Corvallis lab order form.)

Henshaw, D.L.; Sheldon, W.M.; Remillard, S.M.; Kotwica, K.

2006. CLIMDB/HYDRODB: a Web harvester and data warehouse approach to building a cross-site climate and hydrology database. In: Piasecki, M., ed. Proceedings of the seventh international conference on hydroscience and engineering. Philadelphia, PA: College of Engineering, Drexel University. 10 p.

Emerging environmental grand challenges demand new scientific approaches that require collaboration and integration of long-term, multisite data across broad spatial and temporal scales. The LTER Network and USFS Experimental Forest Network sites collect extensive long-term ecological, climatological, and hydrological data. LTER and USFS information managers developed C1imDB/HydroDB (http://www.fsl.orst.edu/climhy/) as one approach to improving access to cross-site data. ClimDB/HydroDB is a Web harvester and data warehouse that provides uniform access to common daily streamflow and meteorological data through a single portal.

Keywords: Ecoinformatics, experimental watershed studies, data archive, meteorological measurements, climate data, hydrology data, metadata.

(see Corvallis lab order form.)

Hunt, A.G.; Grant, G.E.; Gupta, V.K.

2006. Spatio-temporal scaling of channels in braided streams. Journal of Hydrology. 322: 192–198.

The spatio-temporal scaling relationship for individual channels in braided streams is shown to be identical to the spatio-temporal scaling associated with constant Froude number, e.g., $F_r = 1$. A means to derive this relationship is developed from a new theory of sediment transport. The mechanism by which the $F_r = 1$ condition apparently governs the scaling seems to derive from the sensitivity of sediment transport to flow fluctuations when $F_r = 1$. The condition $F_r = 1$ is also given a theoretical basis using arguments from surface roughness.

Keywords: Hydrologic processes, sedimentation, channel geomorphology.

(see Corvallis lab order form.)

Lancaster, S.T.; Grant, G.E.

2007. Debris dams and the relief of headwater streams. Geomorphology. 82: 84–97.

In forested, mountain landscapes where debris flows are common, valley-spanning debris dams formed by debris-flow deposition are a common feature of headwater valleys. In this paper, we examine how wood and boulder steps, i.e., debris dams, affect longitudinal profile relief and gradient at the debris-flow-fluvial transition in three sites in the Oregon Coast Range, USA.

Keywords: Debris dams, landscape modeling, topography.

(see Corvallis lab order form.)

Miller, D.J.; Burnett, K.M.

2007. Effects of forest cover, topography, and sampling extent on the measured density of shallow, translational landslides. Water Resources Research. 43: W03433.

We use regionally available digital elevation models and land-cover data, calibrated with ground- and photo-based landslide inventories, to produce spatially distributed estimates of shallow, translational landslide density (number/unit area) for the Oregon Coast Range. We resolve relationships between landslide density and forest cover. We account for topographic variability between sites and landslide detection bias in air-photo mapping. Even so, ratios of landslide density in forest classes differ among sites. We present strategies for subsampling available data to quantify this variability. We find that older forests, when sampled over tens of square kilometers, commonly exhibited the highest landslide densities, but over hundreds of square kilometers, always exhibited the lowest densities averaging 30 percent of that in recently harvested areas and 79 percent of that in younger, managed forests.

Keywords: Debris flows and landslides, human impacts. GIS, uncertainty assessment, model calibration.

(see Corvallis lab order form.)

Harvesting

Christian, L.; Brackley, A.

2007. Helicopter logging productivity on harvesting operations in southeast Alaska, using ecologically based silvicultural prescriptions. Western Journal of Applied Forestry. 22(2): 142–147.

This study examines production rates and costs for felling and helicopter yarding on eight units harvested in accordance with ecologically based silvicultural prescriptions. The units represent five levels of basal area retention. The levels of retention had irregular spatial arrangements caused by gaps and clumps that ranged from 0 percent retention (clearcut) to 75 percent of basal area retained. Turn time, as adjusted to a standardized distance, and turn weight were used as measures of productivity. There were statistically significant differences in adjusted turn time, depending on the treatment. Areas with higher levels of removal tended to have lower adjusted turn times. Average weighted cost per thousand board feet (mbf) harvested was $322. Regardless of differences in turn time or lifted weight, helicopter logging is an expensive method of harvesting timber and should only be applied to areas that support stands with significant volumes of high-quality timber.

Keywords: Logging costs, partial cut, yarding, Tongass.

(see AWURD center order form.)

Dykstra, D.P.

2006. RILSIM (reduced impact logging SIMulator)—three years later. Forest Harvesting Bulletin, Food and Agriculture Organization of the United Nations. 16(Sept. 2006): 3 p.

The reduced-impact logging software package, RILSIM, is designed to permit rapid financial assessment of proposed or actual logging operations that make use of reduced-impact logging technologies and procedures. Three years after the software package was introduced, a total of 1,500 packets containing a CD-ROM and printed user's guide have been distributed around the world and 2,660 copies have been downloaded. Judging from the download stream, demand for the software remains high and the rate of downloads has increased slightly over time. The software and user's guide have been translated into French for use in Africa and into Portuguese for use in Brazil. The user's guide is also being translated into Vietnamese.

Keywords: Forest management, tropical forests, timber harvesting, financial analysis.

(see Portland lab order form.)

Dykstra, D.P.; Kuru, G.; Taylor, R.; Nussbaum, R.; Magrath, W.B.; Story, J.

2006. Technologies for wood tracking: verifying and monitoring the chain of custody and legal compliance in the timber industry. Moscow, Russia: Worldwide Fund for Nature. 68 p. In Russian.

This report examines a range of technologies that are potentially useful for managing the wood supply chain, with particular emphasis on tracking logs from their points of origin in the forest to the facilities where they are processed into primary wood products. The aim of the report is to provide information useful to individuals and organizations responsible for developing, implementing, and maintaining chain of custody systems for wood

products. The document covers issues related to the wood supply and chain of custody; labeling technologies for logs and wood products; and the regulatory environment under which chains of custody are implemented.

Keywords: Chain of custody, timber tracking, log tracking, log branding, bar codes.

(see Portland lab order form.)

History

Herring, M.; Greene, S.E.

2007. Forest of time: a century of science at Wind River Experimental Forest. Corvallis, OR: Oregon State University Press. 200 p.

Throughout the course of the 20th century, the forest science conducted at Wind River expanded and contracted, split and intertwined, as generations of researchers developed new, sometimes conflicting assumptions about the forests in the Pacific Northwest. Science is a story of discovery and blindness, of opportunities taken and missed; and the Wind River forest provides a stage to tell that story. Forest scientists from 100 years ago were just as insightful and just as blind as their counterparts today. The past was not a simpler time for anyone who lived through it. Fast-forwarding through 100 years of science at Wind River, we are humbled by what each generation of scientists learned and accomplished within the context of their times.

Keywords: Forest research, history, experimental forest, silviculture, ecology.

(see Corvallis lab order form.)

Invertebrates

Rykken, J.J.; Moldenke, A.R.; Olson, D.H.

2007. Headwater riparian forest-floor invertebrate communities associated with alternative forest management practices. Ecological Applications. 17(40): 1168–1183.

Invertebrate communities were characterized in unmanaged headwaters, and the effects of clearcutting without buffers and with buffers of approximately 30 m was examined. A near-stream community was distinct and largely retained by the buffers. Elevation, location, and microclimate were predictors of community structure.

Keywords: Invertebrates, headwaters, riparian buffers.

(see Corvallis order form.)

Land Use

Alig, R.J.

2007. A United States view on changes in land use and land values affecting sustainable forest management. Journal of Sustainable Forestry. 24(2/3): 209–227.

With increasing opportunity costs of keeping land in forests because of increasing values for other land uses, such as for developed uses, forest ownership may become less attractive for some landowners and the return on investment less viable for both private and public landowners. This raises the question of what will become of the forests and the resources the forest supports, such as water and wildlife, if owners of the forests find it too costly to manage the forest. Land markets provide evidence on revealed behavior about what people are willing to actually pay for a bundle of rights necessary to gain access to land that can provide forest-based goods and services into perpetuity. However, due to market failures and the nature of some forest land values, markets do not always reveal true forest land values. Allocation of land by use and cover types is a key determinant in sustainable forest management, with changes in land values providing important signals to land managers. Land valuation differs under market-oriented economies, emerging values in transition economies, and administered values in countries with command economies and is influenced by interactions between the environment and humans, including land ownership, use, and management.

Keywords: Land values, land allocation, externalities, deforestation, forest benefits.

(see Corvallis lab order form.)

Cathcart, J.F.; Kline, J.D.; Delaney, M.; Tilton, M.

2007. Carbon storage and Oregon's land-use planning program. Journal of Forestry. June: 167–172.

An important factor regarding forests and carbon is maintaining the amount of land that is retained in forest cover. Since 1973, Oregon's statewide land use planning program has sought to maintain forest and agricultural lands in the face of increasing development by maintaining forest and agricultural zones, and to limit growth to within urban growth boundaries. We combine projections of forest and agricultural land development with estimates of average carbon stocks for different land uses to examine what effect land use planning has had in sequestering carbon in western Oregon. Results indicate significant carbon sequestration benefits in addition to the conservation of forest land.

Keywords: Forest carbon sequestration, ecosystem services, land use change.

(see Corvallis lab order form.)

Ingram, C.D.; Alig, R.J.; Abt, K.L.

2007. The experience of the USA forest sector in cross-sectoral impacts analysis. In: Dube, Y.C.; Schmithusen, F., eds. Cross-sectoral policy developments in forestry. Rome, Italy: Food and Agriculture Organization of the United Nations: 195–203. Chapter 25.

In the United States of America (USA), forest resources, and the land on which they occur, are in themselves multiple-sector production units. Understanding these relationships is an important goal of the stewards of forests and of the public and private planners of sustainable development. We look at various approaches, revealing the challenges of understanding the level and extent of cross-sectoral impacts in the forest sector. Land is the primary mechanism by which policies from one sector influence the forestry sector, and thus land use models are a major tool for cross-sectoral analysis. The outputs of various sectors are linked through employment and income, providing a second tool, input-output analysis. This discussion also highlights some caveats in the development of cross-sectoral analysis for future strategies.

Keywords: Cross-sectoral impacts, cross-sectoral analysis.

(see Corvallis lab order form.)

Kline, J.D.; Moses, A.; Lettman, G.J.; Azuma, D.L.

2007. Modeling forest and rangeland development in rural locations, with examples from eastern Oregon. Landscape and Urban Planning. 80: 320–332.

The risks that wildfires pose for homes and other private property are of major concern for public lands policy and management. Development of private-owned forest and rangelands also can have landscape-level implications relevant to public lands, if accompanying changes in private forest owner behavior effect changes in wildfire and other ecological conditions and processes. We characterize the spatial distribution of forest and rangeland development within three regions of eastern Oregon, to facilitate examining forest and fuel management alternatives to address wildfire and other forest health issues. We develop empirical models describing the spatial distribution of buildings and the construction of new buildings within each region as a function of a population, existing building densities, slope, elevation, and existing land use zoning. We use the empirical models to create geographic information system maps of future building densities and predict the extent of future forest and rangeland development, which can serve as input into vegetation, wildfire, and terrestrial and aquatic habitat analyses.

Keywords: Spatial land use models, landscape change, wildland/urban interface.

(see Corvallis order form.)

Milne, R.; Jallow, B.P.; Arrouays, D.; Beets, P.; Drichi, P.; Harun, I.B.; Hrubovcak, J.; Huffman, T.; Irving, W.; Koehl, M.; Lin, E.; Olsson, L.; Penman, J.; Shibasaki, R.; Turner, B.; Vargas, J.C.; Viglizzo, E.F.; Alig, R.; Apps, M.; Miguez, J.D.

2003. Basis for consistent representation of land areas. In: Penman, J.; Gytarsky, M.; Hiraishi, T.; [et al.], eds. Good practice guidance for land use, land-use change and forestry. International Panel for Climate Change National Greenhouse Gas Inventories Programme. Hayama, Kanagawa, Japan: Institute for Global Environmental Strategies: 2.1–2.29. Chapter 2.

Information about land area is needed to estimate carbon stocks and emissions and removals of greenhouse gases associated with land use, land-use change, and forestry activities. This chapter seeks to provide guidance on the selection of suitable methods for identifying and representing land areas as consistently as possible in inventory calculations. In practice, countries use methods including annual census, periodic surveys, and remote sensing to obtain area data. Starting from this position, chapter 2 provides good practice guidance on three approaches for representing land area. The approaches are intended to provide the area data for estimating and reporting greenhouse gas inventories for different categories of land. The approaches are also intended to make the best use of available data and models, and to reduce, as far as practicable, possible overlaps and omissions in reporting land areas.

Keywords: Remote sensing, ground surveys, climate change.

(see Corvallis lab order form.)

Landscape Ecology

Ohmann, J.L.; Gregory, M.J.; Spies, T.A.

2007. Influence of environment, disturbance, and ownership on forest vegetation of coastal Oregon. Ecological Applications. 17(1): 18–33.

We used spatial predictions from gradient models to examine the influence of environment, disturbance, and ownership on patterns of forest vegetation biodiversity across a large forested region, the Oregon Coast Range (USA). Gradients in tree species composition were strongly associated with physical environment, especially climate, and insensitive to disturbance. In contrast, forest structure was strongly correlated with disturbance measures and only weakly with environmental gradients, and several attributes of forest structure differed among ownerships. Differences among ownerships were blurred, however, by the presence of legacy trees that originated prior to current forest management regimes. The multiownership perspective revealed biodiversity concerns and benefits not readily

visible in single-ownership analyses, and all ownerships contributed to regional biodiversity values. The detailed tree-, stand-, and species-level data in the vegetation maps revealed regional trends that would be masked in traditional coarse-filter assessment. Our findings suggest that regional conservation planning include all ownerships and land allocations, as well as fine-scale elements of vegetation composition and structure.

Keywords: Conservation biology, community structure, environmental gradients, forest composition, forest structure, plant associations, vegetation types, coarse woody debris-terrestrial, disturbance history, landscape analysis, ordination, Landsat TM, regional assessments

(see Corvallis lab order form.)

Pierce, K.B.

2007. Book review: Why does heterogeneity matter? Landscape Ecology. 22: 953–955.

This is a review of the book "Ecosystem function in heterogeneous landscapes" published in 2005. The authors are G. Lovett, C. Jones, M.G. Turner, and K.C. Weathers. It was published by Springer, New York. The book is a synthesis of the 10th Gary conference held at the Institute of Ecosystem Studies in Millbrook, New York, in 2003.

Keywords: Landscape analysis, ecosystem complexity, spatial analysis, ecosystem modeling.

(see Corvallis lab order form.)

Monitoring

Cooper, B.A.; Raphael, M.G.; Peery, M.Z.

2006. Trends in radar-based counts of marbled murrelets on the Olympic Peninsula, Washington, 1996–2004. The Condor. 108: 936–947.

We conducted land-based radar studies of Marbled Murrelets at 3 to 7 sites in the Olympic Peninsula, Washington, in 1996–2002 and 2004 to estimate population changes and to examine relationships between our counts and oceanographic conditions, murrelet productivity, and regional at-sea counts of murrelets. A prospective 20 power analysis indicated that small (2 to 4 percent) annual declines could be detected with reasonably high power (>80 percent) with the current radar sampling design, by extending the study to 11 to 15 years.

Keywords: Brachyramphus marmoratus*, marbled murrelet, northern oscillation, population trends, productivity, radar.*

(see Olympia lab order form.)

Gray, A.N.; Miller, C.

2006. Vegetation change in the Blue River Landscape Study: 1998-2005. Unpublished report on file at USDA Forest Service, 3200 SW Jefferson Way, Corvallis, OR 97331. http://www.fsl.orst.edu/lter/pubs/webdocs/reports/pub4202.pdf. (27 July 2007).

The Blue River Landscape Study (BRLS) is an adaptive management project in the western Cascades of Oregon intended to implement, evaluate, and refine a landscape management strategy based on natural disturbance regimes. This report summarizes the information and results of upland and riparian forest monitoring conducted in harvest units in the different landscape areas. Initial results of treatments implemented to date indicate treatments were implemented as planned, with good survival of remnant trees following prescribed burns. Little effect was seen on vegetation from different riparian buffer treatments. Suggestions for improvements to sampling design and data collection are provided.

Keywords: Monitoring, range of natural variation, riparian forests, understory vegetation.

(see Corvallis lab order form.)

McNay, R.S.; Marcot, B.G.; Brumovsky, V.; Ellis, R.

2006. A Bayesian approach to evaluating habitat for woodland caribou in north-central British Columbia. Canadian Journal of Forestry Research. 36: 3117–3133.

Woodland caribou (*Rangifer tarandus caribou*) populations are in decline throughout much of their range. With increasing development of caribou habitat, tools are required to make management decisions to support effective conservation of caribou and their range. We developed a series of Bayesian belief networks to evaluate conservation policy scenarios applied to caribou seasonal range recovery areas. We demonstrate the utility of the networks to articulate ecological understanding among stakeholders, to clarify and explicitly depict threats to seasonal range values, and to show how simulated forecasts of spatially-explicit seasonal range values can be assessed against landscape potential and compared to range values under natural disturbances.

Keywords: Bayesian belief networks, monitoring, adaptive management, woodland caribou modeling, wolf, moose.

(see Portland lab order form.)

Yang, Z.; Henshaw, D.

2007. Generating EML from a relational database management system (RDBMS). In: Campbell, J.; Grabner, S., eds. LTER DataBits: Information Management Newsletter of the Long Term Ecological Research Network. Spring 2007. http://intranet.lternet.edu/archives/documents/Newsletters/DataBits/07spring/. (19 July 2007).

Metadata standards are essential for both the understanding and interoperability of ecological and environmental data sets. The Ecological Metadata Language (EML) is an open metadata specification and provides a standard syntax (XML) for LTER metadata. Future data integration activities, such as development of a network-wide data set catalog, demands the creation of EML documents for all LTER data. A generalized solution for generating EML from a Relational Database Management System is presented.

Keywords: Metadata standards, data exchange, information systems, environmental data, LTER.

(see Corvallis lab order form.)

Natural Resources Policy

Marcot, B.G.

2007. The quandries and promise of risk management: a scientist's perspective on integration of science and management. The George Wright Forum. 24(2): 30–35.

This paper briefly lists constraints and problems of traditional approaches to natural resource risk analysis and risk management. Such problems include disparate definitions of risk, multiple and conflicting objectives and decisions, conflicting interpretations of uncertainty, and failure of articulating decision criteria, risk attitudes, modeling assumptions, and weaknesses. Solving these problems can entail use of more recent decision-aiding tools and methods for multi-objective decisionmaking, use of methods for rigorously extracting knowledge from multiple experts, and decomposing complex problems into tractable subparts.

Keywords: Decision analysis, risk analysis, risk management, modeling.

(see Portland lab order form.)

McAlpine, C.A.; Spies, T.A.; Norman, P.; Peterson, A.

2007. Conserving forest biodiversity across multiple land ownerships: lessons from the Northwest Forest Plan and the Southeast Queensland Regional Forests Agreement (Australia). Biological Conservation. 135: 580–592.

As the area of the world's forests shrinks, the management of production forests is becoming increasingly paramount for biodiversity conservation. In the United States and Australia, public debate and controversy about the management of production forests during the later decades of the 20th century resulted in governments adopting sweeping top-down changes to forest policy, with regional forest plans a cornerstone of this process. This paper reviews the biodiversity conservation outcomes of two such processes, the Southeast Queensland Forests Agreement (Australia) and the Northwest Forest Plan (United States).

Keywords: Adaptive management, conflict, land ownership, science and policy, sustainable forest management, uncertainty.

(see Corvallis lab order form.)

Spies, T.A.; McComb, B.C.; Kennedy, R.; McGrath, M.T.; Olsen, K.; Pabst, R.J.

2007. Potential effects of forest policies on terrestrial biodiversity in a multiownership province. Ecological Applications. 17(1): 48–65.

We used spatial simulation models to evaluate how current and two alternative policies might affect potential biodiversity over 100 years in the Coast Ranges Physiographic Province of Oregon. This 2.3-million-ha province is characterized by a diversity of public and private forest owners, and a wide range of forest policy and management objectives. We evaluated habitat availability for seven focal species representing different life histories. We also examined how policies affected old-growth stand structure, age distributions relative to the historical range of variability, and landscape patterns of forest types. Under the current policy scenario, the area of habitat for old-growth forest structure and associated species increased over time, the habitat for some early-successional associates remained stable, and the area of hardwood vegetation and diverse early-successional stages declined. The province is projected to move toward but not reach the historical range of variation of forest age classes that may have occurred under the wildfire regimes of the pre-EuroAmerican settlement period. Ownership explained much of the pattern of biodiversity in the province, and under the current policy scenario, its effect increased over time as the landscape diverged into highly contrasting forest structures and ages. Patch type diversity declined slightly overall but declined strongly within ownerships. Most of the modeled change in biodiversity over time resulted from policies on public forest lands that were intended to increase the area of late-successional forests and species. One of the alternative policies, increased retention of wildlife trees on private lands, reduced the contrast between ownerships and increased habitat availability over time for both early- and late-successional species. Analysis of another alternative, stopping thinning of plantations on federal lands, indicated that current thinning regimes improve habitat for the Olive-sided Flycatcher, but the no-thinning alternative had no effect on the habitat scores for the late-successional species

in the 100-year simulation. A comparison of indicators of biological diversity suggests that using focal species and forest structural measures can provide complementary information on biodiversity. The multiownership perspective provided a more complete synthesis of province-wide biodiversity patterns than assessments based on single ownerships.

Keywords: Forest habitat, forest planning, old growth, Oregon Coast Range, wildlife habitat relationships.

(see Corvallis lab order form.)

Plant Ecology

Domec, J.C.; Meinzer, F.C.; Gartner, B.L.; Housset, J.

2007. Dynamic variation in sapwood specific conductivity in six woody species. Tree Physiology. 27: 1389–1400.

Relationships between pressure gradients and flow rates in the xylem are incompletely understood because steady state conductivity coefficients are inadequate for predicting and interpreting flow under the non-steady-state conditions more prevalent in intact trees. The goal of this study was to determine the magnitude of deviation of trunk sapwood specific conductivity (ks) from that predicted by Darcy's law when ks is measured under steady-state vs. non-steady-state conditions. The results represent very significant deviations from flow rates predicted by Darcy's law, and suggest that if these non-linearities of pressure-flux relationships are not taken into account, large errors in model predictions of sap flux, and ultimately tree productivity, will result.

Keywords: Darcy's law, hydraulic architecture, tracheids, vessels, xylem.

(see Corvallis lab order form.)

McCulloh, K.A.; Winter, K.; Meinzer, F.C.; Garcia, M.; Aranda, J.; Lachenbruch B.

2007. A comparison of daily water use estimates derived from constant-heat sap-flow probe values and gravimetric measurements in pot-grown saplings. Tree Physiology. 27: 1355–1360.

The use of Granier-style heat dissipation sensors to measure sap flow is common in plant physiology, ecology, and hydrology. There has been concern that any change to the original Granier design invalidates the empirical relationship between sap flux density and the temperature difference between the probes. We compared daily water use estimates from gravimetric measurements with values from variable-length heat dissipation sensors, which are a relatively new design. In general, the comparison showed the minor changes to the original Granier-type sensors does not affect the empirical relationship used to determine sap flux density.

Keywords: Transpiration, tropical trees.

(see Corvallis Lab order form.)

Renninger H.J.; Meinzer F.C.; Gartner, B.L.

2007. Hydraulic architecture and photosynthetic capacity as constraints on release from suppression in Douglas-fir and western hemlock. Tree Physiology. 27: 33–42.

We compared hydraulic architecture, photosynthesis, and growth in Douglas-fir with that of a shade-tolerant western hemlock. The study was conducted in a site that had been thinned to release suppressed trees, and one that remained unthinned. Release seemed to be constrained initially by photosynthetic capacity in both species. After released trees increased their photosynthetic capacity, hydraulic architecture appeared to constrain further release from suppression in Douglas-fir, and to a lesser extent, western hemlock. There were no significant differences between the above-ground leaf-specific conductivities of suppressed versus released trees of either species, but leaf-specific root conductance was significantly lower in released Douglas-fir.

Keywords: Advance regeneration, carbon isotope ratios, leaf-specific conductivity, root conductance, nitrogen content.

(see Corvallis Lab order form.)

Scholz, F.G.; Bucci, S.J.; Goldstein, G.; Meinzer, F.C.; Franco, A.C.; Miralles-Wilhelm, F.

2007. Biophysical properties and functional significance of stem water storage tissues in Neotropical savanna trees. Plant, Cell, and Environment. 30: 236–248.

Biophysical characteristics of sapwood and outer parenchyma water storage compartments were studied in stems of eight dominant Brazilian Cerrado tree species to assess the impact of differences in tissue capacitance on whole-plant water relations. Both the sapwood and outer parenchyma tissues played an important role in regulation of internal water deficits of Cerrado trees. Relationships between minimum leaf water potential and water storage capacity across the different species suggested that daily fluctuations in water deficits were substantially reduced in species with large capacitance, contributing to the isohydric behavior of Cerrado trees.

Keywords: Capacitance, cerrado, hydraulic architecture, stomata, water potential.

(see Corvallis Lab order form.)

Plant Pathology

Harrington, C.A.; Thies, W.G.

2007. Laminated root rot and fumigant injection affect survival and growth of Douglas-fir. Western Journal of Applied Forestry. 22(3): 220–227.

Laminated root rot caused by *Phellinus weirii* is a significant disease of western conifers, and effective treatments are needed to reduce its impacts on tree growth and survival. This study evaluated the effects of eight fumigation treatments applied to 47-year-old Douglas-fir (*Pseudotsuga menziesii*) trees in northwest Oregon. After 9 years, four of the fumigation treatments had higher tree survival rates than the untreated control, and the growth rates in those four treatments were not significantly different from growth in the surviving control trees. Growth rates in nonfumigated trees were lowest in trees with high infection levels; diameter growth was more impacted by infection level than was height growth.

Keywords: Laminated root rot, Phellinus weirii*, fumigant injection, chemical control, tree growth, survival.*

(see Olympia lab order form.)

Recreation

Kruger, L.E.

2006. Recreation as a path for place making and community building. Leisure/Loisir. 30(2): 383–392.

Social science researchers who study natural-resource-based rural communities are increasingly interested in the attachments people form with natural landscapes and the actions that result from those relationships. Recreation, encompassing outdoor leisure activities engaged in by tourists and seasonal and year-round residents involves a relationship with the land where the activity takes place. This paper highlights trends resulting in increased recreation participation and presents an overview of literature on place, community, and the phenomenon of amenity migration.

Keywords: Recreation, place attachment, community, amenity migration, public land.

(see Juneau Lab order form)

Regional Assessments

Spies, T.A.; Johnson, K.N.; Burnett, K.M.; Ohmann, J.L.; McComb, B.C.; Reeves, G.H.; Bettinger, P.; Kline, J.D.; Garber-Yonts, B.

2007. Cumulative ecological and socioeconomic effects of forest policies in coastal Oregon. Ecological Applications. 17(1): 5–17.

Forest biodiversity policies in multiownership landscapes are typically developed in an uncoordinated fashion with little consideration of their interactions or possible unintended cumulative effects. We conducted an assessment of some of the ecological and socioeconomic effects of recently enacted forest management policies in the 2.3-million-ha Coast Range Physiographic Province of Oregon. This mountainous area of conifer and hardwood forests includes a mosaic of landowners with a wide range of goals, from wilderness protection to high-yield timber production. We projected forest changes over 100 years in response to logging and development using models that integrate land use change and forest stand and landscape processes. We then assessed responses to those management activities using GIS models of stand structure and composition, landscape structure, habitat models for focal terrestrial and aquatic species, timber production, employment, and willingness to pay for biodiversity protection. Many of the potential outcomes of recently enacted policies are consistent with intended goals. For example, we project the area of structurally diverse older conifer forest and habitat for late-successional wildlife species to strongly increase. Other outcomes might not be consistent with current policies: for example, hardwoods and vegetation diversity strongly decline within and across owners. Some elements of biodiversity, including streams with high potential habitat for coho salmon (*Oncorhynchus kisutch*) and sites of potential oak woodland, occur predominately outside federal lands and thus were not affected by the strongest biodiversity policies. Except for federal lands, biodiversity policies were not generally characterized in sufficient detail to provide clear benchmarks against which to measure the progress or success. We conclude that land management institutions and policies are not well configured to deal effectively with ecological issues that span broad spatial and temporal scales and that alternative policies could be constructed that more effectively provide for a mix of forest values from this region.

Keywords: Biodiversity, forest management, landscape patterns, old growth, ownership effects, salmon habitat, timber production, wildlife habitat.

(see Corvallis lab order form.)

Remote Sensing

Arroyo, L.; Healey, S.P.; Cohen, W.B.; Cocero, D.; Manzanera, J.A.

2006. Using object-oriented classification and high-resolution imagery to map fuel types in a Mediterranean region. Journal of Geophysical Research. 111, G04S04, doi:10.1029/2005JG000120.

The focus of this paper is to evaluate the potential of object-oriented processing to discriminate Mediterranean fuel types by using high-resolution QuickBird imagery. The fire-prone forest type in the study area, coupled with a mix of homes and forest exemplify conditions where high spatial resolution may be most valuable in a fuel map. It is hoped that the methods developed and tested in this study will inform and support future high-resolution fuel mapping activities in the Mediterranean and in other regions.

Keywords: Remote sensing, landscape modeling, landscape architecture, fire.

(see Corvallis lab order form.)

Hayes, D.J.; Cohen, W.B.

2007. Spatial, spectral and temporal patterns of tropical forest cover change as observed with multiple scales of optical satellite data. Remote Sensing of Environment. 106: 1–16.

This article describes the development of a methodology for scaling observations of changes in tropical forest cover to large areas at high temporal frequency from coarse-resolution satellite imagery. The approach for estimating proportional forest cover change as a continuous variable is based on a regression model that relates multispectral, multitemporal Moderate Resolution Imaging Spectroradiometer (MODIS) data, transformed to optimize the spectral detection of vegetation changes, to reference change data sets derived from a Landsat data record for a study site in Central America. A number of issues involved in model development are addressed here by exploring the spatial, spectral, and temporal patterns of forest cover change as manifested in the multitemporal spectral data sets.

Keywords: Satellite image change detection, tropical land cover and land use change, MODIS.

(see Corvallis lab order form.)

Kaplan, N.; Gries, C.; Baker, K.; Henshaw, D.; Valentine, T.; Vande Castle, J.

2007. Information management committee: GIS, technology, and changing organizational structures. In: Campbell, J.; Grabner, S., eds. LTER DataBits: Information Management Newsletter of the Long Term Ecological Research Network. Spring 2007. http://intranet.lternet.edu/archives/documents/Newsletters/DataBits/07spring/. (19 July 2007).

The Long-Term Ecological Research (LTER) Information Management Committee (IMC) is challenged to better facilitate achievement of integrative science as put forth in the LTER strategic research plan, "Integrative Science for Society and Environment." The IMC considers organizational strategies to improve collaboration and coordination of activities across the diverse community of information managers, geographic information systems and information technology professionals. Planning and communication with other informatics and science disciplines is essential as IMC responsibilities expand to include spatial data issues and sensor technologies.

Keywords: Information management, GIS, remote sensing, LTER, program administration.

(see Corvallis lab order form.)

Pflugmacher, D.; Krankina, O.N.; Cohen, W.B.

2006. Satellite-based peatland mapping: potential of the MODIS sensor. Global and Planetary Change. 56: 248–257.

Peatlands play a major role in the global carbon cycle but are largely overlooked in current large-scale vegetation mapping efforts. In this study, we investigated the potential of the Moderate Resolution Imaging Spectroradiometer (MODIS) sensor to capture extent and distribution of peatlands in the St. Petersburg region of Russia.

Keywords: Organic matter, Landsat TM.

(see Corvallis lab order form.)

Turner, D.P.; Ritts, W.D.; Styles, J.M.; Yang, Z.; Cohen, W.B.; Law, B.E.; Thornton, P.E.

2006. A diagnostic carbon flux model to monitor the effects of disturbance and interannual variation in climate on regional NEP. Tellus. 58B: 476–490.

Regional net ecosystem production (NEP) was monitored over a 10.9×10^4 km^2 forested area in western Oregon USA for 2 years (2002–2003) using a combination of remote sensing, distributed meteorological data, and a carbon cycle

model (Fusion). Diagnostic modeling approaches of this type can provide independent estimates of regional NEP for comparisons with inversion or boundary layer budget approaches based on CO_2 concentration measurements.

Keywords: Ecosystem modeling, carbon, climate, fire.

(see Corvallis lab order form.)

Silviculture

Greene, S.; Bruner, H.; O'Connell, K.

2006. Permanent plots in natural stands in the Pacific Northwest. In: Irland, L.C.; Camp, A.E.; Brissette, J.C.; Donohew, Z.R., eds. Long-term Silvicultural and Ecological Studies; Results for Science and Management. GISF Research Paper 005. New Haven, CT: Yale University, School of Forestry and Environmental Studies, Global Institute of Sustainable Forestry: 176–181.

This paper is one of a set that reports on long-term silviculture and ecological studies across the United States. Our paper describes the permanent plot system, primarily in Oregon and Washington, which is managed by the Ecosystems Team of the Pacific Northwest Research Station in conjunction with the Oregon State University Forest Science Databank and the H.J. Andrews LTER. The plots are all in natural stands that span a variety of age classes and ecological types throughout Oregon and Washington. Types of data and their use and application by managers and modelers throughout the region and across the United States are described.

Keywords: Permanent plots, long-term studies, tree measurements, Forest Science Databank, growth and yield.

(see Corvallis lab order form.)

Hummel, S.S.; Calkin, D.E.; Barbour, R.J.

2007. Landscape silviculture for late-successional reserve management. In: Powers, R.F., ed. Restoring fire-adapted ecosystems: proceedings of the 2005 national silviculture workshop. Gen. Tech. Rep. PSW-GTR-203. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station.

Silvicultural treatments to manage fire behavior affect both forest values that can be priced (market) and those that cannot (nonmarket). When the purpose of the treatments is to benefit a nonmarket value, evaluating their net effect is complicated by difficulties in assessing their total cost. Production possibility (PP) curves illustrate the relative cost, or tradeoffs, of managing for a nonmarket value in terms of market or nonmarket values. We combined simulation and optimization models to schedule treatments that reduce fire threat (FT) and maintain late-successional forest (LSF) habitat structure for the northern spotted owl (*Strix occidentalis caurina*) over 30 years in a 6070-ha forest reserve. We evaluated the tradeoffs between reducing FT and maintaining LSF structure by constructing a set of PP curves. Results suggest that at low and moderate levels of LSF habitat structure in the reserve, treating non-LSF units is as effective in reducing fire threat as is treating LSF units. In this range, the treatments have a small effect on owl habitat. In contrast at high levels of LSF habitat structure, treating some LSF units could reduce fire threat in the reserve. In this range, treatments come at a cost to owl habitat. The financial implications of silvicultural treatments need to be evaluated at scales relevant to fire and owls. We thus evaluated net present revenues (NPV) for the collection of treatment units in the reserve over 30 years instead of for each unit in each decade. Results indicate that a mixture of treatments—some of which earned money and some of which lost money in an individual unit—resulted in the lowest cost to the nonmarket values of LSF habitat structure and fire threat reduction. If breaking even (NPV=0) was required for all units within each decade, rather than over 30 years, the cost was similar to requiring that treatments earn $0.5 million NPV. This implies that constraining the time period within which the financial effect of the treatments is evaluated imposed a cost on the nonmarket values in the reserve.

Keywords: Wildfire, fuel management, thinning, climate change, fire history, resilience.

(see Portland lab order form.)

Social Sciences

Patterson, T.M.; Bastianoni, S.; Simpson, M.

2006. Tourism and climate change: two-way street, or vicious/virtuous circle. Journal of Sustainable Tourism. 14(4): 339–348.

This paper presents a knowledge management diagram designed to reconcile two conceptual approaches relating tourism and climatic change. A knowledge management framework is proposed to counter the tendency of scientists, policymakers, the tourism industry and nongovernmental organizations to polarize two conceptual approaches. Using the diagram, tourism researchers can place their studies within broader spatial and disciplinary contexts. This format provides the basis for gap analysis and knowledge management, which can inform and direct future studies on tourism and sustainability.

Keywords: Climate change, conceptual model, sustainability, knowledge management.

(see Juneau lab order form.)

Patterson, T.M.; Niccolucci, V.; Bastianoni, S.

2007. Beyond "more is better": ecological footprint accounting for tourism and consumption in Val di Merse, Italy. Ecological Economics. 62: 747–756.

Habits of conservation, consumption, and recycling are important determinants of economic throughput. Provincial governments interested in tourism's role in a diverse, steady-state economy may wish to orient tourism development around the tourist segments with less intensive consumption habits. We estimate consumption of energy and materials by tourists vacationing in Val di Merse, a rural region of Tuscany, Italy. We compare tourists and their host population by means of a consumption-based indicator, the ecological footprint. The average tourist is often thought to consume more on vacation than at home, and often more than local residents, but our estimate of the tourist footprint as an equivalent resident (5.28 gha) is similar to that estimated for residents (5.47 gha), excluding air travel. Planning and management considerations are discussed.

Keywords: Ecological footprint, tourism, consumption.

(see Juneau lab order form.)

Stedman, R.; Amsden, B.L.; Kruger, L.E.

2006. Sense of place and community: points of intersection with implications for leisure research. Leisure/Loisir. 30(2): 393–404.

Our paper explores the points of contrast and intersection between two theories that have been used to understand the relationships between people and locales: sense of place and community theory. We distil crucial elements from each approach: for sense of place we include settings characteristics, behaviors, symbolic meanings, and evaluations such as attachment and identity. We use the interactional approach to represent community theory, and thus include ecology, society, and action components. We create and introduce a matrix that intersects these elements and find that much common ground exists: there is significant potential for cross fertilization between the approaches. The utility of the approach is illustrated by using public participation as an example topic of interest to resource and recreation managers.

Keywords: Place, community, public participation.

(see Juneau Lab order form.)

Soil

Fellman, J.B.; D'Amore, D.V.

2007. Nitrogen and phosphorus mineralization in three wetland types in southeast Alaska, USA. Wetlands. 27(1): 44–53.

To improve our ability to predict how different wetland soils cycle nutrients, it is necessary to gain an understanding of nitrogen (N) and phosphorus (P) net mineralization rates. As information on mineralization rates in southeast Alaska is limited, this study will improve our ability to predict how different wetlands affect soil nutrient processing. Net N and P mineralization rates were measured both in situ and via lab incubations to evaluate both actual and potential mineralization rates in three wetland types: bogs, forested wetlands, and riparian wetlands. Soil pH was an important controlling variable for both net N and P mineralization rates and soil phosphorus content significantly influenced net P mineralization rates. In situ net mineralization rates ranged from 410 to 1,710 µg N/kg soil per day for N and from 2 to 27 µg P/kg soil per day for P after 56 days. Lab incubations revealed mineralization potentials were 2 to 3 times greater than in situ rates. Net N and P mineralization potentials were greatest in the riparian wetlands and were significantly different from the bogs and forested wetlands. In contrast, the bogs mineralized a greater proportion of the total N and P soil pool (µg nutrient mineralized per gram nutrient) and indicates greater internal nutrient cycling within bogs. These results suggest that different wetland types of southeast Alaska process N and P differently and these wetland types should be evaluated separately in future evaluations of wetland ecosystem function.

Keywords: Biogeochemistry, bog, forested wetland, nitrification, riparian wetland.

(see Juneau lab order form.)

Watershed Analysis

Benda, L.; Miller, D.; Andras, K.; Bigelow, P.; Reeves, G.; Michael, D.

2006. NetMap: a new tool in support of watershed science and resource management. Forest Science. 53(2): 206–219.

In this paper, we show how application of principles of river ecology can guide use of a comprehensive terrain database within geographic information GIS to facilitate watershed analysis relevant to natural resource management. We present a unique arrangement of a terrain database, GIS, and principles of riverine ecology for the purpose of advancing

watershed analysis and natural resource management, including forestry, restoration, monitoring, and regulation.

Keywords: Watershed analysis, GIS, river ecology.

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Wildlife

Marcot, B.G.

2006. Habitat modeling for biodiversity conservation. Northwestern Naturalist. 87: 56–65.

Habitat models address only one aspect of biodiversity but can be useful in addressing and managing single or multiple species and ecosystem functions, for projecting disturbance regimes, and in decision-support. I review categories and examples of habitat models and their utility for biodiversity conservation and roles in decision-support systems. I suggest use of influence diagrams in structuring causal webs, and structural equation modeling to quantify relations, as a general framework for building models of habitat from which known degree of inference can be made to biodiversity parameters.

Keywords: Biodiversity conservation, habitat modeling, indicators, surrogates, multispecies, influence diagrams.

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Marcot, B.G.

2007. Owls in native cultures of central Africa and North America. Tyto Newsbrief. 11(March): 5–9.

This article presents stories of how owls are viewed by some modern native cultures of central Africa (Democratic Republic of Congo) and North America (Southwest United States and British Columbia). Owls are viewed in both areas as harbingers of bad news, ill health, and death. Only the males of African wood owls are viewed as bringing such prophecy, in the African cultures. References for further reading are provided.

Keywords: Owls, African wood owls.

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Marcot, B.G.

2007. Unique songs of African wood-owls (*Strix woodfordii*) in the Democratic Republic of Congo. Gabar. 18(1): 16–24.

Statistical analysis of African wood-owl (*Strix woodfordii*) song spectrograms suggest a significantly different song type in Democratic Republic of Congo (DRC), central Africa, than elsewhere in eastern or southern Africa. Songs of DRC owls tend to be consistently shorter in duration and more monotone in overall frequency range. The first note is either absent or is very soft and slightly lower in frequency than the second note in DRC owls, compared with owls found elsewhere whose first note was prominent, loud, and much higher in frequency than the second note. Also, male owls in DRC sing at a higher frequency than do male owls elsewhere. Further study is needed to determine biogeographic, behavioral, and taxonomic context and causes.

Keywords: African wood-owl, bird song, owl vocalizations, Strix woodfordii*, Congo.*

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Olson, D.H.; Nauman, R.S.; Ellenburg, L.L.; Hansen, B.P.; Chan, S.S.

2006. *Ensatina eschscholtzii* nests at a managed forest site in Oregon. Northwestern Naturalist. 87: 203–208.

The first *Ensatina* nests are described for Oregon. Fourteen nests were found during implementation of a forest density management project, seven before and seven after harvest. Nest detections are presented relative to search effort, salamander capture rates, and downed wood availability.

Keywords: Ensatina*, salamander, nests, downed wood, relative abundance, forest management.*

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Rundio, D.E.; Olson, D.H.

2007. Influence of headwater site conditions and riparian buffers on terrestrial salamander response to forest thinning. Forest Science. 53(2): 320–330.

We examined the effect of forest thinning and riparian buffers along headwater streams on terrestrial salamanders at two sites in western Oregon. Salamander numbers were reduced postthinning at one site with lower down wood volume. Terrestrial salamander distributions along stream-to-upslope transects suggest benefits of one and two site-potential tree-height stream buffers for upslope species.

Keywords: Amphibians, density management, down wood, cover use, refugia.

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Sagar, J.P.; Olson, D.H.; Schmitz, R.A.

2007. Survival and growth of larval coastal giant salamanders (*Dicamptodon tenebrosus*) in streams in the Oregon Coast Range. Copeia. 1: 123–130.

The purpose of this study was to estimate the variation in growth and survival that occur during the larval stage of *Dicamptodon tenebrosus*. We used mark-recapture to assess the rates of apparent survival and growth for two larval age classes (first-years and second/third-years), in winter and summer seasons and in the presence of culverts. By estimating the capture probability of larval *D. tenebrosus*, we also attempted to provide more accurate estimates of survival than simple recapture rates.

Keywords: Dicamptodon*, salamander, mark-recapture, survival.*

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