SOCIETY OF AMERICAN FORESTERS

# Western Forester

November/December 2010 Oregon • Washington State • Inland Empire • Alaska Societies Volume 55 • Number 5

# A National View of Water and Watersheds: Focus on the Forests of the Northwest

BY GEORGE ICE

The amount and quality of water coming from America's watersheds is a vital resource for this nation's health and economy. Water scarcities create competition between users, and aquatic communities are dependent on adequate flows and water quality conditions. Forest watersheds play an important role in our water resources because forests only occur where there is adequate precipitation. Here we look at trends in watershed conditions, discharge and water quality at both national and regional levels.

## Watershed conditions

Anyone who reads Timothy Egan's *The Worst Hard Time* understands the potential consequences of damaging a watershed. *The Worst Hard Time* chronicles the busting of High Plains sod that led to the undoing of a fragile ecosystem and the Dust Bowl Era. Egan's story is not isolated. American history includes a series of resource-damaging practices from cotton and tobacco farming to wetland draining and deforestation.

Perhaps no part of the United States has experienced more watershed damage than the Piedmont Region of the South. There, abusive cotton farming practices from the 1800s to the early 1900s resulted in loss of the A and B soil horizons over much of the area. In the Murder Creek Watershed, Dr. Rhett Jackson and his colleagues from the University of Georgia estimate that about five inches of soil were lost over the entire watershed and that it will take 6,000 to 10,000 years for the sediment deposited in the floodplain and stream banks to be completely removed. Because of its later development, the Pacific Northwest did not experience the same catastrophic soil damage and watershed impacts observed in the Piedmont, but watersheds have been significantly altered.

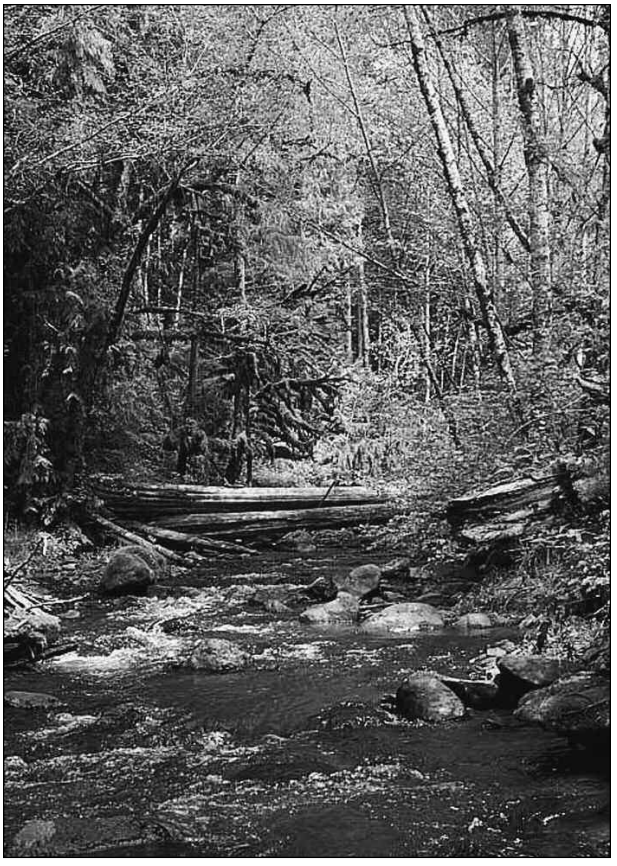

PHOTO COURTESY OF MARYANNE REITER

**Large wood and shade are important for fish habitat.**

In the Willamette River Basin, gallery forests were removed, the river was straightened for navigation, and levees and dams were built to protect farms and cities. In other parts of the Northwest, splash dams and flumes, railroads and truck roads were all used to move wood to mills, each imposing impacts on stream systems. Even fish wheels and other exhaustive salmon harvesting methods disconnected watersheds from annual nutrient inputs from the carcasses of returning salmon runs.

Watershed conditions today reflect these legacy impacts, and contemporary management practices are designed to sustain favorable watershed conditions or even reverse negative impacts. We recognize the consequences of past management, such as reduced infiltration rates due to topsoil loss or decreased large wood in streams for fish habitat, and we try to manage to avoid similar impacts. Much of the Piedmont has reforested, although

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## A National View of Water and Watersheds

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gullies remain (Figure 1) and soil formation will take eons. The forest floor has been restored and sediment loads in streams exceed current inputs, expressing the legacy conditions of the streams and floodplains.

Watershed conditions today often reflect improved management under state and federal programs such as state forest practices acts and the federal Conservation Reserve Program, but conditions are also affected by development and economic pressures. Development can be especially damaging to watersheds because urban and industrial areas have increased impervious surfaces and are highly plumbed to get water off of sites. It doesn't take a hydrologist to tell you that the best hydrologic conditions are achieved by retaining forests in a watershed.

### Quantity of water

The amount of runoff available each year and how it is distributed over time is always an important issue. Forests have long been considered ideal for water supply watersheds because they provide cover and favorable soil conditions. But, there are emerging concerns about how forests, especially young forests, affect evapotranspiration and water available for runoff. The effect of climate change on water supplies further complicates these issues. The United States Geological Survey (USGS) has a database of 22,700 stream gauges across the United States, but many are no longer active and even fewer have 30 years or more of continuous records. Flows at others have been altered by irrigation activities or other water uses. USGS recently reported on trends in streamflow from 1,600 stream gauges across the United States. Nationwide, it found that streamflow has been increasing on average since 1940, as expressed by annual minimum and annual median flows. Change is less clear for annual maximum flows.

PHOTO COURTESY OF GEORGE ICE

**Figure 1. Gully in the South resulting from past abusive agricultural practices.**

Two regions that have experienced negative trends in streamflow are the Pacific Northwest and the South-Atlantic Gulf. Foresters are used to wearing white hats when discussing the amount of runoff. Timber harvesting reduces forest evapotranspiration and increases water available for runoff. However, there can be a reversal of water use where young forests eventually have increased water consumption compared to older forests. Still, most forest hydrologists believe that, on balance over a rotation, a managed forest will increase water supply, although probably not enough to measure.

### Water quality

Nearly 40 years ago, when the Federal Water Pollution Control Act Amendments were being debated, this nation faced serious water pollution issues from untreated industrial and municipal wastes and from diffuse activities that would become known as nonpoint sources of pollution (e.g., agriculture and forestry). Progress over the last four decades has been remarkable. The August 29, 2010, issue of the *Corvallis Gazette-Times* featured a front-page article on the Willamette River cleanup. "Once so polluted it literally choked fish to death, the river


# Western Forester

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*Western Forester* is published five times a year by the Oregon and Washington State Societies' Northwest Office





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Society of American Foresters
5400 Grosvenor Lane
Bethesda, MD 20814
301-897-8720




**Next Issue: Forestry and Energy**

PHOTOS COURTESY OF GEORGE ICE

**Figure 2. Comparison of 1966 (left) and 2009 (right) harvest in the Needle Branch Watershed, Ore., part of the Watersheds Research Cooperative.**

made an astounding comeback in the 1960s and 1970s."

Much of the improvement observed in the Willamette was the result of wastewater treatment plants that reduce oxygen demand discharged to the river by 95 percent or more. Nonpoint source activities implemented streamside buffers and riparian management areas to reduce sediment and nutrient inputs to streams and provide for shade and recruitment of large wood. The September 2010 issue of the *Journal of Forestry* includes an assessment of trends in implementation of forestry best management practices across the United States.

Nowhere in the United States have forest watershed and water quality issues been more contentious than in the Northwest. The Oregon Forest Practices Act was the first in the nation to address protection of water and fish habitat as well as reforestation and fire protection. This act was soon followed by others in Washington, California and Idaho.

There is no question that the Northwest has been a leader in development of Best Management Practices (BMPs). Between 1959 and 1973, a study in the Alsea Watershed tested the impacts of clearcutting and prescribed burning without stream protection and compared these impacts to those in a watershed with buffers along fish-bearing reaches. State and federal agencies, companies and universities in the region have all contributed to important watershed research. Some examples are research sponsored by the Headwater Research Cooperative and Watersheds Research Cooperative (OR), Fish and Wildlife in Managed Forests and Cooperative Monitoring, Evaluation and Research Committee (WA), Mica Creek Watershed Study (ID), and Caspar Creek Watershed Study (CA). For a summary of these findings, read SAF's book, *A Century of Forest and Wildland Watershed Lessons*.

Despite enormous research and management efforts, there remain daunting challenges to address concerning water quality in general and forest practices in particular. While the nation has made remarkable progress in addressing "conventional pollutants" such as biochemical oxygen demand or sediment, new issues include contamination from pharmaceuticals and personal hygiene products, atmospheric deposition of nutrients and heavy metals, and introduction of non-native invasive plants and animals such as the New Zealand mud snail (*Potamopyrgus antipodarum*). Forests appear to be especially vulnerable in this debate because society expects them to produce high-quality water all the time and because they are often subjected to special protection (e.g., anti-degradation components of water quality standards for high-quality waters). A brief list of the most contentious forest watershed issues in this region includes:

- Application of water quality standards that are not attainable even in unmanaged forest conditions;
- Testing the effectiveness of state forest practices rules in achieving water and fish habitat goals, and how and who measures effectiveness;
- Management of forest roads under either nonpoint or point source control programs;
- Minimizing chemical runoff from forests when using herbicides for site preparation and site release;
- Establishing appropriate forest practices for landslide-prone landscapes; and
- Managing runoff from forests impacted by atmospheric deposition of mercury.

Reflecting the complexity of these issues, a recent vote on a revised Oregon SAF position statement supported active management of riparian forests to achieve watershed goals. Encouraging results from retrospective forest paired-watershed studies in Georgia, Texas and now at the Alsea Watershed in Oregon, are finding that contemporary forest practices reduce water quality impacts by 80 to 90 percent (Figure 2). In fact, these studies show that it is often difficult to differentiate management changes from natural background variability and that natural disturbance events such as tropical storms, windthrow events or wildfires often overwhelm the impacts of forest management. We have a long way to go to fully test and refine our practices, but we can be confident that forest management has made great progress in addressing watershed conditions and protecting water resource values. ◆

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# Clean Water and Forestry: Applying New Research to Emerging Issues

BY PETER A. BISSON

Over the last two decades most of the attention given to issues concerning water quality and forest management has focused on protecting habitat for aquatic species such as salmon and trout. The attention has been catalyzed by multiple listings of salmonid populations under the Endangered Species Act and by adoption of watershed-based Habitat Conservation Plans (HCPs) and negotiated legal agreements for state and private lands such as Washington's Forests and Fish Law (www.forestsandfish.com/).

Additionally, efforts to recover salmon by protecting water quality and restoring stream and riparian habitat have included ambitious regional programs such as the Puget Sound Partnership (www.psp.wa.gov/) and the Northwest Power and Conservation Council's Program for the Columbia River Basin (www.nwcouncil.org/fw/Default.asp), which include substantial restoration projects in forested watersheds.

It would be incorrect, however, to assume that future public pressure to protect the quality and quantity of water flowing from managed forestlands will be driven solely by fish conservation concerns. Demand for clean water for a variety of uses will increase. Watersheds are where we live, grow crops and create various forms of industry. As the Pacific Northwest's human population expands, competition for water and the ecological goods and services that water provides will grow more intense. While habitat conservation for aquatic organisms will remain important, it will be only one of a suite of issues with which forest managers charged with protecting water resources must remain engaged. In almost every case, managers will be faced with balancing the ecosystem needs of fish with the need for drinking water, sanitation, energy, agriculture, commerce and recreation.

With this consideration in mind it is worthwhile to examine several emerging issues that are of interest to foresters and watershed specialists: climate change, wildfires and invasive species. That the climate is changing is beyond scientific dispute, even though the causes of change may continue to be publicly debated. With climate change the frequency and severity of wildfires will also change, as will the patterns of invasion of new plants and animals into the Pacific Northwest and elsewhere. Each of these factors can cause significant changes in water quality and quantity, but their specific impacts in the context of forest management, and what can be done about them, are incompletely known. This paper examines each issue from a research standpoint and considers how new scientific findings can be incorporated into forest management strategies.

## Climate change

Potential effects of climate change on water quality in the Pacific Northwest include: (1) higher air temperatures resulting in increased precipitation falling as rain rather than snow; (2) diminishing winter snow pack and reduced flows during subsequent low flow periods; (3) possible increases in peak storm flows; and (4) rising water temperatures (Figure 1).

Climate scenarios predict an increase in large flood events, wildfires and forest pathogen outbreaks, some of which have potential to actually *improve* habitat complexity as a


PHOTOS COURTESY OF P. BISSON

**Figure 1. Examples of the effects of climate change on water quality: (a.) shrinking perennial drainage network of headwater streams; (b.) extreme low flows during the dry season; (c.) increased frequency of severe storms; and (d.) elevated frequency and severity of wildfires.**

result of enhanced floodplain connections and large wood recruitment to streams. Many effects of climate warming, however, will have negative consequences for water supplies and aquatic organisms, at least in the short term. Summer water shortages are likely to be exacerbated by reduced snowmelt runoff—a problem affecting the water needs of both fish and humans. Severe wildfires and more frequent intense rainstorms can cause stream changes (heavy sedimentation, streambed scour and loss of riparian forests) that result in mortality and reduced productivity of aquatic organisms, as well as direct threats to water supplies and property. Over time (decades to centuries), disturbances such as wildfires and floods contribute to maintaining aquatic habitat complexity, but the short-term consequences of these events are often socially undesirable. Managers are thus faced with the difficult task of formulating strategies that balance the long-term benefits and short-term damages of large natural disturbances.

From a habitat resilience standpoint, maintaining as much water as possible in streams and lakes during low flow periods is an effective way of combating the harmful short-term effects of climate change, and there will be obvious benefits to downstream water users of keeping summer flows as high as possible. Other types of management actions can also produce water quality benefits. Maintaining linkages between rivers and their floodplains by allowing channel meandering and maintaining connections to floodplain ponds will act as a hydrologic safety valve that helps reduce the concentrated scouring effect of high flows on stream channels, provides a refuge for aquatic organisms, and will likely improve water quality. Although the effectiveness of several of the following actions has not yet been rigorously tested under real-world conditions, there are theoretical reasons that lend support to their utility in assisting managers in developing strategies to ameliorate adverse climate change impacts. Some of them have already been implemented under current conservation plans.

- Minimize increases in water temperature by maintaining well-shaded riparian areas.
- Maintain a forest stand structure that retains snow water and promotes fog drip, and reduces the "rain on snow" effect associated with large forest openings in the transient snow zone.
- Disconnect road drainage from the stream network by diverting runoff away from active channels to soften discharge peaks during intense storms.
- Ensure that aquatic organisms have access to seasonal habitats, e.g., floodplain ponds in winter or cool water areas in summer.
- Protect springs and seeps from water appropriations that would lessen habitat quality and downstream water availability, and reduce activities that would result in lowering groundwater levels.

Models of various water-related processes that are affected by climate

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change (Figure 2) will continue to be refined, and as modeling becomes more precise it will be possible to identify locations on the landscape that are vulnerable to different types of climate impacts. Armed with these new tools, managers will be better able to develop site-specific strategies to cope with climate-related threats to water quality and quantity.

### Wildfires

Wildfires can cause immediate changes in water quality. The fire itself can result in elevated water temperature, although direct heating is brief. Some fire retardants used to control wildfire contain chemicals that can harm aquatic life if present in sufficient concentrations. More significantly, however, sediment concentrations usually rise in the post-fire environment, watersheds become more prone to landslides and debris torrents, peak flows often increase during storms, the types and quantities or organic materials that enter watercourses are altered, and loss of riparian vegetation leads to increased and more variable stream temperatures. All of these changes can be harmful to valued aquatic and riparian species, and they typically cause problems for downstream water users. Nevertheless, the role of wildfire in maintaining long-term habitat complexity has been increasingly appreciated by aquatic ecologists. In one study in the Oregon Coast Range, wildfires were found to be the catalyst for delivering large wood and coarse sediment to streams. These fire-derived materials functioned as aquatic habitat for more than a century and helped maintain the productivity and diversity of stream-dwelling salmon and trout in watersheds that had experienced large natural burns.

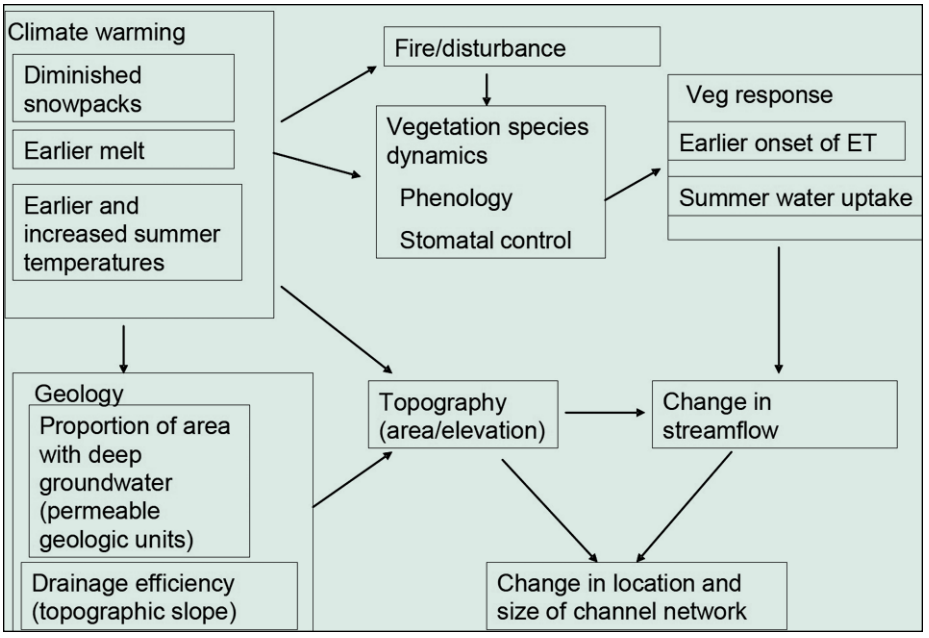


DIAGRAM COURTESY OF GORDON GRANT, PNW RESEARCH STATION

**Figure 2. Potentially important climate-related influences on water quality and quantity that are currently being investigated. ET = evapotranspiration.**

The debate within the natural resource community over what are appropriate pre- and post-fire forest treatments goes far beyond maintaining clean water, and therefore it is useful to consider the issue of stream protection in a much larger context. Because climate change will lead to more and hotter wildfires for a variety of reasons, the question arises: "What can be done to reduce short-term damage to aquatic and riparian conditions while conserving the long-term habitat benefits of fire?" At present, there are no simple answers to this question. Fuels reduction treatments may be worthwhile in riparian areas where the risk of intense fire is very high, but some riparian zones are not likely to burn severely and fuels treatments may compromise aquatic habitat development and harm water quality if they reduce wood recruitment, alter floodplain features and exchanges of aquatic and terrestrial organic materials, and damage stream banks. Likewise, post-fire treatments such as salvage logging and erosion control using hay bales may be appropriate in some locations, but inappropriate in others.

The most effective fire strategies will emerge from thoughtful analyses of local conditions, coupled with assessments of the short- and long-term benefits and risks of potential treatments. Unfortunately, well-monitored field tests of the effects of pre- and post-fire silvicultural treatments on aquatic ecosystems are rare. Managers are encouraged to examine

the recent scientific literature on wildfires and water quality in the western U.S., as perspectives on the role of fire have changed over the last decade and future fire regimes will differ from those of the past. The topic of fire management and water quality protection will continue to be of interest to scientists in the coming years.

## Invasive species

Invasive species are not usually associated with clean water issues in the Pacific Northwest, but they may have a significant impact on attributes in addition to sediment and temperature, such as nutrient concentrations. Many aquatic invasive species (plants, invertebrates and fishes) are limited to coastal and interior lowlands and are not abundant in forested headwater areas, but invasive riparian plants are spreading throughout Washington and other northwestern states at a rapid rate. For example, several varieties of Asian knotweed (*Fallopia* syn. *Polygonum*) are considered threats to native vegetation and are invading many watersheds where they are capable of displacing native shrubs and trees (Figure 3). The proliferation of invasive species will be aided by climate change, more frequent wildfires and expanded human development. Although there are programs in place to detect and control some unwanted invaders, many will simply become part of our future forested landscape.

We have a very incomplete understanding of the impacts of invasive species on water quality and quantity. In some parts of western North America dense growth of non-native species such as tamarisk are believed to have lowered streamflow through water uptake and transpiration. Whether reduced flows can be attributed to invasive riparian plants in the Pacific Northwest is not clear and probably unlikely in high-rainfall coastal areas. Programs aimed at eliminating invasive plants for habitat reasons, however, often rely on herbicides to kill these aggressive invaders and multi-year treatments are common. For species such as knotweed, stem injection of herbicide by hand is often the method of choice, with the added benefit of reducing entry of the chemical into watercourses compared to application by spraying; however, this method is very labor intensive. Nevertheless, there are relatively few scientific studies of the effects of invasive species on streams in forested watersheds or on the water quality impacts of invasive species control programs. More research is needed.


PHOTOS COURTESY OF P. BISSON

**Figure 3. Invasive riparian plants such as Japanese knotweed can spread asexually through rhizome fragmentation, spawning isolated plants (a.) that coalesce to form dense thickets (b.) that exclude native vegetation. Water quality impacts of these invaders are poorly understood.**

## Establishing realistic clean water goals

Climate trends, a changing fire regime, invasive species, and a number of other factors related to human development will make it more difficult for streams in forested watersheds to conform to existing water quality standards. One conclusion seems clear: We will not be able to restore surface waters to conditions that existed prior to Euro-American settlement. Instead, we face a future in which hydrologic regimes, even in the most pristine watersheds, will differ from the past. For some aquatic species, especially those adapted to cold waters, the environmental margin between survival and local extirpation will grow thinner. This poses a challenge to water quality regulators to develop clean water goals that are realistic in the face of inevitably changing conditions, and to forest managers to develop conservation strategies that strive to reduce risk in those circumstances where aquatic resources are critically imperiled. In Washington and elsewhere in the Pacific Northwest, scientists are actively investigating methods of identifying environmental "hotspots" over large geographic areas (places where predicted hydrologic change and highly sensitive species overlap), in which tempered water quality expectations can be met by innovative management approaches that provide for effective water stewardship. ◆

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# Mica Creek Study Results Fill Knowledge Gap

BY TIMOTHY E. LINK AND JOHN A. GRAVELLE

Timothy Link

Questions regarding the effects of vegetation changes on hydrologic systems have resulted in over a century of forest hydrology investigations beginning with the classic paired watershed study at Wagon Wheel Gap in Colorado. As forest management practices evolved and interest in both the hydrologic and ecological responses has increased over the past century, a new generation of watershed studies have been implemented to assess the effectiveness of regulations and best management practices for forestry.

To meet these needs in the interior Pacific Northwest, the Mica Creek Experimental Watershed in northern Idaho has been operated by Potlatch Corporation from 1990 to the present. The study was initiated by Dale McGreer, who was the Potlatch hydrologist at the time. During the early 1990s, concern over timber harvest and its potential to destabilize stream channels due to increasing streamflows was a concern, and this study was designed to both address this issue and provide a comprehensive evaluation of direct and cumulative effects of forest management activities.

PHOTO COURTESY OF K. WATTENMAKER

**An oblique aerial image of the experimental harvest units in the Mica Creek Experimental Watershed.**

In 1994, Dale McGreer handed over the reins to Terry Cundy, who became the Potlatch hydrologist and still oversees the project today. In 2003, Potlatch and the University of Idaho formed a partnership to help increase awareness of the Mica Creek Study to both the public and the scientific community. University of Idaho researchers also provided expertise and secured additional funding to advance snow, tree growth, forest ecology and forest operations research, in addition to the core study initiated by Potlatch.

There are several aspects of the experimental design that enhance the impact of the project for advancing knowledge of the effectiveness of current regulations and contemporary forest management on streams. In addition to a classic nested and paired design that provides BACIPS (Before-After-Control-Impact Paired Series) evaluations, the timing of management activities provides for separate evaluations of road construction and timber harvest activities, which typically are difficult to isolate. The study is also being conducted in typical managed forestlands in the region that are comprised of second-growth coniferous forests managed for timber production. Monitoring consists of streamflows, water temperature, sediment, nutrients, aquatic macroinvertebrates, channel morphology and fish. Monitoring was conducted during a six-year calibration period before roads were installed, followed by a four-year period after road construction, and then a six-year post-harvest treatment period. Monitoring is ongoing as the experiment transitions to a second phase associated with addi-

tional road construction and timber harvest in the study area.

The focal point of the original study design involved timber harvests in two of the small (approximately 400 acre) sub-watersheds, which consisted of 50 percent of the area clearcut in one and 50 percent of the area partial-cut in the other. This experimental design enabled an assessment of the effects of these different contemporary harvest practices on stream systems, including separation of the road construction effects from harvest effects, as well as assessing the cumulative effect of harvesting downstream of the harvested units. Highlights of the results are summarized in the following paragraphs.

Annual average streamflows were found to increase by up to 10 percent following road construction, although the downstream cumulative effects appeared to be negligible. Following harvest, streamflows increased by 36 percent in the 50 percent clearcut catchment and by 23 percent in the 50 percent partial-cut catchments. Increases in streamflows (11-20 percent) were also observed at downstream cumulative monitoring sites. Results of a forest growth model that was coupled with a physically-based hydrologic model indicated that annual yields are expected to return to baseline levels after approximately 25 years. A modeling study to assess the potential effects of different harvest patterns on streamflow regimes indicated that flows were much more sensitive to area harvested relative to specific harvest patterns. For a comparable number of trees removed, partial-cut harvesting (50 percent canopy removal) was found to have a smaller effect on streamflows relative to clearcut harvesting.

Maximum stream temperatures did not change significantly in any of the fish-bearing reaches below the harvest units. Temperature changes within the harvest units increased by a maximum of 3.6 °C, but were highly variable throughout the non fish-bearing headwater reaches. Shortwave and longwave radiation measurements at the stream surface indicated that incoming radiation was comparable to pre-harvest conditions due to rapid recolonization of low-lying herbaceous vegetation in some harvest units. Incoming radiation in the sparsely revegetated areas was approximately 40 percent higher than in the unharvested reaches.

There were no significant changes in sediment concentrations after road building and harvest; however, sediment loads were found to increase by roughly a factor of two in the 50 percent clearcut watershed, primarily as a result of increased flows. Despite this observed change, elevated sediment concentrations returned to baseline levels after one year. No significant sediment changes were observed in the partial-cut watershed.

Stream samples were also analyzed

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for total Kjeldahl nitrogen, total ammonia nitrogen, nitrate + nitrite, total phosphorus and orthophosphate. The only large significant change was in the nitrate + nitrite values that increased by roughly an order of magnitude in samples from the 50 percent clearcut unit. This increase was delayed following harvest and appears to be related to broadcast burning that was conducted for site preparation. The observed increase was also similar to values that were observed following both prescribed burns and wildfire in other forested watersheds.

A number of metrics were used to assess changes in aquatic macroinvertebrate assemblages, including functional feeding group composition, organism densities, taxa richness indices, species diversity and sediment tolerance indices. No major changes in any of the aquatic macroinvertebrate metrics were found to occur as a result of road construction or timber harvest. Substantial year-to-year variability was also observed, suggesting that infrequent sampling may not provide adequate information to assess subtle effects of disturbances in forested watersheds.

Changes in systematic channel morphology following management activities have proven difficult to discern. In addition to a network of surveyed cross sections and substrate pebble counts collected throughout the study, a comparison of channel habitat surveys completed in 1994 and 2010 was completed to assess the potential impact of harvest on stream geomorphology and fish habitat. Frequency of basic habitats remained relatively unchanged across the entire stream network based on a change detection threshold of ±10 percent. Small changes were observed between reaches categorized by confinement, gradient and substrate; however, it was very difficult to identify whether changes were due to land management or other extraneous influences.

Preliminary fish data suggest that populations increased in the 50 percent clearcut stream following timber harvest. Observations of the upstream extent of fish presence suggest that fish are moving higher up in the stream network following timber harvest, which may be due to increased flows that are enabling access to higher reaches.

Overall, the Mica Creek Study indicated that road construction and timber harvest activities that were conducted in compliance with the Idaho Forest Practices Act rules were generally effective for protecting water quality in this area. This knowledge is critical to ensure the sustainability of both natural resource-based rural economies and aquatic ecosystem health in the region. The study also indicated that partial-cut harvesting produced the smallest changes to both the flow regime and quality of the stream water in the experimental area. As forest managers of public lands in the region are increasingly being challenged to demonstrate the potential environmental effects of forest thinning, the results of this project fill a key knowledge gap that will enable managers to make informed decisions based on sound science.

In 2007, the Mica Creek Study moved into a second phase, where the experimental area transitioned into a regular working forest managed for timber production. Streamflow and water quality monitoring is currently ongoing. Continued evaluation of the effects of successive management activities coupled with concurrent vegetation recovery will therefore continue to provide important results on the effectiveness of the Idaho Forest Practices Act regulations and Best Management Practices for forestry in the interior Pacific Northwest. ◆

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# Sediment in Forest Streams: More Than Meets the Eye

BY PAUL W. ADAMS

In early 1986 a landmark conference was held at the University of Washington on "Streamside Management: Forestry and Fishery Interactions." The conference helped assemble and synthesize much of the region's seminal research and thinking on this challenging topic, and with its 471-page published proceedings (Salo, E. and T. Cundy, eds., 1987. UW Inst. Forest Resources Contrib. No. 57), it provided an exceptional foundation for understanding and management that continues nearly 25 years later.

Among the many topics addressed at the conference was "Fine Sediment and Salmonid Production: A Paradox." The latter is reflected in this quote from the printed paper:

> *Nearly all laboratory [sediment and fish] survival studies have used simplified unnatural gravel mixtures… Also, mitigating factors… such as structural roughness and spawning behavior… complicate direct field application of laboratory studies. Nevertheless, forest practice rules designed to minimize fine sediment and turbidity in streams have resulted primarily from laboratory studies. The relatively few studies dealing with the effects of sediment from forest management in natural environments have been less conclusive… field studies have shown both increases and decreases in salmonid populations associated with forest management. The studies have generally failed to isolate the effects of fine sediment from other habitat changes. A more holistic view of the role of sediment in stream ecosystems is needed.*

Keep in mind that the context of this discussion was forest practices and research between the mid-1960s and the mid-1980s. Since that period, there have been great changes in practices and policies for forest stream protection as well as more research. Many of these changes reflect the expanded understanding, emphasized elsewhere in the 1987 paper and in many other studies, of the vital role of physical structure and rearing habitat in streams. Yet the nature of some persistent concerns and policy proposals involving forestry and sediment at times seems to be founded in a 1970s-era understanding of the issue. Let's briefly review a few of the important things we now know and should consider with sediment in forest streams in the region.

First and foremost: Sediment happens. That is, sediment is no stranger to forest streams or the species that inhabit them. Sediment does vary widely in amount, quality and timing, but it's a common stream component that originates from natural erosion in uplands, riparian areas and stream channels themselves. Monitoring of streams in undisturbed forest watersheds verifies this, with sediment-

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laden samples common during both large and small storm events (see figure). If similar observations of muddy water are noted for a stream draining a watershed with a recent timber harvest, how can we be sure the harvest is the cause? Answer: With considerable time, effort and expense, because hundreds if not thousands of samples or measurements can be needed to find a statistically valid difference due to the harvest. And even if such a difference is found, the next important question is whether such a difference, especially if it's not persistent, is likely to cause problems for fish or other resources.

Although technology has made water quality sampling and analysis much easier in recent years, there is no way to avoid the need for many samples to accurately characterize stream sediment patterns over time and space. Among the challenges is identifying where, when and how long to sample, because sediment can originate from relatively hard-to-see, chronic sources (e.g., stream bed and bank erosion), as well as more obvious but infrequent events (e.g., rapidly moving landslides) in widely different areas in a single watershed. Even with automated samplers, it's often necessary to sample for the entire duration of a storm because sediment levels can vary greatly and differently as streamflow rises and falls. Sediment also includes sand, gravel and cobbles that move closer to the stream bed and require different sampling devices and schemes to accurately characterize.

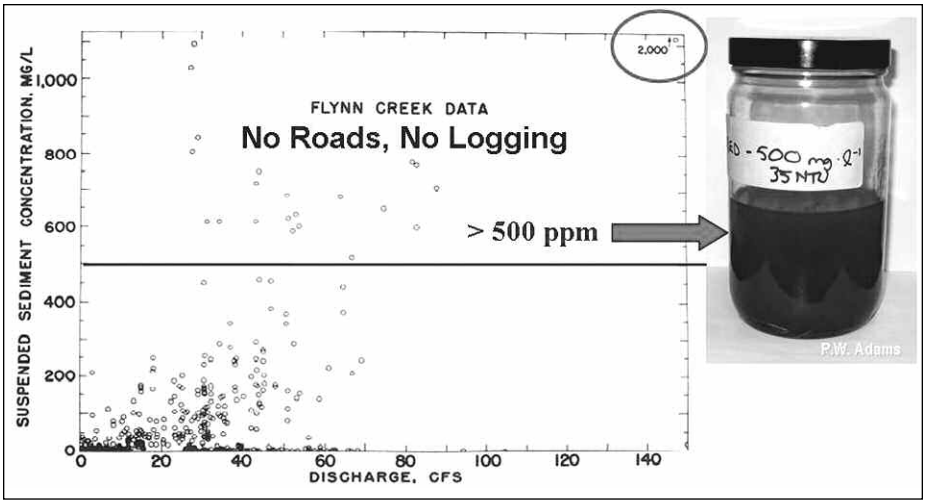



PHOTO COURTESY OF PAUL W. ADAMS

**Sediment in samples from a stream draining an undisturbed forest watershed in the Oregon Coast Range. Jar at right contains water with a sediment level of 500 parts per million.**

In addition to automated equipment and digital technologies, newer tools include isotope tracers and clay mineral analyses that can "fingerprint" sediment and thereby trace it back to its original erosion source. The latter method was valuable after the 1996 flood raised questions about the role of forest practices in water supply problems that impacted the City of Salem—the analysis of sediment sources showed that forestry played only a minor role (see www.gao.gov/archive/1998/rc98220.pdf). Instead, the major problems were traced to natural earthflows and other land use activities that generated unique clay sediments that overtaxed the water treatment system.

One shortcut for water quality moni-

toring that's been used for decades is to measure turbidity, a relatively simple optical reading of water "cloudiness" that can provide an index of stream sediment levels. But like sediment, turbidity is sensitive to changes in geology and other local influences, and it presents similar challenges in clearly establishing what's natural or normal in a specific watershed. Nonetheless, turbidity is part of the current array of water quality standards and monitoring requirements, including those that apply to municipal water systems. For example, recently the Oregon DEQ examined turbidity patterns in source waters for municipal systems in the Coast Range (see www.deq.state.or.us/wq/dwp/docs/TurbidityAnalysisOregonPWS201006.pdf) and it also released a technical review to support efforts to revise Oregon's water quality standard for turbidity (see www.deq.state.or.us/wq/standards/docs/Turbidity/10-WQ-022.pdf).

These and other issues related to sediment in streams will continue to challenge forestry and other natural resource professionals, and support the need for monitoring, research and education about forest practices and other water quality influences. With ongoing concerns about the use of pesticides in forestry, for example, questions have arisen as to whether these chemicals are transported with sediment originating from forestlands. Two major legal cases in Oregon this year (see article by Julie Weis and the "Policy Scoreboard") also involve concerns directly related to sediment from forestlands. With such issues in mind, it seems fitting to close with a quote from the same era as the first quote in this article, especially given its persistent relevance and applicability:

*"Simplicity cannot be willed upon the forest hydrologic system."*—R.D. Harr, Forest Hydrologist, 1987 ◆

*Paul W. Adams is a professor and Forest Watershed Extension specialist in the Forest Engineering, Resources and Management Department at Oregon State University. He also currently chairs the Oregon SAF Policy and Legislation Committee. He can be reached at 541-737-2946 or paul.adams@oregonstate.edu.*

## OSAF Position Statement Addresses Riparian Forest Management

In August 2010, Oregon SAF (OSAF) approved an updated Position Statement on "Managing Riparian Forests," with the following core position:

*The OSAF believes that active management of riparian areas on public and private forestlands should be a key part of contemporary strategies and policies to maintain and improve water resources and fish and wildlife habitat. This view is supported by the low levels of riparian forest management now seen throughout Oregon, even where policies allow some active management. Of particular concern is that, lacking management, many of these unique and ever-changing forests now have or will develop conditions that are less than ideal for habitat and water quality, including reduced biodiversity and substantially increased risks of damaging wildfires.*

*Factors that have limited the management of Oregon's riparian forests include concerns about potential impacts, policies that typically restrict rather than promote management, and the complexities and costs of management under the existing regulatory constraints. A common perception is that active management of riparian forests will only have negative outcomes for desired resources. However, a growing body of research and management experience shows that carefully prescribed forest practices can have little or no extended impacts while maintaining or improving resource conditions. OSAF believes that both state and federal policies should reflect these important realities and do more to encourage active management of riparian areas on Oregon's forestlands.*

The original OSAF position statement on this topic was adopted in 1998, as a direct response to concerns about low populations of wild anadromous fish species, an issue reflected in the title "Fish and Riparian Forests." The 2010 update is broader and considers the diverse functions and benefits of riparian areas, as well as the limited management of many riparian forests that stems from both regulatory complexities and perceptions that little or no management is best for riparian and aquatic resources.

Limited management of riparian areas is a serious concern in drier forest types that are prone to wildfire and insect and disease hazards. A recent survey shows that, although some riparian forest management is occurring on western federal lands, these projects typically are small in size and located in wildland-urban interface areas (Stone, K.R. et al. 2010. Environmental Management, Vol. 46:91-100). Where major wildfires have occurred, it is clear that burn severity in riparian areas can be as high as upland areas, with direct and substantial impacts on local soil and water resources.

In moist forest types, limited riparian management can restrict opportunities to maintain or improve watershed functions and fish and wildlife habitat. Landowners may also unnecessarily forgo income from carefully prescribed timber harvests, or allow invasive species problems to grow in extent and impact. With such broad concerns for both moist and dry forests, the updated OSAF position makes a strong statement about the role and need for active management of many riparian forests.

Additional supporting discussion and a downloadable PDF of the complete statement can be found at www.forestry.org/pdf/riparian10.pdf. ◆

# The Environmental Impact of Contemporary Forest Practices: A Progress Report from the Watersheds Research Cooperative

BY ARNE SKAUGSET

The overarching goal of the Watersheds Research Cooperative (WRC), a research cooperative administered by the College of Forestry at Oregon State University, is "to determine the environmental impact of contemporary forest practices." The research is centered on forest streams, so environmental impact in this context means aquatic ecosystems, or more specifically, streamflow, water quality, aquatic habitat, fish, amphibians and aquatic invertebrates. The research is carried out at three paired watershed studies located across western Oregon: the Hinkle Creek Paired Watershed Study (HCPWS) in southern Oregon, the Alsea Watershed Study Revisited (AWSR) in the central Oregon Coast Range, and the Trask Paired Watershed Study (TPWS) in northwest Oregon. You can learn more about the WRC and the paired watershed studies at www.watershedsresearch.org.

The high variability in space and time of the environmental variables is a consistent result from all three paired watershed studies. One of the interests in the environmental impact of contemporary forestry includes off-site, downstream or "cumulative" impacts on aquatic ecosystems. Thus, the contemporary paired watershed studies are carried out at a scale that allows the study of cumulative impacts.

For example, the two watersheds that encompass the HCPWS have an area of 1,942 ha (4,800 acres) and the TPWS encompasses a study area of approximately 2,400 ha (6,000 acres). Measuring environmental variables over these spatial scales for up to 10 years allows insight into the variability in space and time of these variables as never before studied.

In Hinkle Creek, during calibration, the maximum daily temperature in the non-fish-bearing, tributary streams varied by as much as 4.5ºC for streams that are side-by-side with the same aspect, geology, soils and vegetation. Also in Hinkle Creek, the survival of coastal cutthroat trout varied from approximately 20 to 60 percent depending on the year and the location in the watershed (mainstem vs. tributary and North vs. South Fork). In Needle Branch in the AWSR, dissolved oxygen levels ranged from 2 to 10 mg/l depending on time during the summer and location in the watershed. These are examples of naturally occurring variability in either control or treatment watersheds before timber harvest occurred. Other similar examples of variability can be produced with other environmental variables from all three of the paired watershed studies.

Despite the high natural variability, change was detected in several environmental variables as a result of the timber harvest. The results that are discussed below are confined to the HCPWS because, at this time, it is the only one of the three paired watershed studies that has post-treatment results available. There were two harvest entries in the South Fork Hinkle Creek. The first was in 2005-2006 and consisted of four clearcuts installed adjacent to non-fish-bearing streams. The second entry took place in 2008-2009 and consisted of four clearcuts installed adjacent to fish-bearing tributaries or the main stem of the South Fork Hinkle Creek. At this point, the most robust results are limited to the response of individual variables to timber harvest at the scale of individual stream reaches

The response of stream temperature to the timber harvest was not what was expected, and at times, was counterintuitive. First of all, the general expectation was that maximum daily stream temperatures would increase greatly. This was not realized. For the most part, where maximum daily stream temperatures increased, the increase was minimal—about 1ºC or less. For one stream reach the average maximum daily temperature increased 2.5ºC as a result of the timber harvest. For a second stream reach the increase was 4.5ºC, but that was in response to a dam break flood. For two stream reaches the average maximum daily temperature decreased 1-1.5ºC. With the exception of the stream reach that experienced the dam break flood, where the average minimum daily temperature increased, daily minimum temperatures decreased. Initially, some of the responses of stream temperature were puzzling, but after analyzing the canopy closure and groundwater data, it appears that all of the responses, even the counterintuitive ones, can be explained.

Aquatic insects also responded to timber harvest at the stream reach level. After the first harvest entry the density of aquatic insects increased, but the number of species decreased in the vicinity of the clearcuts. After the second harvest entry, a similar response was observed in the fish-bearing tribu-

PHOTO COURTESY OF KELLY JAMES

**The first harvest entry in the Hinkle Creek Paired Watershed Study occurred during winter 2005-2006. A 55-year-old harvest-regenerated stand of Douglas-fir was harvested with contemporary logging equipment. Pictured above is a swing yarder in a skyline configuration coupled with a stroke-boom delimber and a loader.**

taries and the main stem in the vicinity of the clearcuts. Populations of aquatic insects were unaffected in the fish-bearing tributaries and mainstem except for the reach of stream impacted by the dam break flood and areas in the vicinity of clearcuts.

Streamflow and sediment yield were also affected by the first harvest entry. Mean monthly streamflow and sediment yield from the non-fish-bearing streams increased after timber harvest. The increases in streamflow were expected, proportional to the area harvested, and consistent with expectations. The increases in sediment yield were consistent with the increases in streamflow.

As of 2008, there were no off-site or cumulative impacts due to timber harvest detected on the fish-bearing tributaries or the mainstem of the South Fork Hinkle Creek to biological response variables. There was no impact on either the growth or survival of coastal cutthroat trout in the fish-bearing portions of the South Fork. A similar result was observed for aquatic insects and amphibians, in this case the Pacific giant salamander.

Cumulative or off-site impacts were detected for two environmental variables: streamflow and sediment yield. Increases in mean monthly streamflow and sediment yield were detected after timber harvest at the outlet of the South Fork Hinkle Creek. Again, the increases in streamflow were expected and consistent with expectations given the amount of timber harvested upstream. For the most part, increases in sediment yield were consistent with the increases in streamflow.

Work continues at all three the paired watershed studies. For the TPWS, the calibration portion of the study will be completed this winter and the treatment phase will begin in 2011. The initial harvest entry in the AWSR is installed. A subsequent treatment will be installed in 2012, and of course, analysis of post-treatment data is underway. Data collection for the HCPWS will be completed next year. Analysis of the data for both harvest entries continues. The focus of the analysis to date has been the response of individual environmental variables to timber harvest at the scale of an individual stream reach. However, efforts are underway to expand these analyses to include an integrated response at the watershed scale. ◆

*Arne Skaugset is associate professor, Oregon State University Department of Forest Engineering, Resources and Management, in Corvallis. He can be reached at 541-737-3283 or arne.skaugset@oregonstate.edu.*

## Golden Members Honored

SUBMITTED PHOTO

**Left to right: Blue Mountain Chapter Co-chair John Herbst, new Golden members Ken Evans and Joe DesJardin, and OSAF Chair Tim Keith celebrate Ken and Joe's Golden membership awards in September. Ken and Joe both live in John Day.**

**Joe DesJardin retired from the U.S. Forest Service in 1986 after having worked 30 years, the last seven years in timber sale work on the Malheur National Forest. Ken Evans retired from the Forest Service in 1987 after 37 years with the USFS, the last eight years as supervisor of the Malheur National Forest.**

# The Ninth Circuit Strikes Again: Logging Roads Ruled to Require Clean Water Act Permits

BY JULIE WEIS

In August 2010, in a decision having practical implications far beyond the forest, a three-judge panel of the Ninth Circuit Court of Appeals concluded that two public roads used for logging and related silvicultural activities on Oregon's Tillamook State Forest were point sources requiring Clean Water Act permits (National Pollutant Discharge Elimination System, or NPDES, permits). The appellate court's decision, on which rehearing has been sought, has potentially far-reaching ramifications beyond the realm of forest roads and into the everyday world of all roads, private or governmental, that feature ditches or culverts designed to capture and properly dispose of stormwater runoff.

The logging roads decision has its origin in an Oregon district court case filed more than four years ago by an environmental nonprofit (Northwest Environmental Defense Center or NEDC) against the State of Oregon (actually against Oregon's State Forester and the individual members of Oregon's Board of Forestry) and four Oregon forest products companies: Hampton Tree Farms, Inc., Stimson Lumber Company, Georgia-Pacific West, Inc. and Swanson Group, Inc. NEDC's lawsuit claimed that stormwater flowing into ditches alongside the Trask River and Sam Downs roads on the Tillamook State Forest in northwestern Oregon was transporting sediment into streams and rivers in a manner that constituted "discharge of a pollutant from a point source" and hence required an NPDES permit. Because of the potential implications of the case, the Oregon Forest Industries Council and the American Forest and Paper Association, joined by Tillamook County, intervened on the side of the state and forest products industry defendants.

The Oregon district court quickly dismissed the logging roads lawsuit in early 2007 on the grounds that any discharge of pollutants from the public roads was excluded from the NPDES permitting system by EPA's so-called Silvicultural Rule (found at 40 C.F.R. § 122.27(b)(1)). Under the Silvicultural Rule, harvesting operations, surface drainage, or road construction and maintenance from which there is natural runoff are exempt from the NPDES permitting requirement. NEDC appealed the dismissal of its case, and more than three years later the Ninth Circuit sided with NEDC by concluding that "stormwater runoff from logging roads that is collected by and then discharged from a system of ditches, culverts, and channels is a point source discharge" requiring an NPDES permit.

The technicalities of the Ninth Circuit's decision are not the point of this article. But in brief, the appellate court first took issue with EPA's authority to adopt the Silvicultural Rule in a way that exempted stormwater runoff from logging roads and their associated drainage systems from the Clean Water Act. The Ninth Circuit then turned its attention to an argument not even reached by the district court, namely whether certain amendments to the Clean Water Act dealing with the complicated issue of stormwater discharges (Section 402(p) of the Clean Water Act, 33 U.S.C. § 1342(p)) had exempted logging road stormwater runoff from the NPDES permit requirement. Despite EPA's prior decision to the contrary, the Ninth Circuit concluded that logging was a defined industrial activity not exempt from the NPDES permitting process. In reaching that conclusion, the appellate court ignored commonsense reasons why logging roads did not fall within the regulatory definition of "immediate access roads . . . used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility."

So what does the logging roads decision mean in a practical sense? First, as of this writing, the decision resides in a sort of legal limbo. The Ninth Circuit did not impose a remedy on the state and forest products industry defendants, but instead sent the case back to the district court to consider that issue. The case remains in the Ninth Circuit, however, because on October 5, 2010, the state and forest products industry defendants asked the Ninth Circuit to rehear the case, either by the same three-judge panel that decided it originally, or by a larger "en banc" panel of 11 Ninth Circuit judges. If the Ninth Circuit declines that request, the parties' last chance for further review would be with the U.S. Supreme Court. If no further review is granted, the case eventually will end up back in Oregon district court.

Second, if the case is not revisited by either the Ninth Circuit or the U.S. Supreme Court, the logging roads decision will become the law of the land within the expansive Ninth

Circuit. The Ninth Circuit encompasses nine states—Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon and Washington—plus two Pacific Islands, so the number of affected private and governmental entities is potentially huge. And NEDC likely will advocate for a nationwide remedy, which would inflict the logging roads decision on the rest of the nation's roads.

Although it is difficult to predict the way in which the Oregon district court ultimately might fashion a remedy, some observers believe that many private and governmental entities will be required to obtain a permit for the discharge of stormwater from logging roads under their control or ownership. The U.S. Forest Service already has received notice of legal challenges to forest road construction, restoration and maintenance activities—and been sued in Idaho—as a result of the logging roads decision, even though the agency was not a party to the case. In most cases, EPA's delegation of NPDES permitting authority to states will mean that the permitting process will fall to already-overburdened state agencies that historically relied on comprehensive and prudent systems of best management practices to address the issue of silvicultural stormwater runoff.

At this point, the Ninth Circuit's logging roads decision has created more questions than answers. So stay tuned as the case works its way through the legal system, and perhaps catches the eye of those in Congress that recognize a problem in need of a legislative solution. ◆

*Julie Weis is a partner in the Haglund Kelley Horngren Jones & Wilder law firm in Portland, Ore., where she enjoys putting her natural resources background to work on environmental law matters, including forest products issues, as part of a busy civil litigation practice. She can be reached at 503-225-0777 or JWeis@hk-law.com.*



# We Remember

## Estel "Brownie" Brown 1918-2010

Bynum Estel "Brownie" Brown died June 14, 2010, in Walla Walla, Wash. He was 91. Brownie was born at home in Anatone, Wash., in 1918. He graduated from high school in Anatone and continued his education at Washington State University, receiving a degree in forestry. While at WSU Brownie met his future wife, Janice Brown, and they were married in 1941. They had two children. His wife Janice preceded him in death.

Brownie served in the U.S. Navy during World War II. Following his discharge, he began working for the U.S. Forest Service. He also worked for Oregon Pulp and Paper Co. in Salem, and Crown-Zellerbach Corp. in Portland, where he served in many managerial positions until his retirement in 1983.

In November 1990 Brownie married Mary Scott Torland. Brownie and Mary were snowbirds with homes in Sun City West, Ariz., and Walla Walla. Brownie enjoyed traveling the world on business prior to his retirement and later for pleasure. His prize-winning rose garden and beautiful yard were a source of satisfaction and pride.

Per Brownie's request, there will be no service.

## William R. Taylor 1916-2010

William R. Taylor, retired forest ranger, died May 28, 2010, in Vancouver at age 94. Mr. Taylor was born Jan. 3, 1916, and was raised in Holbrook, Mass., 13 miles south of Boston. He graduated from Sumner High School in 1933. He spent a year at Northeastern University in Boston and then completed a year at the New York State Ranger School in Wanakena, N.Y., graduating in 1937. After graduation, he found work with the Appalachian Mountain Club as a hutmaster in Pinkham Notch during the winters; and Lonesome Lake, Franconia Notch during the summers. By 1939, he was working for the U.S. Forest Service in New Hampshire, and was then drafted into the U.S. Army in 1940. He served in the U.S Army from 1940 to 1945 in anti-aircraft artillery, rising to the rank of staff sergeant. He served in the U.S., Iceland and Europe. After being discharged, he earned a bachelor's degree in forestry from the New York School of Forestry at Syracuse University. He received his master's degree from the University of Idaho. Bill's employment with the U.S. Forest Service began in Spokane, followed by short-term employment in Priest River, Idaho; Berkeley, Calif.; Spokane; and Olympia. A permanent appointment to the U.S. Forest Service came in 1952 to the Mount Baker National Forest, followed by assignments to the Siuslaw National Forest; the Siskiyou National Forest as district ranger of the Chetco district; the Umpqua National Forest as district ranger of the Diamond Lake district; and his final assignment was to the Gifford Pinchot National Forest as land exchange specialist. He retired in 1979.

Bill was a charter member of the Society of American Foresters, and a member of the American Forestry Association. He was a member of Trinity Lutheran Church in Vancouver. He married Janet Miner in 1941. She died in Tacoma in 1991. He married Betty Smyth in December 1992 in Grants Pass.

The following words describe Bill's enjoyment of working and camping in the forests: Rocks are my pillow; cold ground is my bed. I use the blue sky for my blanket, Moonlight for my spread.

## Dwight Nelson Jeffers 1916-2010

Dwight Jeffers, a 50-year SAF member, passed away April 28 after a long, active and happy life. Born August 16, 1916, in Laramie, Wyoming, Mr. Jeffers was the son of a forester who always knew that he would be a forester too. After graduating from the University of Idaho, he began his career in Susanville, Calif., in 1941, scaling logs in the summer, pulling on the mill's green chain in the winter. He hired on with Weyerhaeuser in 1943, ultimately becoming chief forester of their 600,000-acre St. Helens tree farm. In 1959 he transferred to the company's Tacoma office as liaison forester. The most rewarding period of his career came when he established their national system of tree nurseries. Always an active participant in his professional organization, he established the Southwest Washington chapter of the SAF.

After retiring from Weyerhaeuser in 1981 he traveled the United States and Europe with his wife, hiked the Cascades and Olympics with his children and friends, kayaked and biked the Puget Sound area, tutored elementary school children and enjoyed painting watercolors.

# 2011 OSAF/WSSAF LEADERSHIP CONFERENCE

## January 20-22, 2011 – Best Western Hood River Inn – Hood River, Oregon

All SAF members from Washington, Oregon, and Inland Empire are invited to participate in the 2011 Leadership Conference. The program will allow you to: learn how to run an effective business meeting, gain exposure to SAF bylaws, understand our role in national/regional policies, discover the SAF Northwest Office, hear about the duties of SAF officers and SAF programs, and get to know new and old friends alike. We are privileged to have both Michael Goergen, SAF Executive Vice President, and 2011 SAF President Roger Dziegelenski attend our conference. Please take advantage of this rare opportunity to engage and socialize with your SAF leaders.

### THURSDAY, JANUARY 20, 2011

OFRI Speakers Bureau Training–**Jordan Benner**, OFRI–registration through OFRI (3:00-5:30 p.m.)

### FRIDAY, JANUARY 21, 2011

- SAF Northwest Office Committee Meeting (7:00 a.m.)
- Concurrent OSAF and WSSAF Executive Committee Meetings/Registration (9:00 a.m.)
- Lunch–included in registration fee (Noon)
- Welcome–**Shaun Harkins**, Plum Creek Forester and 2010 OSAF Delegate-at Large (1:00 p.m.)
- Parliamentary Procedure Demonstration (1:15 p.m.)
- OSAF/WSSAF Bylaws Recap–**Chuck Lorenz**, District 1 Council Representative and WSSAF Treasurer (2:00 p.m.)
- Break/Foresters' Fund/Exhibitor Displays (2:15 p.m.)
- Council and National Office Updates–**Michael Goergen**, SAF Executive Vice President (2:30 p.m.)
- SAF Northwest Office Services–**Lori Rasor**, SAF Northwest Office Manager/Editor (3:30 p.m.)
- How to make an SAF meeting fun–**Steve Pilkerton**, Marys Peak Chapter Member (4:30 p.m.)
- Break/Foresters' Fund/Exhibitor Displays (5:30 p.m.)
- No-Host Cocktail Social/Foresters' Fund Raffle (6:00 p.m.)
- Banquet–included in registration fee (6:30 p.m.)
- Banquet Speaker–**Roger Dziegelenski**, 2011 SAF President (7:00 p.m.)

### SATURDAY, JANUARY 22, 2011

- Breakfast–included in registration fee (6:00 a.m.)
- SAF Policy/Position Statements–**Paul Adams**, Oregon SAF Policy and Legislation Committee Chair (7:00 a.m.)
- Concurrent Session (8:00 a.m.)
  - OSAF goals for 2011–**Mike Cloughesy**, 2011 OSAF Chair
  - WSSAF goals for 2011–**Adrian Miller**, 2011 WSSAF Chair
- OSAF/WSSAF/IESAF Website Demonstration–**Eric Kranzush**, Website Committee Chair (9:00 a.m.)
- Continuing Education/CFE Credits–**Mick Sears**, OSAF CFE Coordinator (10:00 a.m.)
- Foresters' Fund–**Norm Michaels**, OSAF Foresters' Fund Chair (10:30 a.m.)
- Break (11:00 a.m.)
- SAF Treasurer Duties–**Steve Caffereta**, OSAF Treasurer (11:15 a.m.)
- Awards/Recognition–**Jim Rombach**, OSAF Awards Co-Chair (11:45 a.m.)
- Lunch–included in registration fee (12:15 p.m.)
- Membership Services–**Craig Richards**, OSAF Membership Co-Chair (1:15 p.m.)
- Closing Remarks/Adjourn (1:45 p.m.)
- Full Sail Brewery Tour (3:00 p.m.)

### OFRI SPEAKERS BUREAU TRAINING (FREE)

OFRI has scheduled a training session for their current Speakers Bureau presentations from 3:00-5:30 p.m. on Thursday, January 20. They are seeking foresters interested in being part of their Speakers Bureau and representing OFRI during short presentations within your community. For further information or to register, contact Jordan Benner with OFRI at 971-673-2951 or benner@ofri.com.

### LODGING

A block of rooms at the Best Western Hood River Inn have been reserved at a special rate of $79.00 plus 9 percent tax, single or double standard rooms; and $89.00 plus 9 percent tax single or double for river view rooms. For reservations, call 1-800-828-7873 or 541-386-2200. All major credit cards are accepted. The Best Western Hood River Inn is located a short hour east of Portland. Take exit #64 off I-84. On the web at www.hoodriverinn.com. Make sure to ask for the SAF Leadership Conference rate when making room reservations.

### REGISTRATION

The Leadership Conference registration fee is **$150 Regular Rate** and **$125 Student Rate**. There is no late fee, but registration by January 12 would be appreciated. Please return your completed registration form and a check made payable to *Oregon SAF* to: SAF 2011 Leadership Conference, Northwest Office, 4033 SW Canyon Rd., Portland, OR 97221. Visa and MasterCard accepted. The registration fee includes lunch on Friday, Friday night banquet, Saturday breakfast, lunch on Saturday and all breaks.

### BREWERY TOUR

Scheduled for Saturday at 3:00 p.m., take a short walk to the Full Sail Brewery to tour and sample great microbrew.

**SAF CFE hours will be available onsite.**

**QUESTIONS?**

Contact Shaun Harkins, 541-267-1855, Shaun.Harkins@plumcreek.com

## Registration Form – 2011 OSAF/WSSAF LEADERSHIP CONFERENCE

### January 20-22, 2011 — Best Western Hood River Inn • Hood River, Oregon

*Registration includes all materials and meals (Friday lunch,banquet & social, and Saturday breakfast and lunch)*

Name_____ SAF Chapter_____ Email_____

Address_____ City/State/ZIP_____ Day Phone_____

Special dietary needs?_____

$_____ $150/person Regular Rate Conference Registration

$_____ $125/person Student Rate Conference Registration

$_____ **TOTAL AMOUNT ENCLOSED**

*Return form & payment to:*
*Leadership Conference, SAF Northwest Office, 4033 SW Canyon Rd., Portland, OR 97221;*
*503-224-8046; michele@safnwo.org*

**– PLEASE REGISTER BY JANUARY 12, 2011 –**

**METHOD OF PAYMENT**

☐ **Check** (enclosed) ☐ **Credit Card** (Visa/MC)

Number: _____

Expiration Date: _____

*Make checks payable to OSAF*

# Calendar of Events

**Fifth Western Native Plant Conference,** Dec. 7-9, Portland, OR. Contact: WFCA.

**LoggerPC V4,** Jan. 11-12, Corvallis, OR; and March 15-16, Corvallis, OR. Contact: FEI.

**Fuel Reduction on Steep Slopes,** Jan. 19-20, Corvallis, OR; April 12-13, Boise, ID; May 3-4, Kamloops, BC. Contact: FEI.

**2011 Oregon/Washington State SAF Leadership Conference,** Jan. 20-22, Hood River Inn, Hood River, OR. Contact: Shaun Harkins, 541-267-1855, shaun.harkins@plumcreek.com.

**Basic Road Design Workshop,** Jan. 25-28, Corvallis, OR; Feb. 8-11, Las Vegas, NV; April 18-21, Boise, ID. Contact: FEI.

**Biomass as a Renewable Energy Source,** Jan. 26, Portland, OR. Contact: The Seminar Group, 800-574-4852, www.theseminargroup.net.

**Forest Stand Dynamics Short Course,** Jan. 31-Feb. 4, Pack Forest, Eatonville, WA. Contact: Barbara Ruth, 203-432-5117, barbara.ruth@yale.edu.

**Mechanized Harvesting,** Feb. 1-2, Corvallis, OR; March 22-23, Coeur d'Alene, ID; April 14-15, Boise, ID; May 5-6, Kamloops, BC. Contact: FEI.

**Timber Value Seminars,** Feb. 15 or April 12, Beaverton, OR. Contact: Tom Hanson, 503-201-4428, TJHanson@forestmgt.com.

**Unit Planning and Layout,** Feb. 28-March 3, Corvallis, OR. Contact: FEI.

**Streambank Soil Bioengineering,** March 9, Spokane, WA. Contact: WFCA.

**Small Log Conference 2011,** March 23-25, Coeur d'Alene, ID. Contact: 406-529-3353, janraulin@gmail.com.

**Helicopter Logging Workshop,** April 1, Coeur d'Alene, ID; and April 22, Boise, ID. Contact: FEI.

**Washington Farm Forestry Association annual meeting,** April 14-16, Vancouver, WA. Contact: Bob Brink, 360-686-3524, farmer@pacifier.com.

**Carbon Credits,** April 21, Seattle, WA. Contact: The Seminar Group, 800-574-4852, www.theseminargroup.net.

**2011 OSAF/WSSAF joint annual meeting,** May 11-13, Jantzen Beach Red Lion Hotel, Portland, OR. Contact: Bob Deal, general chair, 503-808-2105, rdeal@fs.fed.us.

## Contact Information

**FEI:** Forest Engineering Inc., 620 SW 4th St., Corvallis, OR 97333, 541-754-7558, office@forestengineer.com, www.forestengineer.com.

**WFCA:** Western Forestry and Conservation Association, 4033 SW Canyon Rd., Portland, OR 97221, 503-226-4562, richard@westernforestry.org, 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.**

# IFA Nurseries Honors Bill Hagenstein

In 1941, William D. "Bill" Hagenstein was a young forester working for the West Coast Lumbermen's Association (WCLA). One of his assignments was to survey the land for the association's first forest seedling nursery. Bill found a property of 40.5 acres just eight miles north of Olympia, Wash., with excellent soil for growing trees and a maritime climate. And the land was located alongside the highway that would become Interstate 5.

On January 20, 1942, the Nisqually Nursery was inaugurated with the first crop of Douglas-fir seedlings used in 1943 to replant 4,000 acres of burned lands in Pierce County. In the early 1970s, the Nisqually Nursery was converted to a greenhouse facility that still supplies seedlings to forest landowners through the Northwest.

In 1948, at 32 years of age, Bill became the executive director for the West Coast Lumbermen's Association. In 1952, several forest industry groups including WCLA merged to become the Industrial Forestry Association (IFA). Bill Hagenstein served for the next 28 years as IFA's executive vice president. Throughout his career with IFA and beyond, Bill Hagenstein has been a booming voice supporting sustainable forestry and responsible forest land management. He has earned the title of "America's greatest living forester."

On August 12, the IFA Board of Directors honored Bill by renaming the Nisqually Nursery to the "William D. Hagenstein Forestry Nursery." The event was held on site at the nursery with many notable members of the forestry profession attending.


PHOTO COURTESY OF BOB ALVERTS

**Bill Hagenstein at the August 12 dedication of the new W.D. Hagenstein Forest Nursery.**

Since its inception in 1942, IFA Nurseries has grown to become a major supplier of forest seedlings in the Northwest with facilities in Oregon at Canby, Klamath Falls and Elkton and the corporate office in Wilsonville. IFA nursery facilities in Washington include the newly named William D. Hagenstein Forestry Nursery and the Toledo Nursery. The IFA nursery system can produce up to 30 million seedlings per year.

For more information about Bill Hagenstein, refer to *Corks & Suspenders; Memoir of an Early Forester* by William D. Hagenstein at www.corksandsuspenders.com/.

For more information about IFA Nurseries, contact Tom Jackman at 503-855-5538. ◆

# WSSAF Nearly at Financial Target

The Washington State SAF this year embarked on its first-ever Capital Campaign with a target of $6,000. Funds will be split 50 percent to the WSSAF Foundation and 50 percent for maintaining and enhancing WSSAF operations.

Since the annual meeting in LaConner, we have receive $5,434 (90.5 percent of the target), with $3,294 going to the foundation and $2,140 to WSSAF operations. As of press time, WSSAF would like to thank the following donors for their support: American Tree Farm System; Dick Atkins; B. Bruce Bare; Jerry Behm; Harry Bell; Stan Blinks; Lee Boeckstiegel; Morrie Boles; Wade Boyd; Jim Brady; Franklyn Brown; Joseph Buhaly; Jocko Burks; John Butruille; Cascade Hardwoods; Jennie Cornell; Robert Curtis; Jerome Davies; Bob Dick; John Ehrenreich; Ann Forest Burns; Kevin & Susan Gehringer; John Gorman; Don Hanley; Ed Hartley; Henry Hays; Pete Heide; Charles Heimbigner; International Forestry Consultants; Mike Jackson; Clyde Kalahan; James E. King; John Malone; Bob Marx; Norman McDonell; Microsoft Corporation; Ted Nelson; Elizabeth Peterson; Richard Pierson; Port Blakely Tree Farms; Jerome Proutt; Steve Ricketts; Frank Shirley; Gary Shirley; South Puget Sound Chapter; William Taylor; David Thorud; William Truax; William Turrill; Ellen Walkowiak; John Walkowiak; West Fork Timber; Jack Winjum; and Archer Wirth. ◆

**We urge membership to help us reach our target and make a tax-deductible donation by sending it to:**

**SAF Northwest Office**
**4033 SW Canyon Rd.**
**Portland, OR 97221**

*Checks can be made payable to: WSSAF*

# Forestry Board Seeks Comment on Draft Policy Update

BY ROD NICHOLS

Are Oregon's forests being managed sustainably? A set of indicators developed with broad public input suggests they aren't, and the Oregon Board of Forestry is inviting resource professionals and the public to help shape a plan to improve the health and productivity of our public and private forests.

"Based on Oregonians' own indicators of sustainable forest management, our forests are facing some significant challenges," said board chair John Blackwell. "We're updating our Forestry Program for Oregon, a broad plan to ensure that we'll always have healthy forests providing a full range of benefits. We hope Oregonians will offer their input along the way."

A 90-day public comment period for the draft 2011 Forestry Program for Oregon began on October 1 and will run through December 3. A public review draft of the document, along with supporting information and instructions for submitting comments, can be found on the board's website at www.oregonforestry.gov/.

The update comes as Oregon's forests face major challenges, including:

• Fragmentation and conversion: Rising real estate values and inability to derive sufficient income from managing their forestlands are driving more owners to consider selling forests for other uses. This often means permanent loss of forest values such as wildlife habitat, clean water and timber production.

• Encroachment: Oregon's population continues to expand into forested areas. This can increase the incidence of wildfire, drive up firefighting costs and create conflicts—for instance, among neighbors primarily interested in the residential value of their lands and those whose goals include timber harvest.

• Invasive species: A long-term warming trend has heightened the threat of disease outbreaks and insect infestations. The altered conditions are also more favorable to invasive plant species that compete with native vegetation.

• Declining health of federally owned forestlands: These lands make up 60 percent of Oregon's forested acres, and large expanses in drier parts of Oregon need thinning and other treatments to restore their health and reduce their vulnerability to severe fires.

• Difficulties in rural, forest-dependent communities: These include high unemployment and insufficient revenue to fund local services.

The draft Forestry Program for Oregon update proposes specific goals and objectives to address the current problems and to set forests on a pathway to provide a steady flow of multiple benefits for Oregonians. The document's goals are linked to 19 indicators of sustainable forest management endorsed by the board. Using available data, the indicators set desired trends and monitor progress.

"I invite Oregonians to take a look at the new draft Forestry Program for Oregon and to offer their comments," board chair John Blackwell said. "Forests are immensely important in our state, and this is an opportunity to help make sure that they're healthy and productive well into the future."

Forestry Program for Oregon-related questions and suggestions may be directed to David Morman, Oregon Department of Forestry, 2600 State St., Salem, OR 97310, 503-945-7413, dmorman@odf.state.or.us. ◆

*Rod Nichols has been the general news media contact for the Oregon Department of Forestry in Salem since 1988. During the wildfire season, he spends much of his time reporting on fires and firefighting to the media and the public. He can be reached at 503-945-7425 or rnichols@odf.state.or.us.*

# Central Chapters Team Up in Washington

BY DOUG RUSHTON

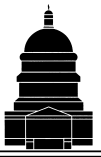
The Mid-Columbia and Central Washington chapters held a joint meeting on a sunny day in Cle Elum, just east of Snoqualmie Pass. In addition to the normal business of an SAF chapter, state chair John Walkowiak presented the Chapter of the Year award to Erik Sjoquist, 2009 chapter chair, and Bart Ausland, 2010 chapter chair.

Like foresters do, the 27 attendees adjourned to a nearby 10-acre commercial thinning of ponderosa pine. It was thinned for beetle control, reduction of fuel and overall improvement of forest health. The second stop was at Masterson Ranch, a large-scale fuels reduction project involving 1,800 acres of thinning from below in second- and third-growth ponderosa pine. Both commercial and non-commercial management prescriptions have been implemented on the ground. Both projects were directed by Bret Daugherty of Timbered Rangeland Management out of Ellensburg, Wash. It was one of those days when you are glad to be working in forestry and are able to be in the woods. ◆

PHOTO COURTESY OF DOUG RUSHTON

**John Walkowiak, left, presents the Washington State Chapter of the Year award to Central Washington Chapter leaders Bart Ausland (center) and Erik Sjoquist (right).**

*Doug Rushton is a member of the Central Washington Chapter in Ellensburg. He can be reached at drushton21854@gmail.com.*



# 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.*

**Old-growth Position Statement Revision Underway.** OSAF's position statement on "Managing Mature and Old-growth Forests" expired October 31 and the Policy Committee is working on a revised and updated version. A key objective is to streamline the original statement, which was much longer than OSAF's other positions due to the topic's complexity. The streamlining should be aided by the wider recognition now of the need for active management of public forests, particularly those in drier forest types with high fire and health hazards. A major federal court ruling this August (see www.ca9.uscourts.gov/datastore/opinions/2010/08/13/09-35094.pdf) that allows timber harvest for fire hazard reduction in a late-successional reserve (LSR) on the Deschutes National Forest should add to such recognition. However, both existing and proposed policies for public forest management still often include individual tree diameter and/or age-based harvest constraints that confound the application of sound silviculture by forestry professionals. All OSAF position statements are available online at www.forestry.org and draft updates may be posted in the "members only" section. Contact: Paul Adams, OSAF Policy chair, 541-737-2946; paul.adams@oregonstate.edu.

**Federal Laws and State Forest Practice Policies.** The federal Clean Water Act (CWA) and Coastal Zone Management Act (CZMA) intersected with state forest practices policies in recent months, with questions and concerns about state vs. federal rules and authority over forest practices on state and private lands. In addition to the CWA court case discussed in the article by Julie Weis, both federal agencies and private parties have challenged Oregon's forest practices rules in their adequacy for meeting requirements under the CZMA and/or the CWA. Among the responses have been steps by the Oregon DEQ to develop Total Maximum Daily Load (TMDL) allocations for nonpoint source pollution (primarily sediment) for coastal watersheds. Although the outcomes are not yet clear, including clarifying the roles of various state and federal agencies, they could include greater restrictions for riparian buffers and forest roads on some state and private lands. Contact: Paul Adams, OSAF Policy chair, 541-737-2946; paul.adams@oregonstate.edu.

**Idaho Timber Association Disbands.** The Intermountain Forest Association (IFA) has advocated for Idaho's forest business firms for nearly 75 years, but will disappear at year's end. Member companies recently decided to handle lobbying and public policy issues on their own instead of through a common organization. The decision reflects not only difficult economic times in the industry, but also company consolidations. Overall, according to a document prepared by the IFA's executive committee, Idaho's timber-based economy remains healthy and should rebound when national home construction picks up. Contact: Jay O'Laughlin, IESAF Policy chair, 208-885-5776; jayo@uidaho.edu.

**Northern Rockies: Dead Timber Facts.** As revealed in the latest national timber inventory (2007), timberlands in Idaho and Montana each have five billion cubic feet of sound dead timber, more than double what was counted a decade before. This is more than half of the nation's inventory of sound dead timber (Colorado and Wyoming have another one-fourth of it, Alaska about five percent, Oregon and Washington none). And this was ***before*** some recent large-scale pine beetle outbreaks. Two-thirds of the region's timberlands are national forests, and that's where more than 90 percent of the dead timber is. Results of the recently completed CROP (Coordinated Resource Offering Protocol) studies by the U.S. Forest Service reveal that over the next five years the agency plans to remove four percent of the gross annual growth from the region's national forests, ***if*** all planned projects clear NEPA hurdles and ***if*** they are funded. Contact: Jay O'Laughlin, IESAF Policy chair, 208-885-5776; jayo@uidaho.edu.

**Working Forests Position Paper Developed.** In the last two issues of the *Western Forester* we requested the Washington State members to comment on several possible position paper subjects. No response. Period.

WSSAF has an outline of a position paper on "working forests" that we will distribute to a small group of interested members for further development. Please contact Harry Bell at harry@greencrow.com if you want to help develop this position paper.

On October 12 the executive committee approved occasional attendance and input by SAF to the state Forest Practices Board, state Board of Natural Resources and the Puget Sound Partnership. Several members were given the mission of developing a strategy to do this—possibly using our state position paper on biomass for the first meeting(s). If you have thoughts or would like to participate, contact Harry Bell. ◆

# Oregon's State Forester Resigns

Oregon State Forester Marvin Brown is stepping down at the end of the year, Board of Forestry Chair John L. Blackwell announced on October 19. The board accepted Brown's resignation after determining that the Department of Forestry needs fresh leadership.

Blackwell, of Portland, said the seven-member board believes that new leadership is essential as the board and the Oregon Department of Forestry address complex and difficult issues ahead. "Marvin has deep knowledge of forestry, and of the many public benefits that sound forest management provides," Blackwell said. "We thank him for his steady leadership and professionalism during challenging times."

The Board of Forestry's members, who are nominated by the governor and confirmed by the state Senate, oversee forest policy matters within the state's jurisdiction, and appoint the state forester, who serves as director of the Department of Forestry.

Challenges confronting the board and department include working with forest landowners, conservation groups, community organizations, legislators and others to sustain essential services, such as wildfire protection and enforcement of environmental laws, in the face of a depressed forest economy and shrinking state budgets, Blackwell said.

"These services and others are vital in achieving sustainable forests, which in turn benefit the state as a whole," Blackwell said. "Keeping these programs viable in these economic times will require united effort and broad support among many interests, and we'll continue to strive for that unity."

Brown's resignation is planned to be effective December 31, 2010. Blackwell said the process for selecting a permanent replacement would begin immediately, and that the board will "look very hard" within the agency for a replacement, but will also look outside. Nancy Hirsch, a 21-year agency veteran, will serve as interim director.

Brown, named Oregon's state forester in 2003, has extensive professional experience in the public and private sectors. He held several leadership positions with the Missouri Department of Conservation, including seven years as Missouri state forester. His career experience also includes work in the forest products industry and with numerous professional associations and international forest policy forums. ◆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