

# Western Forester

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## NCASI Brings Good Science to Environmental Issues



PHOTO COURTESY OF GEORGE ICE, NCASI

**Flume experiments in 1979 at Weyerhaeuser Company's Kalama Springs Field Laboratory on intrusion of fine sediment into stream gravels.**

BY ALAN LUCIER, GEORGE ICE,  
LARRY IRWIN AND BEN WIGLEY

The National Council for Air and Stream Improvement (NCASI) is the environmental research arm of the forest products industry. The industry established NCASI in 1943 to assist in reducing environmental impacts of effluents from pulp and paper mills. NCASI accelerated the development



**Alan Lucier**



**Ben Wigley**

and deployment of effluent treatment systems by organizing collaborative research and technical information exchanges. Environmental impacts were reduced substantially in a cost-effective manner.

Today, NCASI addresses a wide range of environmental information needs for 83 member companies engaged in pulp and paper, building products and forestry businesses in the United States and Canada. NCASI creates value for its members and society by bringing good science to environmental issues. Keys to success are commitment to scientific excellence and understanding of the environmental information needs of decision

makers in industry and government.

In 2006, NCASI's largest program is Forest Environment and Sustainability (FES). NCASI dues funding for FES is approximately \$3 million per year. This core funding is "leveraged" through supplemental funding mechanisms and cost-sharing arrangements so that total funding support for FES research is greater than \$15 million per year. A substantial portion of NCASI's forestry research is conducted in the Northwest because of the region's important roles in wood production and environmental policy.

Task groups comprising representatives of member companies and their associations set FES priorities through NCASI's annual budget process. Priorities evolve with industry information needs. NCASI's first forestry studies in the mid 1970s were designed to assist the industry with implementation of nonpoint source control provisions of the Federal Water Pollution Control Amendments of 1972. Current FES priorities include forest watersheds and wetlands, threatened and endangered species (T&E), silvicultural chemicals, sustainable forest management, biodiversity, climate change and forest carbon, resource monitoring and assessment, and long-term site productivity.

Support from member companies and effective collaboration with the forestry research community have been foundations of the FES program from the beginning. For example, Weyerhaeuser Company and Oregon State University (OSU) were partners in an early FES investigation of sediment intrusion into stream gravels. That study was conducted at Weyerhaeuser's Kalama Springs Field Laboratory near

(CONTINUED ON PAGE 2)

**In This Issue: NCASI Forest Environment and Sustainability Program**

## NCASI Brings Good Science

(CONTINUED FROM FRONT PAGE)

Mount St. Helens by Bob Beschta with OSU and his student, Bill Jackson. Over the past 25 years, NCASI has organized or supported many field studies conducted as partnerships among private landowners, agencies and universities.

Positive impacts of NCASI's good science are illustrated in the following examples.

**Best Management Practices (BMPs).** NCASI technical studies have played important roles in the forestry community's efforts to evaluate and improve the effectiveness of BMPs. Results have supported continuous improvement in state programs for controlling forestry nonpoint sources and have helped forest managers achieve cost-effective improvements in environmental performance. Moreover, NCASI's efforts to document BMP effectiveness and continuous improvement have had significant positive impacts on forest and envi-

ronmental policies. Ongoing studies by NCASI and cooperators are testing the effectiveness of current BMPs. The New Alsea Watershed Study, for example, will measure the environmental effects of contemporary harvesting and management conducted under the Oregon Forest Practices Act. It will be interesting to compare effects of contemporary practices with effects observed in the original Alsea Watershed Study during the 1960s.

**Northern Spotted Owl.** Listing of the northern spotted owl as a threatened species triggered a remarkable sequence of events with profound impacts on forestry, wood supplies and the forest products industry in the Pacific Northwest. Most research on the spotted owl was started after listing and important results came too late to inform some critical policy decisions during the 1990s. Nevertheless, NCASI and others have supported long-term studies that have produced major improvements in scientific understanding and management options for the spotted owl. New policy delibera-

tions regarding the owl in 2006 are expected to incorporate many of these improvements.

### *Threatened and Endangered*

**Species.** With the spotted owl experience in mind, NCASI has developed a reliable process for identifying and addressing industry information needs related to T&E species. The core of the process is ongoing communication and technical information exchange among wildlife biologists in industry, agencies and universities. Effective scientific networking helps NCASI identify and fill critical information needs while there is still time to inform fundamental policy decisions. In some cases, good science reveals species conservation options that make listing unnecessary. In other cases, good science enables cost-effective conservation strategies for listed species.

### *Biodiversity and Sustainable*

**Forestry.** A fundamental challenge to the concept of sustainable forestry is the popular notion that managed forests are "biological deserts" (i.e., have little or no value as wildlife habitat). NCASI's network of cooperative studies in major forest regions has already demonstrated that managed forests actually make important contributions to sustaining wildlife populations including many species with high conservation priority. Current research is focused on testing options for enhancing biodiversity in managed forests. For example, NCASI is conducting a major field study in the Pacific Northwest entitled "The Role of Retained Structures for Conserving Wildlife Habitat and Biodiversity in Managed Forests." The term "retained structures" refers to snags, downed wood, slash piles, patches of advanced regeneration and other structural elements. Study objectives are: (1) characterize the quantity, physical habitat attributes, and functionality of retained structures in and adjacent to final harvest units at sites in the Pacific Northwest; (2) determine the fates of retained structures over time and assess if they are functioning as essential wildlife habitat and contributing to community diversity; (3) describe and



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## Next Issue: Healthy Forests Initiative Update

quantify the use of retained structures by wildlife relative to placement on the landscape; and (4) assess the extent to which characteristics of retained structures and their configuration (e.g., clumped, scattered, embedded within vegetation patches) can be used to model the occurrence or abundance of wildlife and plants. This study is part of a research initiative on biodiversity in managed forests being conducted by NCASI's Western Wildlife Program with core support from American Forest Resource Council, Oregon Forest Industries Council, Washington Forest Protection Association and NCASI.

The articles that follow in this issue provide more details about selected aspects of NCASI's Forest Environment and Sustainability Program. Like many of you, we are optimistic about the future of forestry and timber production in the West and other parts of the world. Timber production is the solar-powered engine for forest-based industries that help meet human needs for shelter, communications, personal hygiene, artistic expression, packaging, recreation and fuel. Managing environmental aspects of timber production responsibly and proactively is an essential element of sustainable forestry. NCASI is proud to play a small, but important role by providing reliable technical information on environmental and sustainability topics to timber producers, wood buyers and other stakeholders.

NCASI publishes *Forestry Environmental Program News* to provide member companies and others with current information about NCASI research and related topics. This monthly newsletter now goes to almost 1,500 readers free of charge. If you wish to receive this newsletter, please contact [publications@ncasi.org](mailto:publications@ncasi.org). ♦

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# Forest Watershed Program Develops Tools to Achieve Water Quality Goals

BY GEORGE G. ICE

**W**ater and its beneficial uses has always been an important issue for the public. Maryanne Reiter, in the feature article from the March/April 2005 issue of *Western Forester*, pointed out that water quality is consistently rated as one of the top environmental concerns in public surveys in the Pacific Northwest. Therefore it is not surprising that the Forest Watershed Program is the oldest of NCASI's environmental forestry programs, dating back to 1977. It was spawned by the need for technical information about forest management impacts on water quality to respond to emerging nonpoint source programs under the 1972 Federal Water Pollution Control Act Amendments (also known as the Clean Water Act). This article provides a brief overview of the Forest Watershed Program and key strategies designed to help member companies achieve their environmental goals for forest watersheds.

Whether forests are managed or in conservation reserves, they usually produce higher quality water than other land uses. The public looks to forests to produce consistently high quality water



and abundant fisheries, and holds forest managers to a high level of performance. Timber management and forest road building can result in undesired impacts to water quality, and the forestry community has developed Best Management Practices (BMPs) and forest practices rules to sensibly reduce these impacts. Consistent application of BMPs is necessary for success, as repeatedly demonstrated by state surveys of silvicultural nonpoint source control programs ([www.stateforesters.org/reports.html](http://www.stateforesters.org/reports.html)). The NCASI Forest Watershed Program has addressed many issues over nearly 30 years, but three key themes of the program are: (1) testing of BMP effectiveness; (2) identifying realistic performance measures; and (3) developing tools that can allow managers to assess alternative management options and their impacts on water quality.

## BMP Effectiveness

NCASI's foundations are built on providing member companies with the technical information and research they need to solve environmental problems. BMPs represent practical steps that can be taken to reduce water quality impacts. At the core of the NCASI Forest Watershed Program is the need to identify the effectiveness of BMPs. There are often several approaches to reducing water quality impacts, so the effectiveness of these alternatives needs to be tested. It can also be important to demonstrate BMP effectiveness to the public and to agencies.

One of the classic tests of BMP effectiveness was the original Alsea



PHOTO COURTESY OF CODY HALE, OREGON STATE UNIVERSITY

**Turbidity probe and sediment sample intake as part of a revisit of the Alsea Watershed Study to compare water quality impacts with and without the Oregon Forest Practices Act.**

Watershed Study near Toledo, Oregon, from 1958 to 1972. That study compared the impacts of timber harvesting with and without riparian buffers using a paired watershed approach. In the watershed without buffers, streamwater temperatures were severely elevated and dissolved oxygen concentrations in the stream plummeted to levels that could not sustain fish. The stream in the watershed with buffers experienced almost undetectable changes in temperatures and dissolved oxygen concentrations. These results showed that by altering management practices, water quality impacts can be minimized.

The amazing resilience of forests in this region is demonstrated by the regrowth of the forests in the clearcut watershed from the original Alsea Watershed Study. NCASI, in cooperation with Plum Creek Timber Company, Oregon State University, USDA Forest Service and Colorado State University, is now re-establishing monitoring in these watersheds to test the water quality impacts of contemporary forest management under the rules of the Oregon Forest Practices Act. What can we expect?

Watershed studies comparing historic and contemporary forest practices



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conducted elsewhere suggest that we can expect dramatic improvements in water quality today. In the 1970s, one of the fathers of forest hydrology, John Hewlett with the University of Georgia, conducted a test of water quality impacts from “loggers choice” timber harvesting. Hewlett concluded that although the impacts were temporary and mild compared to alternative land use activities, they could have been reduced by taking just three steps: (1) better construction and maintenance of roads; (2) adequate streamside management zones; and (3) hand planting to avoid disturbing gullies with machine planters. With these three BMPs, Hewlett predicted a 90 percent reduction in first-year sediment losses from the watershed. Tom Williams with Clemson University and colleagues recently conducted that experiment in the Piedmont with BMPs and found exactly what Hewlett predicted: about a 90 percent reduction in first-year sediment impacts. Other tests throughout the United States show that BMPs can be remarkably effective in reducing water quality impacts.

Where erosion and sediment problems are identified, forestland managers can choose a number of control options to address them. Some are listed in the *Control and Mitigation Handbook* developed by NCASI, which compares the effectiveness and cost of alternative methods of control for water quality impacts as well as what conditions may limit or enhance a control option ([www.ncasi.org/Publications/Detail.aspx?id=2621](http://www.ncasi.org/Publications/Detail.aspx?id=2621)). EPA's 2005 *National Management Measures to Control Nonpoint Source Pollution from Forestry* is another source of information ([www.epa.gov/owow/nps/forestrygmt/](http://www.epa.gov/owow/nps/forestrygmt/)).

### Performance Measures

BMPs are designed to achieve the goal of reducing water quality impacts from management practices, but there is always a question about what reduction is sufficient to achieve protection of beneficial uses. Despite our perception that forests provide uniformly high-quality water, we have found that watershed performance measures, such as wood recruitment or water quality criteria, can be unachievable for natural reasons. In fact, this diver-

sity of conditions may promote aquatic biological diversity. For example, NCASI-sponsored research on wood recruitment found that forest streams east of the Cascades may naturally have lower levels of large wood than westside streams. In a past issue of the *Western Forester* we described a synthesis of the literature on nutrient (nitrogen and phosphorus) concentrations for forest watersheds throughout the United States and forest stream temperatures in the Pacific Northwest. In both cases, and in a similar case for dissolved oxygen concentrations in northern Louisiana, we found that even “least impaired” streams often cannot achieve existing or proposed water quality criteria. Performance measures must always be tested by determining what is achievable for site-specific conditions and what is

biologically relevant to the aquatic organisms we are trying to protect.

Complicating this assessment of performance measures is the role of natural disturbance patterns such as wildfire and how this overlays on habitat and water quality conditions. Additional information on NCASI research on performance measures can be found at [www.ncasi.org/programs/areas/forestry/watershed/realistic\\_goals.aspx](http://www.ncasi.org/programs/areas/forestry/watershed/realistic_goals.aspx).

### Assessment Tools

Watershed studies are costly, time consuming and difficult to conduct, and their findings need to be translated to the site-specific conditions found in other watersheds. Another component of the NCASI Forest Watershed Program is support for development of assessment tools.

For example, there are concerns that

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roads can intercept subsurface flow and route it rapidly to streams, resulting in increased peak flows. NCASI supported work at the University of Washington and Battelle Northwest Laboratories to develop a spatially explicit model, the Distributed Hydrology Soil and Vegetation Model (DHSVM), which can test how roads and timber harvesting influence runoff at both the site and watershed scales. The model runs a complete water balance on pixels across a watershed, routes water into the soil profile and downslope, and routes runoff downstream after it emerges as stream flow. More information on this model can be found at [www.hydro.washington.edu/Lettenmaier/Models/DHSVM/](http://www.hydro.washington.edu/Lettenmaier/Models/DHSVM/).

There is a common understanding among forest hydrologists that 20 percent of the road network causes 80 percent of the sediment runoff. By treating this 20 percent, sediment impacts to streams can be dramatically reduced. NCASI helped support development of a road sediment model, SEDMODL2, that can be used to identify these high sediment-contributing road segments. We are now working with member companies, USDA Forest Service and Watershed GeoDynamics to compare this and other road sediment models to existing sediment data to see how they perform. More information on this and other predictive tools is available at [www.ncasi.org/programs/areas/forestry/watershed/predictive\\_tools.aspx](http://www.ncasi.org/programs/areas/forestry/watershed/predictive_tools.aspx).

Historically, the highest concentra-



PHOTO COURTESY OF GEORGE ICE, NCASI

**A riparian management area left under the Oregon Forest Practices Act. NCASI forest watershed research is assessing how riparian buffers moderate changes in suspended sediment, temperature and even silvicultural chemical concentrations of streams adjacent to forest management activities.**

tions of herbicides in forest streams resulted from overspray or inadvertent drift of fine droplets from aerial applications. Work by the USDA Forest Service, Spray Drift Task Force, EPA, NCASI and others has resulted in models that can be used to determine how best to avoid drift to streams. Information is available at [www.agdrift.com/AgDRIFT2/DownloadAgDrift2\\_0.htm](http://www.agdrift.com/AgDRIFT2/DownloadAgDrift2_0.htm). Controls can include the use of nozzles that produce large, quick-falling drops, and application limits for height of application and meteorology. Because we better understand the equipment and application conditions necessary to reduce drift, and because forest operators avoid direct overspray of waterbodies, concentrations of chemicals found in streams immediately after herbicide applications are typically much less than those detected in the 1970s. Research supported by NCASI in Texas, Georgia and Oregon is helping us understand how to minimize herbicide delivery to streams and the fate of these chemicals in watersheds.

#### Synthesis of Program Goals

BMPs are a balance between the

need to control water quality impacts and the need to be practical and economically sustainable. With work such as the Alsea Watershed Study, we can demonstrate that current BMPs reduce water quality impacts, often by 90 percent or more. There will always be pressure to continue to reduce water quality impacts from forest management and we need to determine what is achievable and biologically relevant. Forest management impacts must be assessed in terms of a dynamic forest environment that requires disturbance to maintain certain functions. Tools that allow realistic testing of alternative management strategies are necessary to translate our understanding of forest watersheds into effective and practical management regimes. A short list of articles for additional reading and a more detailed list of Forest Watershed Program work products is available at [www.forestry.org/wf/2006.php](http://www.forestry.org/wf/2006.php). ♦

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# Wildlife Program Takes Proactive Approach to Find Solutions

BY LARRY L. IRWIN

**D**emonstrating that wildlife populations can be sustained in managed forests has long challenged land management agencies and the forest products industry. The NCASI Western Wildlife Program (WWP) was formed in 1986 to generate reliable science that links wildlife population ecology with habitat conditions created by forestry in the Pacific Northwest and adjacent states. The primary goal is to identify cost effective forest management alternatives that sustain wildlife populations and biological diversity within managed forest landscapes.

Cooperative, manipulative research with forest products companies and agencies provides enormous opportu-



nities to shift perspectives and build scientific support for new forest management paradigms. In developing a recent strategic plan to work toward that goal, the WWP identified four basic activities: Decision Support Tools; Threatened and Endangered or Priority Species; Risk of Not Managing Forests; and Landscape or Ecosystem Level Management.

## Decision Support Tools

Forest managers need reliable analytical tools that can quantify the presence or status of wildlife populations and/or habitats on their lands. Such tools may forecast the potential effects of implementing alternative forest and wildlife management strategies that meet forestry business goals. For NCASI, this theme involves developing and validating models that can assess wildlife habitat conditions, predict wildlife population responses or assess biological diversity. Wildlife habitat

models can be linked with forest growth models and timber harvest scheduling models to predict future conditions for wildlife.

One example of this type of application is an assessment of spotted owls (*Strix occidentalis*) while restoring forest health in areas at risk to large-scale, uncharacteristically intense wildfires. Work sponsored by the WWP showed that modest reductions in forest overstory cover could reduce fire risk and still retain important habitat structure for the owls. Another tool developed through the WWP supports short- and long-term decision making associated with the northern goshawk (*Accipiter gentilis*).

## Threatened and Endangered or Priority Species

Work on threatened and endangered or priority wildlife species requires an understanding of habitat relationships of sensitive species, especially when habitat is potentially affected (either positively or negatively) by management. In addition to spotted owl and northern goshawk, NCASI has commissioned or conducted research on pine marten (*Martes americana*), elk (*Cervus elaphus*), marbled murrelets (*Marmoratus brachyramphus*), pileated woodpeckers (*Picoides pileatus*) and forest bats.

An example of NCASI research on a priority species is its nationally recognized research program on elk. Big game animals like elk provide the primary yardstick by which the public judges the efficacy of forest practices rules. Forest habitat management for elk in the Pacific Northwest has largely been based on research conducted during the 1960s through 1980s. The primary emphasis of that research was to document negative effects of forestry on big game, focusing on such topics as reductions in thermal and hiding cover or increases in roads (roads may alter animal distributions and increase vulnerability to legal and illegal harvest by hunters). Many biologists accepted the concept that the weather-sheltering effect of dense, late-successional forests (i.e., thermal cover) reduces energy expenditure and enhances survival and reproduction.

Much has changed over the last 15 years. Timber harvest has been greatly

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curtailed on federal lands, but elk and deer herds are declining in many areas of the Northwest. These declines were not predicted by available science. In response to these declines, NCASI and cooperators have focused on developing an experimental understanding of large mammal nutritional status. Nutrition has fundamental influences on virtually every basic life process that is linked to reproduction and survival. Initial experiments found that the presumed influence of thermal cover on elk survival and reproduction was substantially overrated. Other habitat attributes, such as security and dietary adequacy in summer and winter, are more important than thermal cover.

In 1995, NCASI and the Oregon Department of Fish and Wildlife, along with the USDA Forest Service and Boise Cascade Corporation, embarked on research to provide information on fundamental relations between nutrition and productivity of elk. Summer-autumn nutrition was found to markedly affect growth and development of elk calves and their ability to survive winters. The research also established that relatively small deficiencies in dietary quality create comparatively large detrimental effects on animal performance.

Although the nutrition studies conducted with captive elk indicated a crucial contribution of nutrition to elk performance, that work could not address the extent to which sum-



PHOTO COURTESY OF RACHEL COOK, NCASI

**John Cook (right) and his wife Rachel head a major research program in which nutritional status of wild elk is assessed using ultra-sound techniques. The project includes wild elk from 22 elk herds from Forks, Wash., to Rocky Mountain National Park, Colorado.**

mer-fall nutrition was important to wild elk herds. Since 1998, NCASI has been using its body condition evaluation techniques to assess the nutritional status of wild elk herds across the Northwest, including populations in Yellowstone National Park and Rocky Mountain National Park. This study is an opportunistic effort in which data are being collected in cooperation with wild elk captures by state wildlife agencies, Indian tribes and the National Park Service. Data collected from 19 wild elk herds indicate that substantial nutritional differences occur within and among herds, and that nutritional inadequacy is widespread among elk herds in the Northwest. As a result, elk in many areas are seriously challenged to obtain



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diets that satisfy their nutritional needs during much of the year, not just winter. The data clearly refute the old perception of a nutritional "utopia" in summer through autumn. By extension, then, how forest habitats are managed on elk summer and fall ranges is likely to have appreciable influences on herd productivity in many ecosystems. This ongoing study will continue to accumulate data on additional herds as opportunities with other organizations and agencies arise.

NCASI began an additional project in 2000 that moved toward the ultimate goal of the program, which is to identify influences of forest management on herd productivity and dynamics with an explicit focus on nutritional pathways. This study involved transporting captive elk to native habitats in order to measure the nutritional responses of elk to a variety of habitat conditions in intensively managed forests in the coastal foothills and Cascades of western Oregon and Washington.

Preliminary analyses indicate that early successional stages produced by forestry are important to the nutritional well-being of wild elk. Other successional stages either produce too little forage to benefit elk or support plant communities dominated by species that are unpalatable and low in nutritive value. These data support what some wildlife biologists have long believed, namely that the large and productive elk herds of the Northwest are largely a product of the huge catastrophic disturbances early in the 20th century that created vast areas of early successional habitats. Data from this study are providing a basis for predicting the future consequences to elk of forest policies that favor a preponderance of late successional vegetation, and are providing rigorous scientific evidence of the value to elk of early successional vegetation produced through active forest management.

### **Risk of Not Managing Forests**

Forest management is frequently

based upon the precautionary principle in which short-term, risk-averse decisions prevail. There could be considerable long-term consequences to wildlife and biodiversity from forest policies that limit or prohibit active forest management. The most common example involves the uncharacteristically large and intense wildfires in the past 25 years. Yet without analytical tools and decision-making procedures that equip land managers with confidence in assessing and displaying short- and long-term risks and benefits of restoration versus no such restoration, balanced decisions are not possible. There are no easy resolutions to such ecological problems because management to reduce risks often creates short-term negative impacts.

One of the most dramatic examples of the long-term consequences of the precautionary principle for wildlife is management of spotted owls. Many populations of this species occur in fire-prone forests. Hands-off management of this habitat may inevitably lead to catastrophic habitat loss, but forest management designed to reduce wildfire risks over the long run is widely presumed to reduce habitat quality for the owl in the short run.

In late 2003, NCASI helped design and support a symposium that summarized our understanding of risk assessment. This symposium looked at management and decision making as applied to natural systems, emphasizing state-of-the-art methods for predicting hazards, and explored how forest management affects risks of uncharacteristic wildfires. In 2005, a special issue of *Forest Ecology and Management* was published based on key presentations from that symposium ([www.elsevier.com/locate/foreco](http://www.elsevier.com/locate/foreco)). NCASI is continuing this work by conducting research on spotted owls in at-risk landscapes in Oregon and California.

### **Landscape or Ecosystem Level Management**

Today, work on wildlife requires information and technical methods for assessing or identifying the capacity of managed forest landscapes to support biodiversity such that sustainable populations of native animals and plants are maintained. Topics extend well

beyond the scope of single species models or tools for assessing habitat conditions. *Where* one manages might be as important in understanding biodiversity responses to forest management as *how* and *what* vegetation is modified. Answering important questions necessitates linking data and models across multiple scales of geography and time. Traditionally, wildlife habitat assessments involved mapping vegetation types (usually seral stages) and stand patterns, but we now know that assessing landscapes for biodiversity potential should necessarily involve linking forest vegetation inventories with vegetation growth simulators and data on climate and lithology.

One example of this theme is ongoing work conducted for NCASI by researchers from Oregon State University and Montana State University. Results of the first phase of work, described in this issue by Loehle, indicated that place-based biophysical factors such as climate and forest productivity drive biodiversity variation across the Pacific and Inland Northwest. This suggests that biodiversity management will be most effective if it is tailored to local planning areas where vegetation composition and structure are accounted for.

### **Key Lesson from the Western Wildlife Program**

The key lesson from the WWP may be the need to *ask the right questions*. Whether the issue was the effects of forest management on spotted owl or elk or bats, NCASI scientists have tried to ask "what are key habitat components that foresters can manipulate in a way that is both economically and biologically sustainable?" NCASI, its member companies, and numerous other private and agency partners continue to look for solutions to the forest wildlife concerns of the West. A list of suggested articles for additional reading and a more comprehensive list of Western Wildlife work products can be found at [www.forestry.org/wf/2006.php](http://www.forestry.org/wf/2006.php). ♦

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# The Fall River Long-term Soil Productivity Study: Linking Processes to Operations in Pacific Northwest Douglas-fir

BY ERIC D. VANCE, THOMAS A. TERRY,  
ROBERT B. HARRISON, CONSTANCE  
A. HARRINGTON, BRIAN D. STRAHM  
AND ADRIAN ARES

**F**orest management practices can significantly affect forest productivity. In the Pacific Northwest, there is a long history of field studies designed to assess tree and stand growth responses to operational management practices. These studies have yielded valuable information for forest managers, particularly on the influence of site preparation, vegetation control, fertilization, initial planting density, and thinning on tree and stand growth, and have helped to develop a basis for site-specific management prescriptions.

Good examples of effective silvicultural response studies are those established by the University of Washington Regional Forest Nutrition Research Project, where tree responses to various forest fertilizer regimes have been examined across hundreds of sites in the region. However, most empirical silvicultural field studies do not explicitly evaluate processes underlying site-specific growth responses, which limit forest managers' ability to translate those responses to other locations.

In addition to their direct effects on tree growth, silvicultural practices can also have unintended effects on site productivity that may influence forest responses years or even decades into the future. For example, harvesting and site preparation could affect forest productivity if they overly remove or redistribute soil organic matter and nutrients



**Eric D. Vance**

or detrimentally disturb the soil. These effects could alter nutrient and water availability, and thus impact tree growth. Forest fertilization, on the other hand, may add to the nutrient pool.

Because long-term forest responses to silvicultural practices may be impossible to quantify and interpret if only tree growth is measured, forest scientists and managers have increasingly recognized the importance of understanding processes controlling these responses. It can be costly to accurately quantify process-level effects because they often involve detailed measurements in the field and laboratory, as well as specialized equipment and personnel. However, understanding these processes is likely to be important for tailoring prescriptions and Best Management Practices (BMPs) for specific site and stand conditions. Evaluating the short-term and long-term effects of management is a critical part of our commitment to sustainable forest management and of providing the environmental values associated with healthy, productive forests. The recognized importance of maintaining long-term site productivity is also a key element in the widespread adoption of forest certification systems.

## The dilemma of operational versus controlled factor research designs

While empirical silvicultural field studies have most commonly been used to assess the effects of management operations on tree growth, their utility is limited in several respects. One reason is the high variability associated with forest sites and operations, particularly that related to soil disturbance and the distribution of residues and competing



PHOTO COURTESY OF WEYERHAEUSER COMPANY

**Operational forest management practices can result in highly variable site conditions, making it difficult to separate and quantify factors influencing tree growth responses.**

vegetation following harvesting and site preparation. Such high variability reduces the ability of investigators to detect treatment effects. Field studies of operational practices also tend to alter many tree growth-controlling factors at once, making it difficult to isolate cause and effect mechanisms. When the same operation is performed at a different site, the inherent site limitations may change or may be differentially affected by the operation. Without quantifying these controlling processes, it becomes difficult to apply operational study results beyond the site from which they were derived.

An alternative to the operational field study is what might be termed the controlled process study, where the system is simplified so that individual factors controlling productivity can be manipulated and quantified. Greenhouse pot experiments are the extreme example of a system where

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individual factors are manipulated so that their influence on tree growth and physiological/phenological responses can be assessed. While the strength of such studies is the ability to control and assess the influence of individual factors on tree growth and function, their relevance to operational management practices is limited.

In the 1980s, the USDA Forest Service, under the leadership of Robert Powers, developed a network of forest productivity study sites across the United States and in Canada using a creative design for controlling site factors in field settings.

The core design of the Long-Term Soil Productivity (LTSP) study network includes three harvest intensity levels (bole-only, whole-tree and whole-tree plus forest floor); three levels of compaction (none, moderate and severe); and two levels of competition control (none and complete). The objective of the harvest intensity and compaction treatments is to assess how two key site productivity factors, soil organic matter and soil porosity, affect stand productivity with and without competing vegetation. To more consistently reduce soil porosity than would be possible under normal forest operations, entire plots were compacted once or twice using a pneumatic roller or similar equipment in the absence of harvest residues, which were removed to aid soil compaction, then subsequently replaced. The design provides considerable control over important tree growth-controlling factors, but was not intended to mimic operational conditions. Mitigation treatments such as tillage or fertilization are not generally included.

#### **The Fall River study**

During the establishment of the LTSP site network, industry scientists and forest managers, university researchers, and LTSP network leaders and collaborators began to discuss the need for a long-term study in the Pacific Northwest region that would have design elements of the LTSP network studies, but would more closely link operational management practices to soil-site processes and forest productivity. This resulted in a cooperative agreement between scientists and managers from the University of

Washington, Weyerhaeuser Company and the USDA Forest Service Pacific Northwest Research Station. As a representative of the broader forest products industry, the National Council for Air and Stream Improvement, Inc. (NCASI) provided early and continued endorsement for the establishment of the study and direct support of monitoring and assessment elements. Additional partners include the Pacific Northwest Stand Management Cooperative, Olympic Natural Resource Center and Michigan Technological University. The findings from this study will be integrated with other long-term site productivity studies to refine BMPs to enhance and maintain forest productivity in the Pacific Northwest.

The Fall River study is located on fertile, well-drained, silty clay loam soil (Typic Fulvudand, Boistfort series) on Weyerhaeuser land in the Coast Range west of Centralia, Washington. Like the LTSP network studies, the impacts of organic matter removal, soil compaction and vegetation control on site processes and tree growth are a core

part of the study design. The randomized block design (four replications) includes four levels of harvest/biomass removal from an existing Douglas-fir stand: (1) bole-only; (2) bole-only to a five centimeter diameter top; (3) total tree; and (4) total tree plus all legacy wood in the forest floor from the previous stand. All treatments received competing vegetation control for five consecutive years. Adjacent portions of the original stand with similar stand and soil characteristics provided the opportunity to sample non-harvested conditions. Two sets of organic matter removal plots were installed in each replication of the study so fertilizer can be applied to one set of these plots at a later date.

Soil disturbance/compaction treatments were established using one or more passes of a shovel forwarder in eight traffic lanes within bole-only removal treatment plots with harvest residues in place as occurs operationally. Compaction plus tillage was added as an additional treatment to assess the need for soil amelioration in the com-



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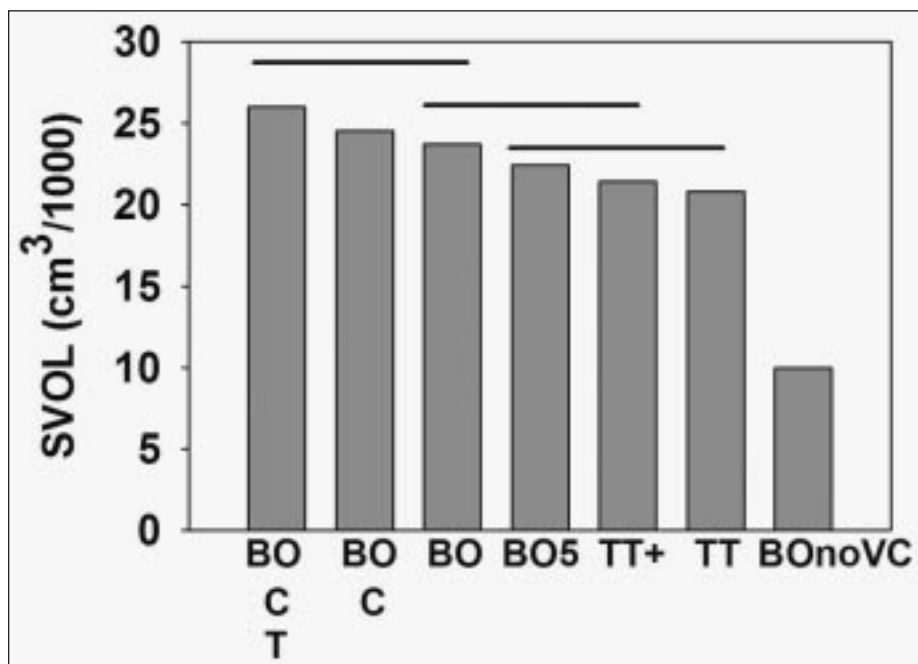
paction treatment. Compaction-related treatments received the same control of competing vegetation as the main harvest removal treatments. An additional treatment received bole-only removal, but no control of competing vegetation where the impacts of vegetation control could be assessed. The large size of the plots [0.25 hectares (0.63 acres)] allows for long-term assessment and future thinning. The result was a series of treatments that allow us to assess the influence of operational management practices on key site factors likely to impact forest productivity.

### Key early findings and management implications from Fall River

**Resilience.** Perhaps the most significant finding during the initial six years of the Fall River study is the site's remarkable resilience. At age five, the extreme biomass removal treatments have had only a small, negative influence on tree growth (see Figure 1). Total tree removal slightly reduced stem volume index (stem diameter<sup>2</sup> x height) over the bole-only treatments, while tree response on the total tree and total tree plus treatment were similar.

The most likely cause for the reduced stem volume was drying of the surface soil during the summer dry season rather than nutrient depletion. Compaction treatments substantially increased soil bulk density and soil strength, and reduced soil porosity, but had no significant effect on tree growth at age five and even enhanced tree volume growth at age three, probably due to increased available water holding capacity in the compacted soils. A trend toward greater seedling growth with compaction is still evident after five years. Because the initial soil

**Figure 1. Douglas-fir plantation age five, Volume Index (SVOL = basal diameter (cm<sup>2</sup>) x total height [cm]) for trees in biomass-removal, soil compaction and tillage, and vegetation control treatments at Fall River. Treatments (all receiving vegetation control) are BO = bole-only removal; BO5 = bole-only up to five centimeter top diameter removal; TT = total tree removal; TT+ = total tree plus all legacy wood removal; C = soil compaction; and T = soil compaction and tillage. BOnoVC = bole-only removal without vegetation control. Means under the same horizontal lines do not differ at P ≤ 0.05.**



bulk density at the study site was low, its increase did not lead to values that were above critical levels.

**Most limiting factor.** Despite the severity of the harvest removal and compaction treatments, the factor that has most limited early tree growth has been competing herbaceous vegetation. This appears to be primarily a soil water effect, as the presence of herbaceous competitors significantly reduced soil water availability during the growing season, but had little effect on age five Douglas-fir foliar nitrogen (N) concentrations compared to plots where competition was controlled.

**Nitrogen retention.** When compared to the non-harvested stands, the bole-only and total-tree plus harvest-

ing treatments increased availability and leaching of N for two years following harvest; however, N concentrations in soil solution declined to negligible levels by year five and only a very small amount of the total on-site N pool was mobilized and lost. Another major finding of the study was the unique nitrate retention capacity of the variable charge, volcanic soils at Fall River, which probably contributed to leaching rates that were too small to be of significance for either site productivity or water quality.

**Management implications.** The resilience of the site to biomass removal and soil compaction, the high soil N retention capacity, and the strong herbaceous competition as the major factor limiting early tree growth are among the important findings related to site productivity at Fall River. The importance of herbaceous competition in restricting early tree growth has been demonstrated in a majority of the LTSP network studies. One of the interesting findings at Fall River has been the correlation of soil water availability with early tree volume across and within treatments, while the beneficial effects of increased soil



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temperatures were important only when field season soil water was high. Increased soil water also appears to be responsible for enhanced seedling growth in the compaction treatments in the driest year (age three).

Interpretations of treatment impacts on tree growth should be made in the context of the soil at Fall River, which is near the high end of the fertility range for Douglas-fir and has unique characteristics and resiliency due to its volcanic origin (andic properties). It is important to note that soils of similar origin are broadly distributed in the region. For example, the historic Mt. Mazama (now Crater Lake) eruption about 7,000 years ago deposited some material over nearly all of the Pacific Northwest area north of the eruption site, including the Fall River site. The extent of variable charge soils and their role in increasing forest productivity in the region needs to be assessed. Herbaceous competition was controlled at Fall River longer than in normal operational practices, which should be taken into account when estimating the potential gains that can be achieved with operational levels of vegetation control.

The value of findings from Fall River and the LTSP study network should increase as the treatment effects are observed across a wide range of sites over an extended time period, and as studies are added to the long-term site productivity strategic database in the Pacific Northwest. A recently installed study sponsored by Green Diamond Resource Company, Port Blakely Tree Farms LP, Green Crow Ltd. and the Forest Service/Forest Industry Agenda 2020 program includes core treatments from Fall River at two sites with contrasting soils and will be an important addition to this database.

The broad sponsorship of these studies—forest products companies, NCASI, USFS, University of Washington Stand Management Coop and others—demonstrates the determination of these groups to sustain and enhance forest productivity and will facilitate information transfer as findings are made available. ♦

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## OSAF Foundation Forum

### Scholarships Awarded to OSU Students

**S**tephanie Larew and Judd Lehman, both seniors in Forest Management at Oregon State University College of Forestry, have received scholarships from the Oregon SAF Foundation.

Judd Lehman of Trail, Ore., hopes to one day have enough experience and knowledge to use his skills to manage forestland to the benefit of society. He spent last summer working for the OSU student logging crew and this summer is working for the Forest Service in timber sales administration. He will also spend this summer taking panoramic photos of southern Oregon for comparison of past and present landscape conditions in these areas. Judd serves as chair of the OSU Student SAF Chapter and regularly attends Oregon SAF executive committee meetings. This year he also attended the joint

WSSAF/OSAF Leadership Conference and the Oregon SAF Annual Meeting.

Stephanie Larew of Roseburg, Ore., has many fond memories of enjoying the wilderness with her family, which has led to her great respect and love of the outdoors.

The OSAF Foundation focuses their efforts within Oregon and at development of future professionals and forestry education in general. Scholarship applicants are asked to address their career goals and aspirations, job experiences and how they believe their education in forestry will prepare them for the future. One criteria the students must meet is to demonstrate potential for future membership in SAF through active participation in the SAF student chapter. For more information on the OSAF Foundation, visit [www.forestry.org/or/foundation](http://www.forestry.org/or/foundation). ♦

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# Landscape Studies Address PNW Biodiversity Goals

BY CRAIG LOEHLE

**T**he conservation of biological diversity has become an important issue in forest management. One example is the Sustainable Forestry Initiative (SFI)<sup>TM</sup>, which includes conservation of biological diversity as a goal. This article describes NCASI landscape studies that assess strategies for achieving biological diversity goals.

The field of landscape ecology has been used to develop guidelines for forest management at the landscape scale, based on concepts such as habitat continuity, patch size and patch connectivity. These guidelines address such features as riparian buffers, wildlife movement corridors, the abundance and distribution of old-growth forests, retention of stand structural features such as snags and down woody debris, and many others. Such guidelines have been included in state-level forest regulations and dominate



forest management on national forests. When implemented on the ground, these management guidelines may produce complex spatial patterns in the forest (see photo). These guidelines can be very expensive to implement, and in extreme cases, can make forest management impossible. At the same time, the results of implementing the guidelines on the landscape have not been generally demonstrated to be beneficial to wildlife. For example, the actual use of corridors by animals has not been well documented.

Implementation of forest management guidelines that are expensive, but have not been demonstrated quantitatively to benefit biodiversity, is problematic. While companies are not averse to protecting biodiversity, they need to do so in a cost-effective manner. For this reason, the National Council for Air and Stream Improvement, Inc. (NCASI) has been conducting landscape studies nationwide to address issues of efficacy and efficiency in achieving biodiversity goals.

When studying landscapes and biodiversity, context is extremely impor-

tant. Climate is a well-known control on biodiversity. Diversity in all taxa generally declines toward the poles. There are also gradients in biodiversity with net primary productivity, which is influenced by both temperature and precipitation. These broad climatic gradients set the context for biodiversity within a particular region. At the local scale, topographic complexity and the variety of vegetation types can contribute to biodiversity. These governing factors determine what management approaches will be effective as well as what managers can expect in terms of natural biodiversity for the area in which they are working.

NCASI conducted a major study on bird and woody plant diversity in the Pacific Northwest that focused on climatic and topographic variables. Models were developed for bird, tree and shrub richness. Bird models were based on Breeding Bird Survey (BBS) route data, and tree and shrub richness models were based on forest inventory plots. The best model for bird richness included terms for land cover heterogeneity, percent of conifers along the route, net primary productivity, solar radiation in May and June, vapor pressure deficit in July, precipitation in May and June, and terrain slope ( $R^2 = .58$ ). The best model for shrub diversity ( $R^2 = .82$ ) included topographic heterogeneity, maximum leaf area (fPAR), and the logarithm of the area sampled. For tree richness, the best model ( $R^2 = .57$ ) also included topographic heterogeneity and logarithm of the area sampled.

Observed bird species richness was high in an arc extending from the

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PHOTO COURTESY OF LARRY IRWIN

**Forest management guidelines produce novel structures with unknown wildlife benefits. Photo shows woody debris left on a site and remnant trees left for wildlife habitat.**

Siskiyou Mountains in southwest Oregon, northward along the east side of the Cascades, across the Okanogan Region of north-central and northeastern Washington and into northern Idaho and northwestern Montana. Tree and shrub richness were highest in broadly similar regions. Richness of sensitive bird species was highest in the forested ecoregions east of the Cascades and in the Siskiyou Mountains. Bird richness was lowest in nonforested parts of the region. The major industrial forestlands in this region occupy environmental settings that are relatively high in predicted bird richness and are in proximity to areas of high bird, tree and shrub biodiversity potential. The results suggest that there is no single overarching factor that controls the richness of bird and tree diversity across this region. Rather, habitat composition, vegetation productivity, climate and topography interact to drive diversity, with the strength of each factor varying across the region. Results of these studies are being prepared for publication, and follow-up studies on bird diversity are being conducted at the ownership scale.

A community structure analysis was conducted for birds using these same data. The analysis found that the shape of the species abundance curve changed with scale. This changing distribution shape resulted because species that are found on more routes are also more abundant on routes

where they occur. This finding led to a proposed scaling model in which the abundance curve results from a sampling process and not just a simple summation. It was also found that some birds are so rare that sampling them at all is problematic. Out of the more than 2.5 million birds observed in our study, 31 species had frequencies of less than 10 birds per year over the 308 routes. Such low abundance makes it impossible to either detect population trends or relate bird abundance to habitat or management variables.

In other NCASI studies, new methods are being developed for studying landscape issues. For example, a new approach for modeling bird response to habitat and landscape structure shows promise. This method utilizes, at multiple scales, data on features of the landscape such as distance to water and forest age heterogeneity. Because controlled studies of spatial patterns are difficult to achieve, NCASI has developed methods to utilize existing spatial data to test for landscape pattern effects. A NCASI model of fire spread on a landscape has been used to show that commercial forestry can contribute to reducing fire risk.

In our latest effort, the effect of forest management guidelines was tested in an operational forest setting using the Habplan harvest scheduler. In other studies, NCASI is studying effects of riparian buffers, responses of wildlife to residual structures, responses of owls and elk to habitat features, and other landscape issues. These studies are mentioned in some of the other papers in this issue. Landscape studies discussed above can be accessed at the NCASI website at [www.ncasi.org/search/](http://www.ncasi.org/search/). ♦

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# Global Climate Program a Technical Resource

BY ALAN A. LUCIER AND  
REID A. MINER

**G**lobal climate change is an exceedingly complex and dynamic issue. Science has not yet answered many fundamental questions about the extent, causes and consequences of climate change. Nevertheless, many scientific and political leaders are convinced there are sufficient and compelling reasons for reducing greenhouse gas emissions.



Reid Miner

NCASI's Global Climate Program (GCP) addresses technical information needs of special concern to the forest products industry. The GCP's first task in the early 1990s was to evaluate scientific reports suggesting that active forest management is a major net source of greenhouse gas emissions. Studies by NCASI and others over the past 15 years have shown that these early reports were incorrect. It is now clear that active forest management is essential to maintaining positive carbon sequestration in the forest sector over the long term. Active management provides an economic incentive for keeping land in forest cover, produces wood for biofuel and energy-efficient materials, and supports carbon sequestration in houses and other products.

Another early task for the GCP was to evaluate scientific reports that were predicting imminent and severe impacts of climate change on forest resources. It soon became clear that these reports were derived from complex models based on unproven assumptions. During the 1990s, NCASI supported research projects that helped fill some important gaps in scientific information about tree and stand responses to changes in climate variables and carbon dioxide concentrations in the atmosphere.

In 2006, the GCP continues to be an important technical resource for NCASI members and the forest products industry. However, the GCP's focus has shifted in recent years to helping the industry respond to cli-

mate policy issues and proposals. We have made significant progress in developing consistent and credible approaches to measuring sources and sinks of greenhouse gases associated with the forest products industry. Current priorities include: (a) greenhouse gas accounting methods; (b) life cycle analysis of greenhouse gas emissions associated with forest products and substitute materials; and (c) the feasibility and cost of various options for reducing greenhouse gas emissions and increasing sequestration. Evaluating new scientific literature on climate change and its potential effects on forests is an ongoing task.

Our current general assessment of scientific and technical aspects of global climate is summarized below. This assessment is necessarily a work in progress because the scope of the global climate issue is enormous and new information appears every day.

There is strong evidence for a long-term global warming trend beginning in the mid 19th century. This trend has been irregular (i.e., sometimes interrupted by periods of cooling) and variable among regions. It appears that current temperatures in some regions are below levels experienced during the Medieval Warm Period (MWP) during the 10th to 14th centuries. There is disagreement among scientists as to whether the MWP was a regional or global event.

Scientists have been investigating the causes of climate change for centuries. In recent decades, science has devoted considerable attention to the hypothesis that human emissions of greenhouse gases will cause severe global warming. The Intergovernmental Panel on Climate Change (IPCC) predicts substantial future climate warming in response to large future increases in greenhouse gas emissions. IPCC's high-end warming scenarios include major adverse impacts on ecosystems and human societies (e.g., melting of the major ice sheets and rapid sea level rise).

There are major gaps in scientific understanding of the mechanisms of natural and human-induced climate change. Evidence for and against a

substantial human influence on recent global warming is ambiguous. Confidence in long-term climate forecasts is low. Climate science is making good progress on many important topics, but it is not clear when reliable forecasts will be available. Directionally, human emissions of greenhouse gases have a warming effect on climate, but it is not clear whether this effect will be amplified or counteracted by natural processes. Some experts believe that climate cooling is the greatest risk related to natural climate variability.

Increases in CO<sub>2</sub> concentrations in the atmosphere have important implications for forest health and productivity whether or not there is a significant global warming effect. The productivity of well-managed woodlands may increase because higher CO<sub>2</sub> concentrations tend to increase photosynthesis, water use efficiency and plant growth. Effects of CO<sub>2</sub> on plants are greater in some species than in others, and therefore will alter competition among plant species.

Uncertainty about climate forecasts translates into uncertainty about future climate impacts on forests. Climate warming *per se* would be unlikely to cause forest dieback because most tree species can tolerate temperatures warmer than they normally experience. Warming could damage forests severely if it occurs with drought or has indirect impacts mediated by insects, diseases or wildfire. Climate cooling could cause forest dieback directly because inadequate cold tolerance is fatal to trees.

CO<sub>2</sub> emissions associated with fossil fuel combustion account for about 60 percent of total human releases of greenhouse gases. Substantial but smaller fractions of the total are attributable to CO<sub>2</sub> emissions from deforestation and to methane emissions associated with agriculture, landfills, production and transport of natural gas, and other human activities. Emission sources vary significantly according to whether a country is developed, developing or least developed.

Greenhouse gas emissions are expected to increase for the foresee-

(CONTINUED ON PAGE 23)

## Calendar of Events

**Tree Day and Family Adventure Day**, Aug. 18-19, Udell's Happy Valley Tree Farm, Lebanon, OR. Contact Fay Sallee at [ksallee@proxaxis.com](mailto:ksallee@proxaxis.com) or 541-451-5322.

**Who Will Own the Forest 3?** Sept. 11-13, World Forestry Center, Portland, OR. Visit <http://wfi.worldforestry.org> or call 503-488-2137.

**Meeting the Challenge: Invasive Plants in PNW Ecosystems Conference**, Sept. 19-20, Center for Urban Horticulture, Seattle, WA. Visit <http://depts.washington.edu/urbhort/> or call 206-685-2692.

**Components of Successful Reforestation**, Sept. 26-27, Hilton Conference Center, Eugene, OR. Contact: WFC.

**Inland Empire Dry Kiln Workshop**, Oct. 2-5, Moscow, ID. Contact: UID.

**How to Design and Direct a Large Area or National Inventory**, Oct. 3-5,

Portland, OR. Contact: WFC.

**Managing for Wildlife Habitat in Westside Production Forests**, Oct. 18, Hilton Hotel, Vancouver, WA. Contact: WFC.

**2006 National Convention Our Woods: Wild and Working**, Oct. 25-29, Pittsburgh, PA. Visit [www.safnet.org](http://www.safnet.org).

**3rd International Fire Ecology and Management Congress**, Nov. 13-17, San Diego, CA. Contact: Detlef Decker at [ddecker@wsu.edu](mailto:ddecker@wsu.edu) or 509-335-2811.

**Keeping Working Forests: The Role of Forests in Preserving Open Space**, Nov. 28-29, Bend, OR. Contact: WFC.

**Forest Road Surfacing: Principles, Designs and Applied Practices**, Dec. 11-12, Olympia, WA, and Dec. 14-15, Canyonville, OR. Contact: WFC.

**2007 Oregon Logging Conference**, Feb. 22-27, Lane Events Center, Eugene, OR. Visit [www.oregonloggingconference.com](http://www.oregonloggingconference.com) or call 541-686-9191.



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### Contact Information

**UID:** University of Idaho Extension,  
1000 West Hubbard, Suite 140, Coeur  
d'Alene, ID 83815, 208-446-1680;  
[cschnepf@uidaho.edu](mailto:cschnepf@uidaho.edu).

**WFC:** Western Forestry and  
Conservation Association, 4033 SW  
Canyon Rd., Portland, OR 97221, 503-  
226-4562; [richard@westernforestry.org](mailto:richard@westernforestry.org);  
[www.westernforestry.org](http://www.westernforestry.org).

Send calendar items to the editor,  
*Western Forester*, 4033 SW Canyon Rd.,  
Portland, OR 97221; fax 503-226-2515;  
[rasor@safnwo.org](mailto:rasor@safnwo.org). The deadline for  
the September/October 2006 issue  
is August 14, 2006.

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## Our Voice

*Our Voice is a column for students that will appear occasionally in the Western Forester. The intent is to provide students with a venue to present their thoughts and views on a variety of topics related to forestry and SAE, and to provide a communications link where professional members can learn what is on the minds of students and our future leaders.*

### Scientists are Curious

BY FOREST HIETPAS

**F**orestry is one of the oldest professions known to man. Even the Roman Empire had forest reserves set aside for the production of their ships. What's more, just as long as we have been harvesting trees there has no doubt been someone out there asking how we can do this better. Over time the definition of the words "better" and "the greatest good" have changed, but humanities association and need for forest resources has not changed.

Natural sciences are an interesting field. I like to say I got into forestry because I had all these questions about the natural world and wanted answers. In all reality, I cannot stand the thought of being behind a desk, not quite yet.

While some people just don't want to be trapped inside, the best man-

agers, professors and field techs I have worked with have all had one thing in common—they believe they are making a difference. They demonstrate passion, interest and concern for what they are doing. Not only do these sentiments help a person maintain their self-worth, but it also holds them accountable for their actions.

Foresters and their colleagues are in an interesting position because their daily decisions often affect the world long after they are gone. I believe this responsibility should weigh heavy on the minds of scientists and managers alike. What are you leaving for the future generations? In today's markets, humans, both near and far, must live with those decisions and are dependent

upon the outcomes and products of not only the wood, but the carbon, water and habitat those decisions create.

In my mind I paint this superhero picture of the noble forester. The brave surveyor of the wilds, hand held to brow as she stands poised on a rock outcropping, wind gently tugging at her cruisers vest. Yup, that happens all the time.

Why do people get into this field in the first place? It's definitely not for the money; you don't often see a Relaskop hanging from the rearview mirror of a Maserati. It's not the fame; perhaps it's the infamy? I think that all natural scientists, biologists, oceanographers, geologists, foresters and their related fields are truly curious about the world around them and want to get their boots dirty. Both Peninsula College and the University of Washington have allowed me to do this by assisting in research and allowing me to do my own research.

I know at some point in time that desk will catch up to me. For now, I am happy to have found my niche. I don't know where I'll end up as far as a job goes, but as long as I'm under the canopy or on a mountain, I think I'll be okay. ♦

### About the Author

#### Forest

Hietpas is a senior at the College of Forest Resources focusing in ecosystem sciences and landscape management. He is currently working for the Forest Ecosystem Structure, Function and Dynamics lab studying long-term cone production plots and development of old-growth characteristics in the Cedar River Watershed. Past research at Peninsula College for Dr. Daniel Underwood includes the socioeconomic impact of the Northwest Forest Plan on Clallam and Jefferson counties, as well as soil microbial response to over-story thinning. Forest hails from the foothills of the Olympic Peninsula.



### About the UW College of Forest Resources

Established in 1907 as one of the oldest units on the University of Washington campus and one of the original natural resource programs in the country, the College's vision is to provide world class, internationally recognized knowledge and leadership for environmental and natural resource issues.

College teaching, research and outreach programs focus on the integrating theme of sustainability in natural and managed environments that include wilderness and park-like ecosystems, intensively managed timber plantations and urban ecosystems.

In addition to campus facilities, major field sites for teaching, research and outreach include the 4,250-acre C.L. Pack Experimental Forest located 70 miles south of Seattle; Olympic Natural Resources Center near Forks, Wash., Wind River Canopy Crane in southwest Washington, the Botanic Gardens, and the 230-acre Washington Park Arboretum managed in conjunction with the City of Seattle.

For additional information, visit [www.cfr.washington.edu/About/cfrprofile.htm](http://www.cfr.washington.edu/About/cfrprofile.htm).

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# SAF Council Report: Moving Forward on Policy, Membership and Credentialing Issues

BY G. KIRK DAVID

**T**he June 3-4, 2006, Council Meeting was a busy one, addressing a wide range of the business of your professional Society. No matter what your natural resource interest—scientific, social, political, philosophical, private, public, industrial or international—SAF is involved and can provide plenty of education and interaction as a benefit to any member who wishes to participate.

Council approved the new Forest Inventory and Analysis SAF Position Statement; President Marvin Brown's FY 2007 Interior Appropriations testimony; FY 2007 Agriculture Appropriations testimony; Secure Rural Schools Land Sales Initiative comments; and Rocky Mountain Forest Insect Response Enhancement and Support Act (FIRES) letter.

Executive Vice President Michael Goergen reported on his recent trip to China on behalf of SAF. China is now the world's second largest importer of logs, much of it from world-wide illegal logging. Illegal logging is estimated to cost \$700 million/year to the United States alone. SAF is hoping to help organize a conference on the topic in Beijing in 2008.

House of Society Delegates (HSD) Chair Chuck Lorenz reported that in order to provide continuity of leadership at HSD (a two-year term of succession), a proposal is under discussion to change the annual chair/vice chair election to a chair-elect process. HSD conveners are still hearing some concern over the change in the Fellows nomination and election process. During district reports, each councilor took time to discuss the successes or problems encountered during implementation of the new Fellows nomination process.

Forest Science and Technology Board Chair George Ice provided a summary on the following topics: Working Group annual reports; progress on several SAF white papers; modifications to the make-up of the Working Groups; National Convention

technical sessions; Working Group Officer's meeting in Pittsburgh; and the Forest Science Fund.

Councilor Rick Barnes' coverage for the Finance and Investment Committee included a report on finances, the investment portfolio, and Molly Beattie and Science Funds. Compared to recent years, SAF's finances are in much better shape and improving.

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Senior director for Marketing and Membership Charlene Schildwachter presented innovative questions and ideas about our membership categories, renewals, retention, membership application and dues schedule. Director of Field Services Louise Murgia updated Council on the current status of chapters, their importance, challenges and assistance available to them. She included input from HSD and members.

Council approved seven 2006 National awards and two National Science awards to be presented at the Convention in Pittsburgh.

Council endorsed the referendum issues resulting from the VOS Report that will now require a membership vote to change the Constitution. Proposition #1 will allow SAF to be governed by an updated District of Columbia Nonprofit Corporations Act. As a major benefit of changing to the newer Code, SAF will be able to conduct electronic voting. Proposition #2 will allow changing the National Student Assembly to a more effective and much improved National Student Congress. Proposition #3 will allow the VOS improvements and flexibility to the Forest Science and Technology Board. If the membership votes to pass these referendum items this fall, they will become effective January 1, 2007.

The Committee on Forest Policy (CFP) reported on their accomplishments with: Federal Tax Treatment of Timber Investments; Farm Bill; Conservation Easements; Old Growth; Healthy Forests Initiative and Healthy

Forest Restoration Act; Fiscal Year 2007 Appropriations; ESA Activity; Forest Inventory and Analysis Program; Forest Biotechnology; Timber Harvesting on Federal Lands; Herbicide Use in Forest Management; Invasive Species; Agroforestry; Forest Recovery After Catastrophic Events; Convention Workshop on Forest Policy; Legislative Days; and SAF Policy Network. The CFP has strategically identified the top five threats or challenges to forest sustainability: forestland conversion, forest health, global competitiveness, domestic capacity, and connecting land and people.

Council considered World Forestry Committee input on the question, "What should SAF be attempting to accomplish in international forestry, and are we effectively structured to accomplish our international goals?"

Carol Redelsheimer and David Walters, co-chairs of the Certification Review Board (CRB), gave a brief report on the Certified Forester® program, and an in-depth review of problems with the Continuing Forestry Education (CFE) certificate program: inconsistency in the allocation of contact hours; no effective system to audit contact hours; insufficient control of the CFE trademark; inconsistency of notification of sanctioned CFE events; no training for CFE coordinators; and no national oversight. The CRB proposed both short- and long-term steps of a comprehensive process to solidify the credibility of SAF's valuable CFE credentialing program. Council immediately passed a motion to implement this process.

This is only partial coverage of Council activity at the June meeting. Your district representatives stand willing to bring to Council any questions or concerns you may have. ♦

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*District 1 Council Representative Kirk David can be reached at 208-666-8626 or [kdavid@idl.idaho.gov](mailto:kdavid@idl.idaho.gov). District 2 Council Representative Rick Barnes can be reached at 541-673-1208 or [rbarnes@barnesinc.com](mailto:rbarnes@barnesinc.com).*

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## We Remember

### Fred Graf 1937-2006

John (Fred) Graf, age 68, of Prineville, Ore., died May 26, 2006, in Bend of congestive heart failure and complications of diabetes. Born in 1937, he graduated from Oregon State University in 1961 with

a bachelor's degree and began his long career with the Oregon Department of Forestry in June of that year.

Beginning as a forester in Protection for the Linn County Fire Patrol Association, he quickly moved to Salem in Protection Surveys in July 1962. By October he was promoted to senior forester in the Safety Section. In 1964, Mr. Graf transferred to Coos Bay Management and in July of 1965 to Prineville as assistant to the area director. He returned to Salem May 1967 as Staff Forester 1 in Training and Safety only to be promoted again in 1970 to Staff Forester 2 as assistant to the Fire Prevention director. Next, he transferred to the district forester position of the West Oregon District in 1972. Mr. Graf was promoted to Eastern Oregon Area director in 1978. As area director he headed Fire Protection, Forest Practices and Service Forestry activities on private lands in eastern Oregon, in addition to being responsible for all state forestlands east of the Cascades. He continued in this position until his retirement in 1994, making in total 33 years service to the Oregon Department of Forestry.

Among other activities such as traveling and visiting family, Mr. Graf helped out with Santa's workshop for Prineville Parks and Recreation. He was a long-time member of the Society of American Foresters, belonged to the Central Oregon Chapter and was a Fellow.



### Philip J. Janik 1945-2006

Phil Janik, a native of Milwaukee, Wisconsin, recently passed away in Vancouver, Wash. He received his B.S. in Forestry from the University of Montana and an M.S. in Wildlife Science from Oregon State University. He served as a Naval Officer for 15 years. He was active in the Sustainable Forestry Roundtable, as well as several professional organizations such as the Society of American Foresters, American Fisheries Society, Wildlife Society, and numerous conservation organizations. He served on the Board of Institute for Culture and Ecology and was on the Advisory Board for the College of Forestry and Conservation, University of Montana.

A certified forester and wildlife biologist, he retired from the USDA Forest Service. His Forest Service career started as a forest biologist on the Siuslaw National Forest in Oregon, and led him through several increasingly responsible staff positions in the Intermountain Region, Alaska and the Washington Office. While in the Washington Office, he held positions as chief operating officer, deputy chief for State and Private Forestry, and headed up a national research unit. From 1994 to 1998, he was the regional forester in Alaska, during which time he was responsible for updating the Tongass Plan. ♦



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## Policy Scoreboard

*Editor's Note: To keep SAF members informed of state society policy activities, Policy Scoreboard is a regular feature in the Western Forester. The intent is to provide a brief explanation of the policy activity—you are encouraged to follow up with the listed contact person for detailed information.*

**HCP Signing.** On June 5, Washington Governor Chris Gregoire and Commissioner of Public Lands Doug Sutherland signed the Washington State Forest Practices Habitat Conservation Plan (HCP). This plan is now approved by the U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration and National Marine Fisheries Service. The HCP is the result of the Forests and Fish Act passed in 1999 and is a 50-year agreement with the federal agencies to protect Washington's streams and forests. In essence, the plan recognizes forestry activities meeting the state's forest practices rules that also meet the requirements of the federal Endangered Species Act for aquatic species covered by the plan, including salmon. Adaptive management is required and the plan lays out a science-based process for changing practices. Federal agencies, tribal representatives and others have expressed concern about the plan because the exact acreage of areas where timber harvesting is excluded is not known. Related to this is concern that Forests and Fish may allow the small forest landowner to reduce habitat protections over what is required by industrial landowners.

**Changes in Board of Forestry a Looming Issue?** Several members of the Oregon Board of Forestry are now voluntarily serving past their initial four-year appointments. This opens the door to some unscheduled changes in membership and some lively public discussions about potential appointees.

The Board of Forestry has many responsibilities, including development and oversight of forest policies and regulations for state and private forestlands. The seven-member board is appointed by the governor and confirmed by the state Senate. No more than three members may receive significant income from the forest products industry and the board must include a resident of each ODF administrative region. Board members are allowed to serve for no more than two four-year terms. If judged appropriate by the executive committee, OSAF may weigh in publicly as new board mem-

bers are nominated. Information about the Board of Forestry is available at [oregon.gov/ODF/BOARD/index.shtml](http://oregon.gov/ODF/BOARD/index.shtml). Contact: Paul Adams, OSAF Policy chair, 541-737-2946; [paul.adams@oregonstate.edu](mailto:paul.adams@oregonstate.edu).

### Forest Recovery Issue Remains Hot.

The year 2006 began with many news reports prompted by an OSU study titled "Post-wildfire Logging Hinders Regeneration and Increases Fire Risk" and related actions involving OSU and agency scientists, students and administrators, as well as federal and state lawmakers. Issues raised by the OSU study have overlapped discussions both in the region and on Capitol Hill about new legislation to deal with the unique management concerns that follow wildfires and other catastrophic events. Passage of HR 4200 in May set the stage for further discussion in the Senate. The national SAF office continues to promote key post-catastrophe recovery concepts on Capitol Hill and with the news media. Information from SAF can be found at [www.safnet.org/policyandpress/forest-recovery.cfm](http://www.safnet.org/policyandpress/forest-recovery.cfm) and federal legislation can be tracked at <http://thomas.loc.gov/>. Contact: Paul Adams, OSAF Policy chair, 541-737-2946; [paul.adams@oregonstate.edu](mailto:paul.adams@oregonstate.edu).

### IESAF Members Encouraged to use Position Statements.

With adoption in June of a new position statement supporting the active management alternatives in the DEIS for the School Fire Salvage Recovery Project on the Umatilla National Forest, IESAF now has five active positions on forestry issues. The others are: Fuel Management Can Reduce Wildfire Risks; Sustainable Forest Management Requires Active Forest Management; Pilot Projects Can Test Alternative Approaches for Managing Federal Lands; and Forest Health. Members are encouraged to use IESAF's position statements to help convey their professional forestry views to key decision makers and the interested public. All of the IESAF position statements are posted at [www.iesaf.org](http://www.iesaf.org). Contact: Jay O'Laughlin, IESAF Policy chair, 208-885-5776; [jayo@uidaho.edu](mailto:jayo@uidaho.edu).

### Ecosystem Services and Northwest Forests.

Capturing the value of ecosystem services is part of attaining sustainability, or in corporate social responsibility terminology, the triple bottom line—economic, environmental and social. Viewing the Pacific Northwest and its forest wealth as ripe for a regional conference to further spur emerging efforts to form conservation banks, carbon markets, water quality trading schemes, and other attempts to improve environmental conditions through market mechanisms, in June 2006 the Katoomba Group held the ninth such conference in Portland. ♦

## Climate Program

(CONTINUED FROM PAGE 18)

able future in response to population increases and economic growth. Stabilizing emissions is a long-term challenge. Energy conservation, fuel switching and carbon sequestration strategies based on existing technologies and infrastructure can make a dent, but will not be sufficient if economic growth continues. Options for achieving large emission reductions (e.g., a major expansion of nuclear power production) have complex implications (economic, social, environmental) and may encounter vigorous opposition.

Climate adaptation research examines options for coping with climate change. Some options are considered "no regrets" measures—i.e., they are likely to provide significant benefits whether or not climate forecasts are accurate. For example, directing coastal development away from the lowest-lying areas would reduce human vulnerability to extreme weather events under a broad range of future climate scenarios.

Climate policies are evolving rapidly and have important interconnections with other policy areas, including global trade, energy security, international development, science and technology, agriculture and forestry. An overarching concern among many business and political leaders is that aggressive policies to limit greenhouse gas emissions could depress economic growth and adversely affect employment and other measures of economic and social welfare. Domestic and international climate policies involving promotion of biomass energy and carbon sequestration have complex and potentially important implications for the forest sector. ♦

*Alan A. Lucier is senior vice president, NCASI, in Research Triangle Park, NC. He can be reached at 919-941-6403 or [alucier@ncasi.org](mailto:alucier@ncasi.org). Reid A. Miner is vice president—Sustainable Manufacturing. He can be reached at 919-941-6407 or [rminer@ncasi.org](mailto:rminer@ncasi.org). For a listing of representative products of NCASI's Global Climate Program, including reports and software, visit [www.forestry.org/wf/2006.php](http://www.forestry.org/wf/2006.php).*



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