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Water, Fish and Forests

BY MARYANNE REITER

PHOTO COURTESY OF JOHN HEFFNER

Clean water and salmon, what could be more symbolic of the Pacific Northwest? Of course, some would argue that a good microbrew and salmon go together better, but since this article is about forestry, we'll stick to just plain water.

Water quality has been a public concern for thousands of years and is still a top issue with the public today. A 2001 public opinion survey commissioned by the Oregon Department of Forestry (ODF) indicated that water quality was one of the top environmental concerns of Oregon's forests. And when Washington residents were asked in 1997, and again in 2002, about the most important use of private forestlands, "a source of clean water" ranked number one. Likewise, concerns over fish abundance and habitat have been in the public forefront over the last several years. As human populations increase and freshwater resources become more strained, water and fish issues on private forestlands will likely become more intense.

Water quality and fish habitat have been the main forces driving forest practices regulation in Oregon, Washington, Idaho and most recently in Alaska's interior forests (see article by George Ice for details on forest practices rules near streams). As a result of the increased protection along forested streams, the quality of water draining forested watersheds in the Pacific Northwest is generally high and fish habitat tends to be better quality than on other land uses.

For example, the Oregon State of the Environment report for 2000 found "instances of good or excellent water quality occur most often in the forested uplands of Oregon." A study in the Snohomish River in Washington indicated that adult coho density on mainly commercial forestlands was 1.5-3.5 times the density of urban, rural or agricultural areas. Even with findings such as these and extensive forest practices rules, there are still concerns whether forests can be managed for timber while still providing exceptional water quality for human and fish use.

PHOTO COURTESY OF MARYANNE REITER

New research on smaller, non-fish bearing streams, called headwater streams, is beginning to help address public concerns about water quality and active forest management.

Water Quality Parameters

Water quality refers to a wide range of physical, chemical and biological characteristics of water. For this article, the focus will be on water quality constituents important for both humans and fish. Forest practices effects can affect the physical and chemical components of water quality such as temperature, light, sediment, nutrients and chemicals; and biological components of the stream system may be affected if these chemical and physical attributes are sufficiently affected by forest practices.

The physical components of water quality that have received the most attention are stream temperature and sediment. Stream temperature is important for regulating organic matter decomposition, the solubility of gases, and health and survival of aquatic organisms. Sediment can impact the turbidity or clarity of the water, making it more difficult for fish to feed. Increased sediment can bury spawning gravels and fill pools. High suspended sediment concentrations can make it more difficult for water treatment plant operators to filter and chlorinate drinking water.

Stream temperature was an early

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focus of forest practices regulations in the Pacific Northwest since overstory shade trees were not routinely left along streams prior to the 1970s. These early concerns led to buffer requirements along fish-bearing streams.

In colder climates, such as Alaska, the effect of forest practices on stream temperature had been less of a concern. Emerging research on the effect of forest practices on fish habitat stimulated review of forest practices standards in Alaska and resulted in the first mandatory no-cut buffers on Alaskan streams in 1990. No-cut buffers for interior Alaska were established in 2003 (www.dnr.state.ak.us/forestry/forestpractices.htm). Most of the concerns over buffers protecting larger streams have been addressed through various studies. However, there are still questions of stream temperature changes in smaller streams that have not had buffer requirements. This issue is addressed in more detail later in the article.

PHOTO COURTESY OF MARYANNE REITER

Headwater streams such as the one shown here can comprise as much as 60-90 percent of the total stream miles of a watershed.

Increased sediment from forested areas, either from chronic sources such as roads or from large events such as landslides, continues to be an environmental concern. In more northern areas that are underlain with permafrost, there are concerns that forest practices could cause it to melt, subside and subsequently erode, leading to increased stream sediment loads. However, in most cases chronic sediment from timber harvest doesn't occur unless there is significant disturbance of soils, generally caused by extensive yarding disturbance, intense mechanical site-preparation or post-harvest burning.

Forest roads continue to be the focus of chronic sediment production. As a result, forest practices rules keep evolving to improve road performance. For example, in Oregon, monitoring was conducted on the type and depth of road surfacing material and how that influences sediment runoff during winter haul. That monitoring effort led to changes in forest practices rules to address the durability of road surfacing. While roads continue to be a concern, research has shown the proper management of road runoff (e.g., frequent cross-drains, sediment traps, etc.) can minimize its production and subsequent delivery to streams.

Chemical characteristics of water include dissolved oxygen, nutrients and pesticides. Like temperature, dissolved oxygen was an early concern of forest operations because uncontrolled harvest practices introduced large amounts of logging residue (slash) into the water. Chemical and biological oxidation of this fresh organic material uses oxygen dissolved in water. As a result, there is less oxygen in the water for fish and other organisms. Because

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4033 S.W. Canyon Rd. • Portland, OR 97221 • 503-224-8046 • FAX 503-226-2515
rasor@safnwo.org • michele@safnwo.org • www.forestry.org

Editor: Lori Rasor • **Assistant:** Michele Docy

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Next Issue: Cost-Effective Reforestation

of these findings, forest practices rules were enacted to keep slash out of streams. Concerns about nutrients (mostly nitrogen from fertilization) and pesticides arose from the potential for the inadvertent introduction of these materials into the water at levels that could cause adverse effects. These concerns led to the enactment of restrictions on chemical application along streams and lakes. Many studies in the region have demonstrated that applying urea fertilizer to forestlands does not result in nitrogen concentrations in excess of recommended drinking water standards or aquatic toxicity thresholds. Likewise, studies on pesticides have also shown that best management practices are effective in protecting aquatic resources. For example, herbicide concentrations in forest streams prior to the implementation of spray buffers could be 100 to 200 micrograms per liter compared to 10 micrograms per liter or less with current buffers.

Emerging Issue: Small Streams

The focus on water quality and fish habitat has traditionally been on larger streams and rivers with fish. In the last several years the focus has shifted to smaller, non-fish bearing streams often called headwater streams. Headwater streams are abundant and can comprise as much as 60-90 percent of the total stream miles of a watershed. Concern over these streams is increasing because they support a wide variety of amphibians and macro-invertebrates, as well as delivering "goods and services" such as food to downstream fish-bearing reaches.

Traditionally these streams have not had the same protection as larger, fish-bearing streams. What little information there is on these streams can be confusing because they do not always behave like larger streams. For example, work in Washington shows that the response of headwater streams to timber harvesting ranged from an increase to a decrease in summer temperatures.

Given the lack of information on these streams as well as increasing concern from the public for protection, land managers have been forced to develop rules and recommendations based on little to no data. In Washington state, a portion of these streams must be buffered with 50-foot no-touch buffers on both sides of the channel to ensure there are no impacts—although there has been no research to show how much protection is needed. In Alaska, stream-protection BMPs apply to all surface waters whether they have fish or not. Buffer restrictions are less stringent on streams without fish, however, and some removal of wood is permitted. To address the information gap on how these streams function on the landscape, several research studies have been initiated in the West (see www.headwatersresearch.org).

Current Water Quality/Fish Habitat Research

There are many who base their view that forestry is detrimental to water quality on studies that evaluated the effects of forest practices that are no longer permitted. Clearly, the Alsea Watershed Study showed that stream temperatures and dissolved oxygen concentrations could be negatively impacted when clearcut harvesting and burning were done through the stream channel. Likewise, the small watershed studies in the H.J. Andrews demonstrated that logging and burning through

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the stream channel combined with poor road construction could drastically increase sediment. Developing a thorough understanding of the efficacy of contemporary forest practices is critical if forestry is to be conducted in a manner that protects non-timber values and to demonstrate to the public that forestry and a healthy environment are compatible objectives.

Currently, there are several major efforts to test whether modern forest practices impact water quality and fish habitat. For example, in northern California a paired watershed study tested the effects of historic and contemporary forest practices on water quality. One watershed was harvested prior to forest practices regulations. This resulted in delivery of about three times the amount of sediment to the stream than occurred for a watershed logged under modern forest practices rules. There were also more landslides in the watershed harvested prior to forest practices rules as compared to the one harvested using modern forest practices.

Current research in Oregon on the effects of contemporary forest practices on water quality is beginning to be conducted. A paired-watershed study has been set up in Hinkle Creek near Roseburg to look at the effects of current forest practices and ODF is looking at conducting large-scale watershed monitoring. In addition, the Alsea Watershed study that first launched forest practices rules in Oregon is being re-initiated to look at water quality effects from current forest practices.

Most of the studies looking at the effects of forest practices on fish habitat do not include fish in the research. Fish data have typically not been collected due to difficulty in collecting fish data and the spatial scale at which salmon operate. Since most of the studies of the effects of forest practices don't include fish, but rather, only surrogate habitat measures, there is no way of knowing if the practices impact the fish themselves. To address this gap, an Intensive Watershed Monitoring (IWM) study is being initiated in Washington that includes fish response (see article on page 14 by Bob Bilby). Parameters being measured include response variables such as fish population metrics and habitat condition, and context parameters including climate and discharge. This study will hopefully enable us to make connections between reach-scale parameters and fish and habitat responses observed at the watershed scale.

Summary

While there will always be some effect from forest practices on water quality, the trend through time has been a dramatic reduction in the impacts as forest practices improve. However, even with improvements in forest practices, new concerns continually arise since water quality is understandably such an important issue for people. The new watershed studies underway will provide information on the effects of current practices on water quality and on fish themselves. These studies will help address public concerns as to whether forests can be managed to provide not only timber, but high quality water as well. ◆

Maryanne Reiter is a hydrologist for Weyerhaeuser Company in Springfield, Ore. She can be reached at 541-741-5627 or maryanne.reiter@weyerhaeuser.com. A list of references is also available by contacting her directly.

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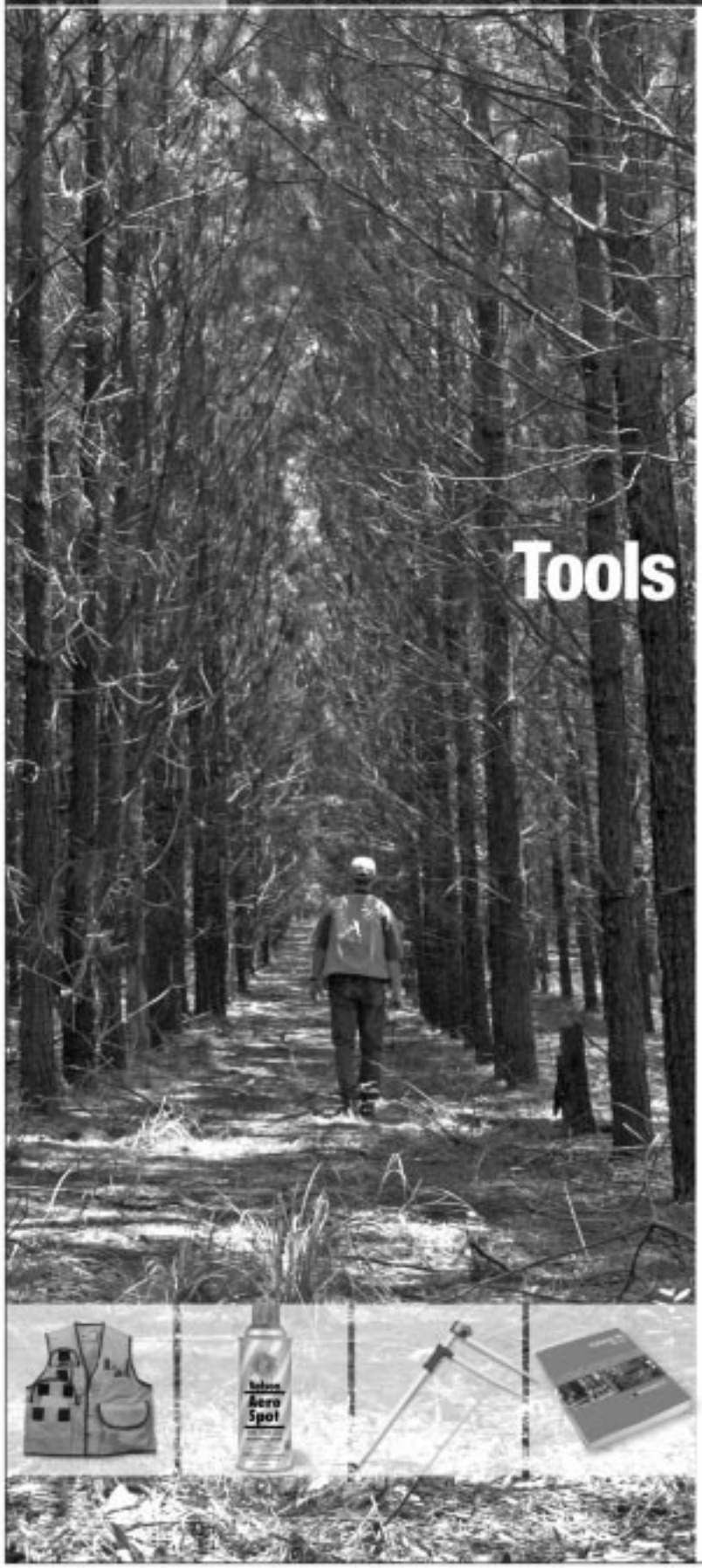

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Using Riparian Canopy Opening and Salmon Carcass Addition to Increase Salmonid Growth

BY PEGGY WILZBACH

Concern about declining salmon and steelhead stocks in the Pacific Northwest has stimulated managers to seek strategies that will facilitate their recovery.

One strategy being implemented with increasing frequency involves introducing salmon carcasses or their analogs to enhance the low nutrient concentrations that characterize forested streams in the region. Low nutrient concentrations can result in a reduced supply of invertebrate prey and slower fish growth. However, nutrients alone may be insufficient to increase salmonid growth if light is an overriding limitation on the primary production that lies at the base of the food web that supports fish.

Opening of the riparian canopy to increase light, if accomplished in a manner that doesn't interfere with other beneficial functions of riparian vegetation, may provide yet another management tool for increasing salmonid growth.

To develop truly successful adaptive management for salmonid recovery, the relative impacts of various manipulations resulting in increased salmonid growth, and the cause and effect relationships driving them, need to be detailed.

PHOTO COURTESY OF LOWELL DILLER, GREEN DIAMOND RESOURCE COMPANY

An example of one of the salmon carcasses used in the carcass addition.

Study conducted

With colleagues at the USFS Redwood Sciences Laboratory in northern California, I conducted a two-year field experiment to evaluate the relative effects of salmon carcass addition and riparian canopy opening on the growth and abundance of resident trout and steelhead.

In each of six streams in the Smith and Klamath River basins in northern California, red alder and other hardwoods were removed from a 20 meter-wide band along both banks of a 100-meter reach to increase incident radiation. A second 100 meter reach, with an intact canopy, was established in each stream as a light control. Salmon carcasses were added each winter to both cut and uncut riparian sections in three of the six streams. This split-plot experimental design is depicted in Figure 1.

The study sites were on lands of Green Diamond Resource Company, who generously assisted us by providing staff and logistical support, and by conducting the alder removal.

Obtaining approval from the state to conduct the manipulation met with stiff resistance, and the alder removal was arduous. Care was taken to minimize damage to the few conifers within the riparian zone. Cut trees were left in place, but dragged when necessary outside of the active channel.

Canopy opening resulted in approximately a 10-fold increase in light reaching the streams, without an increase in stream temperatures. The carcasses came from hatcheries within the basins and were added at a very generous loading of approximately one kilogram per square meter of streambed. Carcasses were anchored to the streambed with rebar to ensure that they wouldn't be immediately flushed downstream. Fish were sampled before and on several events after the manipulations, with individuals Pit-tagged to measure growth.

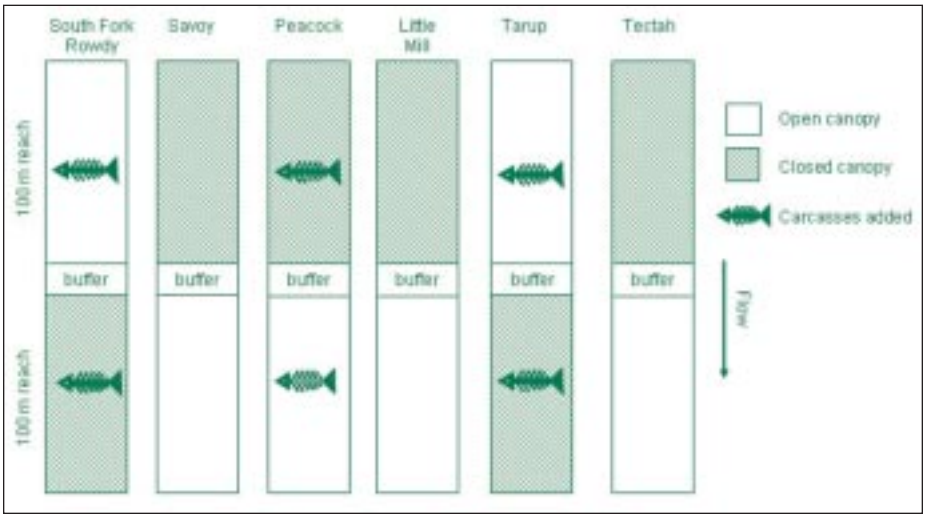
Carcass findings a surprise

What did we learn? Our original expectation was that salmonid abundance and growth would be enhanced by both carcass addition and canopy opening, with the response greatest in those sites that received both treatments.

We found, however, that the addition of salmon carcasses did not detectably affect salmonid biomass, density or growth. In contrast, except for young-of-the-year fish, removal of riparian canopy consistently enhanced salmonid biomass, density and growth. The only significant interaction between carcass and canopy treatments we detected was that carcass addition reduced the difference in specific growth rates of salmonids between open and closed canopy reaches. Nonetheless, the greatest growth was achieved in open canopy reaches without added carcasses. Further details of this study can be found in an upcoming issue of the *Canadian Journal of Fisheries and Aquatic Sciences* (Wilzbach, M.A., B.C. Harvey, J.L. White, and R.J. Nakamoto, in press, *Effects of riparian canopy opening and salmon carcass addition on the abundance and growth of resident salmonids*).

The lack of a detectable response to carcass addition came as a surprise. A number of previous studies have documented the incorporation of marine-derived nutrients into salmonid tissue in freshwater using stable isotope analyses. And an experimental study in an Alaskan

Figure 1



Experimental design to evaluate relative importance of canopy opening and carcass addition on salmonid growth. Each stream had a 100-meter reach in which the canopy was intact and a 100-meter reach in which the canopy was removed. A buffer of 150-200 meters separated the two sections. Three streams received salmon carcass introductions in both open and closed canopy reaches.

stream found that carcass enrichment resulted in increased overwinter growth of cutthroat trout.

Is there a difference between Alaskan streams and those at the southern end of Pacific salmon distribution that might account for the discrepancy in results? Perhaps. Alaskan streams typically receive runs of mass-spawning salmon at the end of the dry season. In our northern California study, carcasses were added during the wet season to correspond with the timing of spawning by migratory salmonids. Flows at this time are high and fluctuating, and nutrients provided by carcasses may be flushed from the system before they can be used. A similar carcass loading would probably have a greater effect during lower flows.

This is not to dismiss, however, the potential importance that nutrient subsidies from salmon carcasses may have to other aquatic and terrestrial consumers. Under conditions of high spawning salmon densities, carcass nutrients may even fertilize riparian vegetation. But our results do suggest that the logistically difficult (not to mention stinky) addition of carcasses to streams in our geographical setting may not be an effective management strategy if the goal is specifically directed toward enhancing the production of juvenile salmonids.

The strong positive response that we observed to canopy opening was not a surprise, and is consistent with other studies reporting at least short-term increases in production of headwater salmonid populations after riparian logging.

The explanation seems to be that canopy opening removes light limitation and increases primary production, with cascading effects through the food web. This raises the intriguing possibility that gains in salmonid production might be achieved by selective trimming of riparian alder or other hardwoods if other habitat requirements are met, and where elevated temperatures are not of concern.

The importance of light in affecting food supply for fish has often been undervalued by management agencies. Riparian vegetation that provides as much shade as possible is rated as "better" in habitat evaluations than vegetation providing less shade. This rating is likely based on temperature increases that often accompany vegetation removal and the overhead cover it provides fish. However, temperature increases are not problematic until they approach a level at which they become stressful. At least in our study sites, this was not an issue.

Additional research is needed to develop pruning strategies that increase light to optimize local food supplies for fish, without sacrificing the beneficial functions riparian vegetation provides. ◆

PHOTO COURTESY OF LOWELL DILLER, GREEN DIAMOND RESOURCE COMPANY

Riparian alder was removed from this section of a stream (Tectah Creek).

Peggy Wilzbach is a research fishery biologist and assistant leader of the USGS California Cooperative Fish Research Unit at Humboldt State University. She can be reached at 707-826-5645 or paw7002@humboldt.edu.

Forest Riparian Protection in the Pacific Northwest

BY GEORGE ICE

Riparian buffers, streamside management zones and similar measures are key components of forest practices programs. Riparian rules are largely designed to protect stream water quality and fish habitat, although other benefits, such as amphibian and wildlife habitat, are beginning to be considered. The Alsea Watershed Study (1959-1973) demonstrated the effectiveness of careful riparian protection in minimizing water quality response to forest management. But how much is enough, and at what point is there a diminishing return?

These questions were highlighted when foresters began testing the consequences of the interim riparian reserves under the Federal Ecosystem Management Assessment Team (FEMAT) recommendations. Foresters found much or even most of the forest could be placed in riparian reserves. Clearly, management of riparian forests can protect water quality and fish habitat values, but at what point does this protection make forest management uneconomical, forcing landowners to convert to other less water quality- and fish-friendly land uses?

Many studies have found that managed and unmanaged forests have the highest water quality of any land use, and other studies have recorded that predominately forested watersheds have more abundant salmon than comparable watersheds with significant agricultural or urban use. A key concept in achieving water quality and fish habitat goals is to keep the land in forests where stream protection rules are more stringent and where forest cover is regenerated.

Riparian management areas are inherently a compromise between environmental and economic goals. Because of their proximity to streams, they are managed differently than other parts of the forest to provide streambank stabilization, allow for settling and uptake of sediment and nutrients, maintain shade, and provide a source of fine and coarse organic material to streams.

In an article in the summer 2004 issue of *Northwest Woodlands* forest riparian protection in the Pacific Northwest and some of the past and ongoing research that has shaped state regulations was described. In a letter responding to that article, L. Rex Hutchins elegantly expressed his bewilderment at the differences in riparian protection and questioned how these differences could develop if science is driving riparian protection requirements. He concluded that for Washington, the riparian rules "…dissuade forest landowners from enjoying the psychological and economical benefits of the proper, innovative, professional management of their lands. These laws have also had a significant impact on the small and large landowner's ability to be a respected player in the economy of the state, thus forcing development of some of these lands." The different state forest riparian rules and some emerging concepts that may alter future riparian forest management strategies are briefly described in this article.

Alaska

The Alaska Forest Resources and Practices Act is designed to protect water quality and fish habitat. It has undergone and continues to undergo revisions of the riparian management standards for private lands. Rules are developed for three separate regions: coastal, interior and southcentral Alaska. As of January 2005, forest practices standards for riparian areas were under review for Region II (southcentral Alaska). For coastal Region I, waterbodies (including streams, wetlands and estuaries) are classified based on whether they provide habitat for anadromous fish and on physical/vegetation characteristics such as channel gradient, streambed substrate, and character of the bank and riparian vegetation.

For low gradient, anadromous waterbodies with banks stabilized by riparian vegetation, harvesting is not permitted within 66 feet of the waterbody. Operations within 100 feet (or the break in slope, whichever area is smaller) must address slope stability concerns. Other anadromous waterbodies cannot have harvesting within either 66 feet or the slope break, whichever area is smaller. For streams tributary to anadromous streams with slopes less than 12 percent, harvesting within 100 feet or the slope break must address slope stability standards and retain low value timber in a portion of the riparian area. For streams tributary to anadromous streams, but with slopes greater than 12 percent, the requirements are similar to those for shallow slopes except operations within 50 feet must comply with slope stability standards. The slope stability standards address road construction, sidecasting of displaced soil from roads, felling of timber away from roads, and full or partial suspension during yarding.

For additional details on this and other rules for the different regions in Alaska visit www.dnr.state.ak.us/forestry/forestpractices.htm#act. This site also provides extensive documentation of the literature on riparian functions.

Oregon

Oregon forest practices rules for riparian areas are designed to protect water quality and achieve mature forest stand conditions that can provide large wood to streams. Oregon defines three types of streams: Type F have fish; Type D are used for domestic water and do not have fish; and all others are Type N. There are also three sizes of streams based on average annual flow. Stream widths associated with these flows vary widely, but in general can be translated on the ground as small (less than four feet wide); medium (4 to 20 feet); and large (greater than 20 feet).

The Oregon rules define the width of the riparian management area (RMA) around streams based on the combination of stream class and size. Large Type F streams have the widest

average RMA (slope length) of 100 feet, while Type N streams receive the narrowest protection. Type N RMAs are 70 feet for large streams and decrease for medium and small streams.

For fish-bearing and domestic water source streams, the general prescription requires that all understory vegetation within 10 feet, all trees within 20 feet, all trees leaning over the stream, and all snags and down wood in the stream or channel be left. There are targets for the number of live conifers and the basal area of trees left in the RMA. Basal area targets for retention of trees in the RMA are based on stream type and size, geographic region and harvest type (e.g., clearcut, light partial cut, etc.). The Oregon rules allow for flexibility in how RMAs are managed based on existing conditions and stream enhancement opportunities. Details about the various management options for RMAs are available at http://arcweb.sos.state.or.us/rules/OARS_600/OAR_629/629_635.html. A useful reference is *Oregon's Forest Protection Laws: An Illustrated Manual*.

Oregon continues to assess the adequacy of its riparian rules. The Oregon Department of Forestry (ODF) is currently testing whether stream temperature and future large recruitment of wood for small and medium streams is protected with the current rules (contact Jim Cathcart at jcathcart@odf.state.or.us for more information).

Idaho

Idaho has had a Forest Practices Act since 1974. Originally the rules for Idaho were very similar to Oregon's, but that has changed. Idaho separates streams into either Class I (streams used for domestic water or fish) or Class II. A minimum 75-foot streamside protection zone (SPZ) is required around Class I streams. The SPZ is measured from the ordinary annual high-water mark or a definable bank. The SPZ around Class II streams is 30 feet wide, or five feet wide if the stream does not contribute surface flow into Class I streams. In some cases a wider SPZ may be necessary; for example, if a wetland extends away from the stream.

The Idaho SPZ rules allow harvesting with severe restrictions. Harvesting near streams requires leaving 75 percent of existing shade and all hardwoods, unmerchantable conifers and shrubs. Directional felling away from the stream is used and equipment can only cross through streams with an appropriate crossing structure. The rules also prescribe minimum standing trees per 1,000 feet (on each side), with the number and size requirements for leave trees based on the stream width and class. Variable tree retention requirements were influenced by research showing that the size of functional wood needed to create favorable habitat diversity increases as the width of the stream increases. Belt and others (www.uidaho.edu/cfwr/pag/pagr8.html) provided a review of the science used to establish riparian protection, including a review of both regional and national research on riparian functions.

Washington

The rules in Washington are the most complex in the region and have undergone substantial revision as part of the Forests and Fish Agreement (FFA). These rule modifications were designed in large part to ensure the success of threatened or endangered salmonids (salmon, steelhead, char). The riparian management prescriptions differ east and west of the Cascade Mountains. In addition, stream characteristics (seasonal flowing non-fish bearing [Type Ns], perennial non-fish bearing [Type Np] and fish-bearing [Type F]) and forest site quality (i.e., site class) influence the riparian management zone (RMZ) width. No harvest is allowed in the channel migration zone (CMZ), which is generally defined as the floodplains where evidence of past channel occupancy exists and future channel occupancy is likely. The RMZ starts at the edge of the CMZ when present, or otherwise at the edge of the active channel.

In western Washington, the total buffer width on Type F is one site potential tree height for Douglas-fir at age 100 using standard site class tables. The RMZ is divided into an outer zone, inner zone and core area, each representing progressively more management restrictions as operations move nearer the stream.

The core zone is a 50-foot no-cut buffer (all distances horizontal). The width of the inner zone, which extends outward from the core, is determined by the width of the stream, site class of the forest and the timber harvesting option chosen. Targets for the inner zone involve the number of trees, basal area and pro-

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portion in conifers, all designed to meet desired future forest conditions near the stream.

A number of complicated options exist for managing the inner zone (e.g., no management, thinning from below, leaving trees closest to the water, hardwood conversion, etc.) in an attempt to maintain flexibility for landowners; however, no management and leaving trees closest to the water are generally the preferred options. The outer zone represents the remaining RMZ and the rules call for retention of 20 trees per acre, but again there are some management alternatives (and again, little or no use of these alternatives). Some cable yarding corridors are allowed through the riparian area when necessary. However, lost basal area within these corridors must be placed elsewhere along the riparian zone within the harvest unit.

For eastern Washington Type F streams, the core zone is a 30-foot no-cut buffer. The inner zone is 45 feet for streams less than 15 feet wide and 70 feet for streams greater than 15 feet wide. Inner zone prescriptions strive to maintain basal area within a "disturbance regime range" appropriate for the forest stand. In addition, shade must be protected within the first 75 feet. Most of eastern Washington state and private forestlands currently fall within the "Bull Trout Overlay," which requires retention of all trees within 75 feet that are shading the active channel.

Washington's rules require partial buffering of perennial non-fish-bearing channels. At least half of the channel length between the uppermost point of perennial surface water and fish-bearing waters must be buffered with 50-foot no-cut buffers on both sides of the channel.

Additional rules focus the distribution of the buffer along these channel segments to protect seeps, springs and the downstream end of the segment. In eastern Washington, this buffer can be modified to a continuous thinned buffer. The rules do not require buffers or tree retention along seasonally flowing non-fish bearing streams, except as required to prevent landslides. However, there is a 30-foot heavy equipment exclusion zone on either side of the channel.

Refer to the forest practices rules for details (www.dnr.wa.gov/forestpractices/rules/). A review of the science behind the new rules can be found at www.forestsandfish.com/pdffiles/RSFFFR.pdf.

Evolving Riparian Protection

The purpose of forest riparian regulations in the Pacific Northwest has evolved over time. They were originally developed to protect water quality by maintaining minimum shade levels, keeping fresh slash out of streams, and protecting near-stream sites from erosion and sedimentation. Each state in this region has now adopted much more complex riparian regulations designed to provide additional benefits such as recruitment of large woody debris and to enhance stream habitat for fish. All riparian protection zones are defined by three factors: classes of streams that are protected; width or area around each class of stream; and management restrictions in the protection zone. But despite a desire to have some consistency in regulations, the various rules that have evolved represent differences between and even within states, with the aim of balancing environmental and economic benefits of streamside forests.

One pattern in the evolution of riparian rules has been a move toward more management options to allow creative management to achieve desired benefits. Despite this increased flexibility, landowners often choose to use the most conservative options in order to avoid any risk of undesired environmental impacts.

Foresters and forest landowners can expect that these rules will continue to evolve. Two areas that will influence these changes are the role of disturbance in creating desirable fish habitat, and small headwater streams and their functions in the stream network (see www.headwatersresearch.org).

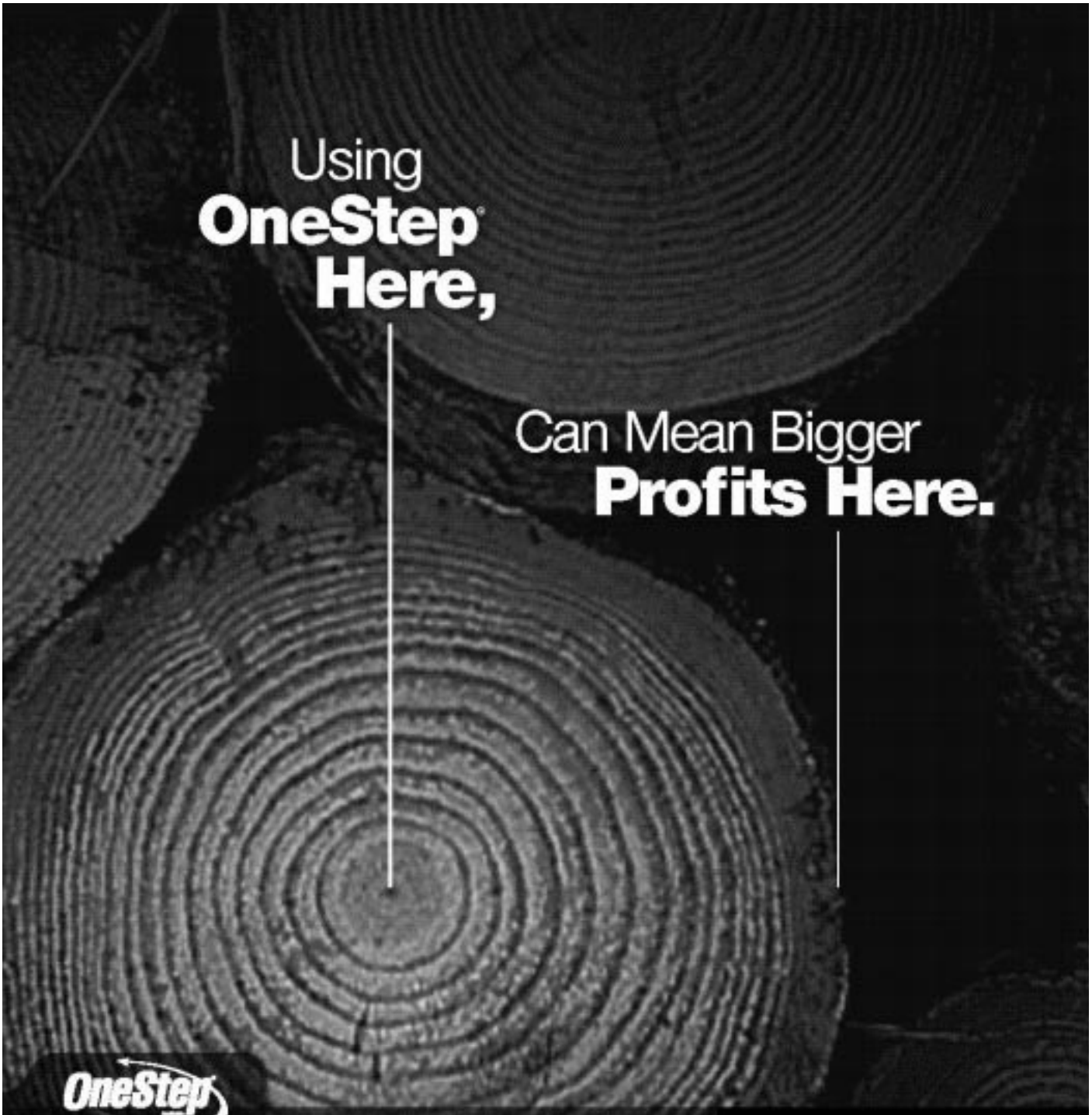
It was only a few decades ago that wood in streams and landslides were considered detrimental. Today we often manage so that large wood can be delivered to streams and we realize that landslide-generated sediment wedges can create favorable off-channel habitat. For decades we have known that macroinvertebrate densities can be increased with reduced shade conditions such as those resulting from disturbance along riparian corridors. Aquatic insects can provide food for fish.

Today, researchers in the United States and Canada are looking at ways to manage riparian areas to achieve the benefits of natural disturbances, and this may involve some level of harvesting near streams to increase light or favor riparian forest development. Headwater streams represent a majority of the length of the stream channel and some have called for wider buffers on these headwater reaches than for large streams. However, because these streams are so numerous they have redundancy in functions and show resiliency to disturbance.

At a 2004 American Water Resources Association conference, *Riparian Ecosystems and Buffers: Multi-Scale Structure, Function and Management,* some of the most intriguing papers dealt with optimizing environmental benefits, such as reduced sediment delivery to streams, while causing no net loss of economic value. In the wake of the resounding passage of the citizen initiative Measure 37 in Oregon dealing with protection of property rights, states may take a more careful look at the balance between environmental benefits and the costs to landowners.

Whatever new riparian issues arise, we can expect each state to develop rules that attempt to achieve balance between the environmental and economic benefits of these areas. Someday we hope to meet Mr. Hutchins' call for "…proper, innovative, professional…" and maybe even consensus management of riparian forests. ◆

George Ice is principal scientist for the National Council for Air and Stream Improvement, Inc., in Corvallis, Ore. He can be reached at 541-752-8801 or gice@ncasi.org.



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The Fire/Fish Risk Management Problem

BY JAY O'LAUGHLIN

"Increased fuel buildup from a century of fire suppression has led to fires of unnaturally high intensity, burning hundreds of thousands of acres of forest that could have provided timber for the economy and habitat for wildlife. Water quality and biological diversity have suffered, adding to poor ecosystem health. The challenge of forest managers, especially on public lands, is to remedy both forest health problems—excessive fuel buildup and watershed degradation—without exacerbating either one."

Rocky Barker. 1997. "New forestry in the next West," Pages 25-44, in *The Next West: Public Lands, Community, and Economy in the American West,* John A. Baden and Donald Snow, editors. Island Press, Washington, DC.

Fish habitat is affected adversely or beneficially by disturbance events on land areas adjacent to waterbodies. Wildfire removes vegetation, exposing soil to erosion and processes that deliver sediment to streams, filling spaces between gravel and adversely affecting spawning habitat and aquatic insect production. The severity of post-fire effects is related to fire intensity, which is heightened where fuels have accumulated to uncharacteristically high levels. This problem is widespread.

In the interior Columbia River basin region, for example, half the area of federal forests is subject to lethal or stand-replacing fires, whereas a century ago only 20 percent of the area was. Lethal fires put fish and wildlife habitat and other values at risk. Forests in the eastern Cascades and Klamath River basin face a comparable situation.

Pre-fire treatment of hazardous fuels can reduce wildfire intensity, thereby reducing erosion potential and sediment pollution. Fuel treatments can cause additional sediment, but only a small fraction of the sediment pulse following wildfire. Analysis to support fuel treatment decisions is multi-dimensional. Effective problem solving depends on defining the problem thoroughly, understanding social and decision contexts, and using multiple methods to generate and analyze solution alternatives.

Problem Definition and Context

What's the problem? Rocky Barker, a Boise environmental journalist, stated it earlier without risk terminology, which sometimes confuses the issues. Developing effective alternatives for improving this multi-objective problem situation is enhanced by understanding social concerns and decision processes.

Barker described one social consideration: "Environmentalists question whether roads and clearcuts can be engineered well enough to prevent sedimentation in some soil types and in streams heavily damaged by past logging and road building. Science probably won't completely answer their concerns. Environmentalists want risks removed for fish, especially in already degraded areas, until rehabilitation takes place."

Decision processes involve the federal Endangered Species Act (ESA) and state laws requiring best management practices (BMPs) to reduce adverse effects on water quality. Although BMP adequacy is a contentious question, adherence to state forest practices regulations should protect fish habitat adequately. All managers must avoid significant habitat modification that could harm ESA-protected fish. Federal land managers must consult with ESA regulators in the U.S. Fish and Wildlife Service (FWS) or National Marine Fisheries Service (also known as NOAA Fisheries) and demonstrate that proposed actions will not "jeopardize" fish recovery efforts. This is problematic.

PHOTO COURTESY OF DAVE POWELL

A tributary stream on the Umatilla National Forest after the Tower Fire in 1996. The fire ignited during a lightning storm and burned more than 50,000 acres. Fish cannot spawn and rear in conditions like this, but if and when adequate vegetation returns to hold soil in place and provide shade, fish will find their way back.

Risk Assessment and Communication

Risk cannot be managed unless it has been properly assessed and some form of model provides the best assessment process. To support fuel treatment decisions, managers need a model comparing the severity of post-wildfire effects with and without pre-fire fuel treatment. USDA Forest Service Chief Dale Bosworth put it this way: "Managers need to weigh the short-term risks posed by active management against the long-term risks of continued inaction, and communicate these risks meaningfully to the public."

The ecological risk assessment model developed by the U.S. Environmental Protection Agency could help meet these needs. A federal fisheries scientist asked, "If ecological risk assessment is the answer, what is the question?" Others replied, "Which is worse, new fires that may result from past management or new management intended to mitigate those fires?" Science cannot address the "which is worse" question, but managers should. The model requires a risk management hypothesis and graphical depiction of the cause-effect relationship. Both are presented on page 13.

In a guidance memo the FWS director and NOAA Fisheries administrator described a risk hypothesis and encouraged ESA regulators to apply it. They said that restoring natural (historical) fire regimes and native vegetation provides benefits by reducing the

severity of wildfire effects, and that over the long term these benefits may exceed the adverse short-term effects of implementing hazardous fuels reduction treatments.

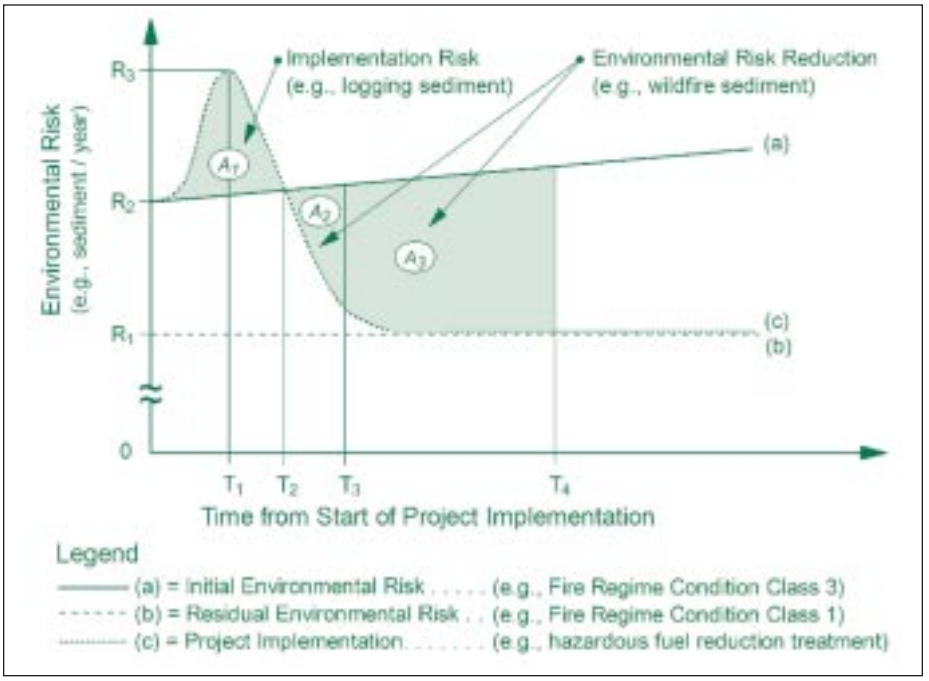
Laws put the onus on forest managers to demonstrate the beneficial and adverse effects of fuel reduction treatments to regulators and the courts. The following steps help with these tasks. First, work with various publics to identify risk assessment endpoints, which are specific ecological entities to be protected. Salmonid spawning and rearing is an appropriate endpoint; vague descriptors like integrity or sustainability are not. Second, identify the stressors affecting the endpoint, such as sediment and/or water temperature. Third, link wildfire, silviculture and other processes to stressors and endpoints, with quantitative data when available. Finally, use professional judgment to compare one alternative (post-fire effects in a treated forest) against another (post-fire effects without treatment).

One hundred years is the minimum analytical timeframe for fish or ESA-protected wildlife, perhaps longer if the fire return interval is more than a century. In fire-adapted forests this assures that a fire will occur at some time during the analysis period, thus eliminating the need to assess fire occurrence probability. By graphing sediment production with and without treatment effects over the entire timeline, the risk manager can compare and communicate the stressor-producing effects of wildfire under the two alternatives (see Graph 1).

The ecological benefit of fuel treatment is that it reduces post-wildfire stressors such as sediment. Graphically, this is the difference in sediment with and without fuel treatment along the timeline [the area between lines (a) and (c)]. Without risk-based analysis, regulators and fish advocates will likely invoke the precautionary principle and not allow fuel treatment because it generates additional sediment and short-term risk to fish, no matter how small. This approach is problematic as it ignores the substantial long-term net benefits of active management that reduces the severity of wildfire effects.

Forest and fish managers are responsible for the resources people value and the risks to those resources. All management decisions involve risk, including the decision not to take action. To generate effective long-term options, managers and regulators need to accept some risk. People make decisions everyday to reduce future risks; for example, changing the oil and filter in your motor vehicle ("pay me now or pay me later"). A graphical risk assessment tool can help managers communicate these ideas. ◆

Graph 1. Model of post-wildfire sediment with and without fuel treatment [lines (c) and (a), respectively].



Fire can occur at any time (horizontal axis) and produce sediment (vertical axis). The management objective is lowering fire regime condition class from line (a) to (b) by treating hazardous fuels and reducing the potential post-fire risk effect from R2 to R1. Pre-fire fuel treatment implementation [line (c)] produces logging sediment (A1). If a fire ignites before time T2 this is as an additional increment to post-fire sediment. The future benefit of fuel treatment is reduced post-fire sediment from a treated forest compared to an untreated condition (A2 + A3). Decision rule: Accept the treatment project if risk-reduction benefits exceed the implementation risk, as they appear to at T4, but perhaps not at T3.

Jay O'Laughlin is policy chair, Inland Empire SAF. He can be reached at 208-885-5776 or jayo@uidaho.edu. This article summarizes the "Risk Assessment Primer for Natural Resource Managers" report he will present at the Tri-Society SAF Meeting in Lewiston, Idaho, on April 15, 2005.

Study Evaluates Fish Response to Management Actions

BY ROBERT BILBY, WILLIAM EHINGER, TIMOTHY QUINN, GREG VOLKHARDT, KIRK KRUEGER, DAVE SEILER, GEORGE PESS, CHRIS JORDAN, MIKE MCHENRY AND DEREK POON

Endangered Species Act listing of many populations of Pacific Northwest salmon in the 1990s initiated a massive effort to protect and restore freshwater habitat ranging from small-scale projects to changes in forest practices regulations. However, relatively little is known about the response of fish populations to these efforts. Sampling fish populations sufficiently to detect a response to a habitat change is expensive and complicated by the fact that the relative importance of various habitat conditions in determining fish production often changes from year-to-year due to variations in weather and flow.

One approach to assessing the response of salmon and trout populations to land management or restoration actions is watershed-scale experiments. Focusing evaluation efforts on a relatively few, intensively monitored locations will enable enough data to be collected to develop a comprehensive understanding of the factors controlling salmon production in freshwater and the impact of management actions on these critical factors.

Several organizations in the Pacific Northwest have begun such efforts. Described below is a program in Washington called Intensively Monitored Watersheds (IMW). This project is a joint effort of the Washington departments of Ecology and Fish and Wildlife, NOAA Fisheries, EPA, Lower Elwha Klallam Tribe and Weyerhaeuser Company, and is financially supported by the Washington Salmon Recovery Funding Board.

Design

Because salmon use multiple habitat types during freshwater rearing, the spatial scale at which an evaluation is conducted should be large enough to encompass all the habitats required for the salmon to complete this phase of their life history, which varies by species. Species that utilize large freshwater systems for spawning and rearing (e.g., ocean-type chinook salmon, sockeye salmon) may not be amenable to this evaluation approach. Therefore, the IMW study is focusing on species that use smaller systems for rearing: coho salmon, steelhead and cutthroat.

Responses of these species to management actions are being assessed using a before-after/control impact design on sets of comparable watersheds. This type of design enhances the ability to differentiate treatment responses from responses due to variations in factors not directly affected by the treatments. At least one watershed will serve as a reference where no experimental treatments will be implemented during the study. A calibration period prior to applying treatments is required to determine how the reference and treatment watershed compare in the key response variables prior to any habitat manipulation.

Experimental treatments will vary depending upon the initial condition of the watersheds, the perceived factors limiting fish production and the feasibility of applying treatments. Many of the selected watersheds have had some type of watershed assessment already conducted (e.g., limiting factors analysis, Washington state watershed analysis). These analyses will be used in conjunction with supplemental information collected as part of the IMW project to identify the suite of actions most likely to influence salmon and trout production. The identified treatments will be applied in conjunction with local citizen watershed enhancement groups.

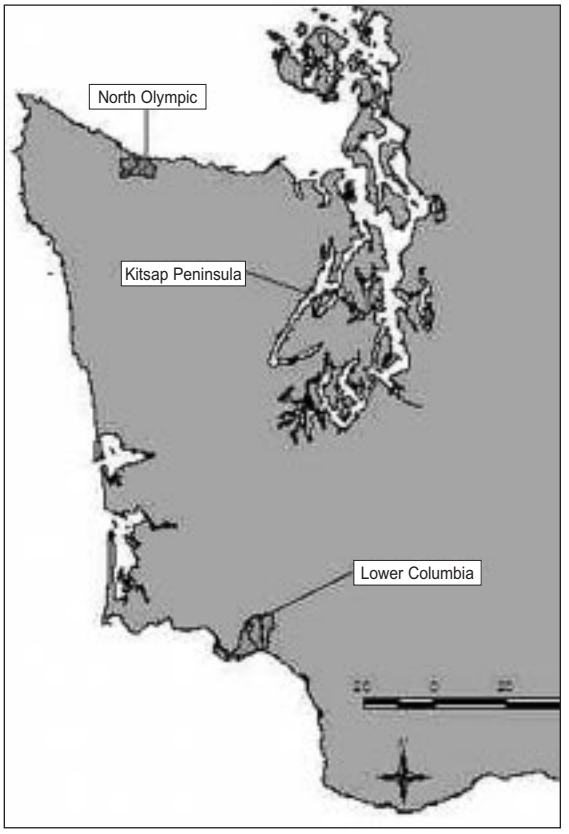
Selected IMW Watersheds

Watersheds to be included in the IMW project were selected based on four criteria:

- Watersheds small enough that habitat may be effectively treated and monitored, but large enough to encompass all freshwater life stages of coho salmon, steelhead and cutthroat trout.
- Current monitoring provides a reliable estimate of smolt production for the entire watershed. Sites with longer records of smolt production were preferred.
- Estimates of returning adults are available or feasible with additional effort.
- There are at least two watersheds in close proximity with similar physical characteristics and size.

Three groups of watersheds were identified (see Figure 1). These watershed complexes include 10 total watersheds—three located along the northern side of the Olympic Peninsula; four on the western side of the Kitsap Peninsula; and three on the north shore of the lower Columbia River. The individual watersheds range in area from 12-75 square kilometers.

Figure 1



Locations of the IMW study sites in Washington.

Variables measured

The specific parameters measured in each watershed will vary depending on the types of treatments being applied. However, a basic set of data will be collected at all of the watersheds. The data collected at all sites includes measures of water quantity and quality, habitat characteristics and fish population metrics.

Water Quantity and Quality. Continuous stage height recorders have been installed near the mouth of each watershed. Water temperature also is recorded at these locations. Water samples are collected monthly and analyzed for dissolved oxygen, pH, specific conductivity, total nitrogen, nitrate+nitrite-N, ammonia-N, total phosphorus, soluble reactive phosphorus, suspended sediment and dissolved organic carbon. Wind speed and direction, air temperature, relative humidity and precipitation are measured at one location in each set of study watersheds. In addition to water temperatures recorded at the gauge site, temperature loggers will be deployed throughout each basin at selected locations to record changes in water temperature from headwaters to the mouth.

Habitat Conditions. The IMW studies lend themselves to the use of two methods of collecting habitat data: a temporally infrequent, basin-wide survey, such as the Hankin and Reeves (H-R) method and a spatially discontinuous, temporally frequent survey based on methods developed by the U.S. Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP).

The H-R-based approach uses visual estimates or coarse measures or counts of habitat attributes (e.g., large wood) to provide estimates of habitat condition and distribution. The H-R approach provides a complete view of stream conditions and is most effective at capturing rare habitat types. However, these rapid estimation approaches have low measurement precision that hinders statistical assessment of temporal change. For this reason, H-R-based surveys will be conducted infrequently, with the goal of characterizing dramatic alterations in habitat caused by severe events such as large floods. The EMAP-based approach uses precise measurements of habitat attributes using transects at sample sites that are selected randomly but in a spatially-balanced manner.

Fish Populations. Information on number of spawning adult salmon and steelhead, abundance of juvenile fish and number of emigrating smolts is being collected at all watersheds. Spawning fish numbers are estimated either from counts of spawning fish or redd counts at randomly selected stream reaches in most of the watersheds. One watershed has an adult collection fence that captures all returning fish. Surveys of redds or spawning fish are conducted on all accessible areas for several of the smaller watersheds. Juvenile fish abundance is determined during summer by electrofishing randomly selected reaches in each watershed. Habitat information also is collected at these locations using the EMAP protocols. Smolts are collected with a fence on seven of the ten IMW streams, providing a complete count of emigrating fish. On three of the streams, partial traps (screw traps) are used due to the larger size of these systems. These traps are calibrated frequently to determine catch efficiency.

Timeline

The IMW effort is planned to last for at least a decade. However, some meaningful results will be produced more rapidly.

For example, the response of habitat conditions to in-channel restoration measures would be expected to have a fairly short response time. Responses of the fish will take longer as the species we are working with have a generation time that ranges from three years to six years or more. We estimate that even with the application of a project that has a great influence on freshwater productivity a conclusive response from the fish will take more than one generation. However, within the next 10 years we expect the results of the IMW effort will greatly enhance the effectiveness and efficiency with which we identify and implement habitat protection and restoration efforts across the region. ◆

Robert Bilby is the chief environmental scientist for Weyerhaeuser Company in Federal Way, Wash. He can be reached at 253-924-6557 or bob.bilby@weyerhaeuser.com. William Ehinger is with the Washington Department of Ecology. Timothy Quinn, Greg Volkhardt, Kirk Krueger and Dave Seiler are with the Washington Department of Fish and Wildlife. George Pess and Chris Jordan are with NOAA Fisheries. Mike McHenry is with the Lower Elwha Klallam Tribe; Derek Poon is with the Environmental Protection Agency.

Improving Access to Certified Wood Markets

BY IAN HANNA

Forest landowners in the Pacific Northwest have a new option for accessing the growing market for certified wood products. The Northwest Natural Resource Group (NNRG), an organization that promotes market-based approaches to working forest conservation, has launched *Northwest Certified Forestry,* a program designed to make certification both more affordable and more effective. The program is intended for family forests, municipal lands and smaller commercial timber growers that pursue high management standards.

NNRG's program brings together multiple landowners under a group certificate approved by the Forest Stewardship Council (FSC), an international forest certification body and forest products brand. Under group certification, fees are significantly reduced because costs are spread among all participating landowners.

Maturing Markets

National demand for FSC products has grown considerably in the past few years, fueled mainly by green building programs, corporate greening initiatives, and export markets.

The Pacific Northwest is one of the fastest growing FSC markets in the country, with several Seattle and Portland area lumberyards, including Compton Lumber, Lumbermens, Environmental Home Center, Dunn Lumber, The Home Depot and Parr Lumber now stocking FSC materials.

FSC markets offer producers the potential for premiums, with retail levels for finished products typically ranging between five to 15 percent. Premium levels tend to be lower on raw timber, typically between two to six percent. For an individual landowner to achieve these premiums, however, FSC certified mills must be within an economical distance and have downstream premium customers.

Lower Costs—Added Benefits

Under the program, landowners with less than 2,500 acres pay fees of 50¢/acre/year with a $200 annual minimum. This contrasts with costs of roughly $2,000/year for being certified individually. For ownerships over 2,500 acres, NNRG negotiates costs based on the size and complexity of the operation.

Northwest Certified Forestry's benefit package also includes several services not available through individual certification. Taken together, these services provide a framework that makes FSC certification a much more practical tool for landowners. They include:

- Sales referrals and new business connections;
- Regional, national and international market development;
- Supply chain development;
- Discounted educational workshops;
- Access to management and market information; and
- Advocacy within FSC, other relevant standards and public policy.

Since Northwest Certified Forestry doesn't provide management services, participating landowners are encouraged to use their existing service providers. In the fall of 2005, the pro-

PHOTO COURTESY OF NNRG

Program member Kirk Hanson shows off a healthy Douglas-fir on his family's Oakville forest.

gram will add a preferred provider referral service for members seeking expertise across a broad range of forestry related professions.

Adding Value

Though some Northwest Certified Forestry members are concerned only with log sales, many are focused on getting the highest possible return on their timber by getting 'closer to the customer.' Most accomplish that goal through manufacturing and marketing high-quality value-added products such as free-of-heart timbers, high-grade lumber, flooring or fine furniture.

Group member Richard Pine, president of O'Neill Pine Company in Lewis County, Wash., sees FSC as a sound marketing strategy for his million board feet of annual harvest. "We were an early adopter of FSC and learned a lot of lessons paving the way," says Pine, "but we still believe certification is a viable niche market. We're beginning to overcome the supply chain challenges of getting FSC products to willing buyers and hope to see continued growth in Northwest and national markets." O'Neill Pine has chosen to focus their value-added marketing on Douglas-fir timbers, with a possible expansion of product lines this year.

Rigorous Standards

While many landowners are already meeting FSC standards, some will find that FSC is simply not a good match given their management goals and style. In general, FSC tends to favor management systems that retain a high degree of structural and species diversity. Even-aged systems have more requirements to meet, while variable retention and group and individual selection are more favored.

Some important requirements of the standard include:

- A long-term management plan;
- Special consideration of rare species and habitats;
- Variable retention in final harvests over six acres;
- A monitoring program appropriate to scale; and
- Minimized pesticide use.

More information on FSC standards can be found at www.fscus.org/documents/index.php.

Making Informed Decisions

As in any business decision, landowners should proceed carefully in evaluating Northwest Certified Forestry. While the FSC market does offer exciting opportunities, it also offers challenges, particularly in ongoing market and supply chain development. As the old saying goes: If it were easy, everyone would be doing it. Landowners should only pursue certification when the pathway to benefits is clear and based on real market opportunity, not just a compelling idea. ◆

Ian Hanna is the program director of Northwest Certified Forestry. He can be reached at 360-379-9421 or ian@nnrg.org.

Northwest Natural Resource Group

About NNRG

The Northwest Natural Resource Group has been a certification advocate in the Northwest for several years, primarily as a contractor and former affiliate of the SmartWood program, an FSC-approved certification body. NNRG is credited with certifying hundreds of thousands of acres of forestland and dozens of manufacturers and distributors in Washington, Oregon and British Columbia. For more information, please see www.nnrg.org.

We Remember

L.L. "Stub" Stewart
1911-2005

Oregon has powerful and wealthy business owners, public-spirited leaders and generous philanthropists. But it no longer has anyone quite like Loran LaSells "Stub" Stewart.

Mr. Stewart, who died January 2, was a throwback to another era in Oregon. It wasn't just that he was a timber baron, president of the towering Bohemia Lumber Co. It was that Mr. Stewart always was determined to build more than a great business. He wanted to help build a great state.

Today it is all but unheard of for the president of a major company such as Bohemia to take time away to serve six years in the Legislature or a long stint on the State Board of Higher Education. It is hard even to imagine one of today's multi-millionaire business owners spending 30 years on the Oregon Parks Commission, pushing for more public parkland and protecting public access to the state's beaches.

Mr. Stewart did all those things and much, much more. The man who was given the nickname "Stub" because of his small stature while growing up in logging camps became a giant in Oregon. He came from a generation of Oregon business leaders who felt obliged to serve their community and state.

Mr. Stewart had every excuse that many of today's business leaders use to justify tending to their companies and avoiding public service. Bohemia was a handful: a big, sprawling company with more than 2,000 employees at mills in Coburg, Culp Creek, Drain, Eugene, Gardiner, Saginaw, Vaughn and several cities in California. At one time it was the nation's largest producer of laminated beams.

Mr. Stewart was a busy man and could have begged off from public service. Instead, he spent his lifetime inspiring many members of his own family, and countless others, to serve. One of his granddaughters now serves on the Eugene City Council and a great-nephew was recently sworn in as a Lane County commissioner.

Mr. Stewart earned a degree in logging engineering from Oregon Agriculture College, now Oregon State University, in 1932. In 1933 he worked as an engineer for the USDA Forest Service in Lane County, John Day, Baker and Lakeview. That work became the foundation of his voluminous knowledge of Oregon geography, politics and regional differences.

In 1946, Mr. Stewart and his younger brother Faye approached their father, a part owner in Bohemia at the time, with hopes of buying the company. Initially, the elder Stewart refused the deal because he didn't think the company would generate enough profit to support the families, but in the end he relented. The two brothers and a brother-in-law, Larry Chapman, became the new owners, and the company reported sales of $1.7 million the next year. Mr. Stewart was named company president in 1950.

Bohemia's biggest timber purchase came in 1958 when the company agreed to buy 146,000 acres of timber between Table Mountain and Culp Creek from Georgia-Pacific. Mr. Stewart called it "the deal that made us" and said it was so big and scary that, after it was done, he was never again afraid of anything. The agreement required the company to take out a $9 million loan with daily interest payments of $1,500. "The next day, I called everybody together and told them what I had done," he recalled in *The Register-Guard*. "Well, we got to work and the dirt just flew and a lot of timber fell. It was the best deal I ever made."

A variety of factors, including the company's reliance on government timberlands and increasing competition from producers in other parts of the country, began to exert financial pressure in the mid-1980s. In 1991, Bohemia sold out, unloading its Oregon assets to Willamette Industries and selling its California holdings to Sierra Pacific.

After his family's timber company was sold, Mr. Stewart stubbornly held on to a single share of Bohemia stock, even though the deal required him to give up all of his interest. He later hung the share on the wall of his family cabin at Odell Lake.

Mr. Stewart gave back millions of dollars to his alma mater, OSU. The Stewart family helped construct the LaSells Stewart Center on campus, and Stewart contributed more than $1.5 million for forestry, whale tracking, marine mammal research, science and athletics.

In his "retirement," Mr. Stewart's name was attached to more than 50 organizations, and he still served on the boards of a number of institutions. Mr. Stewart was also a regular contributor to the Oregon SAF Foundation, and provided a $10,000 "matching" grant contribution in the early years of the Foundation's development. ◆

—*Compiled from* The Register-Guard, The Oregonian *and other sources*

Calendar of Events

UNIVERSITY-SPONSORED EVENTS

Course	Dates	Sponsor	Location
Science and the Northwest Forest Plan	April 19-20	OSU	Portland, OR
Introduction to GIS Applications in Natural Resources with ArcGIS	April 21-22	OSU	Corvallis, OR
Selling Forest Products	May 9-10	OSU	Corvallis, OR
Transfer of Forest Science Knowledge and Technology	May 11-13	OSU	Troutdale, OR
Variable Probability Sampling	May 9-13	OSU	Corvallis, OR
Advanced GIS Applications in Natural Resources with ArcGIS	May 19-20	OSU	Corvallis, OR
Fernhopper Day	May 21	OSU	Corvallis, OR
Plywood Manufacturing	June 6-7	OSU	Corvallis, OR
GPS Workshop	June 13-15	UW	Eatonville, OR
5th International Conference on Forest Vegetation	June 20-24	OSU	Corvallis, OR
Pacific Northwest Forest Harvesting Study Tour	July 10-23	OSU	San Francisco, CA
Western Forest Genetics Association and Northwest Seed Orchard Managers Association Annual Meeting	July 19-21	OSU	Corvallis, OR

OTHER EVENTS

Inland Empire, Oregon and Washington State SAF Tri-Society Annual Meeting, April 13-15, Lewiston, Idaho. Contact: Terry Shaw at 208-885-7452 or tshaw@uidaho.edu.

Basic Road Design, April 18-21, Redding, CA. Contact: Forest Engineering.

Washington Farm Forestry Association Annual Meeting, April 21-23, Ocean Shores, WA. Contact: Dick Atkins at 360-437-2166 or atkins@waypt.com.

Mimicking Nature's Fire: Restoring Fire-prone Forests in the West presentation by Stephen Arno and Carl Fiedler, April 26, World Forestry Center, Portland, OR. Contact: Tony Scherl, World Forest Institute at 503-488-2147 or tscherl@worldforestry.org.

Bringing Climate into Natural Resource Management, May 4-6, Portland Hilton, Portland, OR. Contact: WFCA.

Beginning Forest Road Design Using RoadEng 4, May 5-6 in Astoria, OR; October 7 in Corvallis, OR; and October 20-21 in Corvallis, OR. Contact: LEI.

Global Forest and Paper Summit 2005, June 1-3, Vancouver, BC. Contact: www.globalforestpapersummit.com.

Tree School South, June 16, Umpqua Community College, Roseburg, OR. Contact: Elissa Wells at 541-672-4461 or elissa.wells@oregonstate.edu.

Soil, Water and Timber Management: Forest Engineering Solutions in Response to Forest Regulation (COFE Conference), July 12-14, Fortuna, CA. Contact: Loren Kellogg at 541-737-2836 or loren.kellogg@oregonstate.edu.

Western Forest Mensurationist Meeting, July 4-7, Naniloa Resort, Hilo, HI. Contact: Terry Droessler at 541-753-4702 x102; terryd@duckcreekassociates.com; www.westernforestry.org/wmens.

Contact Information

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

LEI: Logging Engineering International, Inc., 1243 West 7th Ave., Eugene, OR 97403; 541-683-8383; www.leiinc.com.

OSU: OSU College of Forestry Outreach Education Office, Peavy Hall 202, Corvallis, OR 97331-5707; 541-737-2329; http://outreach.cof.orst.edu/.

UW: Bob Edmonds, College of Forest Resources, Box 352100, University of Washington, Seattle, WA 98195; 206-685-0953; bobe@u.washington.edu; www.cfr.washington.edu/events.

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. The deadline for the May/June 2005 issue is April 18, 2005.

World Forestry Center in the Midst of Many Changes

BY JENNIFER KENT

It's taken many years, many dollars and many people to make this happen, but the World Forestry Center's Discovery Museum in Portland's Washington Park is undergoing a $7 million dollar renovation scheduled to be completed this summer. Along with the renovation, the center has also developed a new brand and logo to update its image.

The doors officially closed on January 1 and within a day, work crews started the demolition process. Local contractors Reimers & Jolivett Inc., Forestry Center staff and exhibit designers West Office Exhibition Design are working as a team to create all new thought-provoking, educational and fun exhibits designed to engage visitors to learn about human and wildlife interaction with forests and trees of the world.

The World Forestry Center's new Discovery Museum will bring many opportunities for unique experiences, quality education and just plain fun.

For the World Forestry Center leadership, it also brings the rare opportunity to raise community awareness of our vision and mission.

The new Discovery Museum is comprised of two floors—the lower level focusing mainly on forests of the Pacific Northwest and the upper level on forests of the world.

Guests will start their journey in a new theater that introduces them to the experience that lies ahead, and from there they are free to explore the museum at their own pace. With the help of high-tech computers and hands-on displays, visitors will see new exhibits that include: *Take Me to the Top*, where visitors will be hoisted up 45 feet to see the forest from a unique perspective; riding the rapids of the Clackamas River complete with a souvenir picture; simulated smoke jumping; and the chance to climb aboard a real-life Timberjack harvester.

After exploring the first floor, visitors can meander upstairs where they learn about forests of the world. The global exhibit is intended to show the diversity of forests worldwide, and yet the similarity of challenges that people around the world face in managing their forests. Visitors will embark on a whirlwind virtual tour of four forest types: boreal, temperate, tropical and sub-tropical. The tour is composed of a series of videos viewed in a recreated vehicle.

The first tour is to the boreal forests of Siberia, near Lake Baikal, via the Trans-Siberian railway. When the experience is over, the visitor moves into the next vehicle, the Chinese tour boat on Songhua Lake, in Changbai Mountain, a temperate forest region. Next is a jeep ride through Kruger National Park, South Africa, to view sub-tropical forests. Last, visitors step into a canopy crane for a simulated ride up into the tree tops of Brazil's Amazon tropical rainforest.

The upstairs will also house the temporary gallery space for rotating exhibits that explores art, history and culture from around the world. Another feature will be the suspended canopy walk in which visitors can traverse from one side of the second floor to the other through the tree tops of the forest below.

On a parallel track with the renovation, the Center is also updating its brand and rolling out a new logo and ad campaign. The new logo shows a hand doubling as a tree trunk surrounded by leaves. The logo symbolizes how humans and forests are interconnected and also hints at the "hands-on" interactive nature of the new Discovery Museum.

The renovated museum, new logo and new ad campaign complement each other as the Center moves through this period of change. The grand re-opening festivities are scheduled for the July 4th weekend, and the public will begin to see new ads this spring to help build anticipation and excitement.

The World Forestry Center Discovery Museum—It'll change the way you look at trees! ◆

Jennifer Kent is marketing director for the World Forestry Center in Portland, Ore. She can be reached at 503-488-2117 or jkent@worldforestry.org.

Letters

Dear Editor,

I appreciated the coverage you gave to forestry education in the November/December issue. I agree with Dean Hal Salwasser that there is a need to refine degree programs to improve the business and communication skills of the graduates. Today's forestry graduates need many skills, including data analysis, planning and working with the public. However, they must have a basic, core knowledge of forestry. Producing graduates that can analyze and plan forest resources will be of little avail if the planning and analysis are not based on solid information.

I am also concerned about the apparent assumption that forestry graduates must attend graduate school to become adequate forest managers. There is a vital need for the skills imparted in graduate schools to make progress with the management of the forests, but the forestry graduate with an undergraduate degree should be capable to manage the forests.

Lloyd Olson
Oregon City, Ore.

Letters to the Editor

The *Western Forester* welcomes letters to the editor. Priority will be given to letters no longer than 250 words and referring to ideas presented in prior issues of the *Western Forester*. All letters are subject to editing. Letters may be faxed to 503-226-2515 or sent via email to rasor@safnow.org. Please include name, address and phone number.

SAF Comes to Portland (Again!)

BY SUE BOWERS

After scouting various locations in the West as possibilities for the 2007 National Convention, SAF's staff back in Bethesda, Maryland, and Council members determined there would be no place better than Portland. "What, again so soon?" one might ask (and several of us did!). But the truth is, the Northwest can showcase forestry, provide great facilities and convenient travel means, offer interesting leisure-time activities, is convenient for a significant number of SAF members, and most of all, has a great cadre of SAF members to host such an event.

Michael Goergen made the trip west to take part in the OSAF-WSSAF Leadership Conference in mid-January. While with us, he addressed questions from members of the OSAF Executive Committee as they contemplated accepting Council's invitation to host the 2007 meeting.

Michael described a new model for managing these meetings, which began with the Buffalo convention in 2003. The National Office leads the business aspects of the convention, including budgeting, contracting, marketing and meeting management. Contracted professionals handle exhibit management, convention center and hotel arrangements, audio visual equipment facilitation and transportation arrangements for tours. Oregon SAF volunteers will be involved specifically in tour planning and in hosting our guests in Portland. The new approach allows the local volunteers to attend the convention and not be bogged down with logistical details.

A general chair, chair of the Committee on National Convention Programs, and chair of National Convention Arrangements will be appointed by the SAF President later this year. SAF members outside of Oregon are eligible for these roles, but it is expected that local candidates will be tapped. The planning team will involve members representing the various areas of forestry that have complementary leadership skills to ensure that convention goals are met.

The OSAF Executive Committee members who remembered how much work was involved in 1999 gulped just a bit, but joined the rest of the group in voting unanimously to say "Yes" to Michael and Council.

The dates are set for October 24-28, 2007. Watch for more news about how you can be involved in this exciting project for the forestry profession in Oregon. ◆

Sue Bowers is chair of the Oregon SAF. She can be reached at sbowers@epud.net.

Dean Bare Becomes a Fellow

PHOTO COURTESY OF TOM MENTELE, DIRECTOR OF DEVELOPMENT, CFR

Bruce Bare, dean of the College of Forest Resources (CFR), University of Washington, was officially awarded his Fellow certificate at the CFR's faculty meeting on Feb. 8. The presentation was made by SAF Council Representative and UW alum Ann Forest Burns, who is shown here with Dean Bare and South Puget Sound Chapter Chair Jim McCarter (left).

Idaho Offers Tours for Teachers

A unique and valuable partnership is being forged between teachers, the Idaho Forest Products Commission and a consortium of sponsoring partners. Modeled after the Temperate Forest Foundation Teachers' Tour, teachers spend three days exploring and learning about north central Idaho forests from June 22-25. Throughout the tour, the teachers will learn directly from the natural resource professionals who care for our forests and those who provide products we all use every day. Forest tours are the best way to show teachers the dynamics of the forest products industry and help them educate their students about forest resources and the future choices they will need to make.

Pledge your commitment by recruiting a teacher (or several), recruiting a sponsor, or participating in the sponsor/teacher/forester partnership for this amazing educational experience.

Sponsorships are $300 (registration fee) plus teacher travel costs. You may sponsor a specific teacher from your local area or a teacher who wants to attend the tour can be matched with you.

For more details on the program and how to help, visit www.idahoforests.org or contact Harold Osborne, tour coordinator, at 208-875-1471 or hosborne@potlatch.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.

Reauthorization—Secure Rural Schools and Community Self-Determination Act of 2000. More widely known as the "Craig-Wyden" bill (after U.S. Senate cosponsors Larry Craig, R-ID, and Ron Wyden, D-OR), this law provides an option for counties to collect their historic 25 percent fund shares of timber sale and other receipts from national forests and other federal lands in the county. It also provides funds for resource management as chosen by Resource Advisory Councils created by the act (not to be confused with RACs established by the BLM in the mid-1990s). The law is scheduled to expire in October 2006, and in February 2005, bills to reauthorize it were submitted in both houses of Congress. Three policy implementation reports are available online at http://espri.boisestate.edu/Reports/. Contact: Jay O'Laughlin, IESAF Policy chair, 208-885-5776; jayo@uidaho.edu.

New Forest Service Planning Rule. If you're wondering about the new National Forest Management Act planning regulations, and especially what the commitment to third-party evaluation of such plans under an Environmental Management System might mean, see www.fs.fed.us/emc/nepa/ems/index.htm and read the recent interview with Associate Chief Sally Collins available online at http://certificationwatch.org/article.php3?id_article=2868. Contact: Jay O'Laughlin, IESAF Policy chair, 208-885-5776; jayo@uidaho.edu.

Idaho Legislators Learn About Forestland Conversion. In February, the Inland Empire and Intermountain Societies held their 8th annual information luncheon for legislators in Boise. This year's featured speaker was Dennis Murphy of Potlatch Corp. in Lewiston. He spoke about the TIMO trend, conservation easements under the federal Forest Legacy program, and the company's successful certification of its Idaho timberlands under three programs (SFI, FSC and ISO). Contact: Jay O'Laughlin, IESAF Policy chair, 208-885-5776; jayo@uidaho.edu.

Idaho to Consider Adopting New Forestland Valuation Formula. Although family forest owners in Idaho may opt for a yield tax that defers payment until the time of harvest, owners of more than 5,000 acres must pay annual property taxes derived by a productivity-based formula. Many landowners feel the current formula is unfair. A committee of county assessors, landowners and an independent economist (SAF member Bill Schlosser of Northwest Management, Inc.) was appointed to derive a new formula and has reported its results to the legislature. A bill is expected to see action before the legislature adjourns in March or April. Contact: Jay O'Laughlin, IESAF Policy chair, 208-885-5776; jayo@uidaho.edu.

OSAF Continues Work on New and Revised Position Statements. The OSAF Policy Committee continues to work on some new and updated position statements, which will add to the four

adopted in 2003 (i.e., Active Management to Achieve and Maintain Healthy Forests; Salvage Harvesting; Clearcutting; and Using Pesticides in Forests). Because old-growth forests remain an important issue, a position on this topic was drafted, although the nature and complexity of this issue is extending the process to refine and adopt this position over several months. OSAF's statement on "Fish and Riparian Forests" expired in December, and a draft revision of this 1998 position was shared with the OSAF Executive Committee at its meeting in January 2005. The Policy Committee decided that more time was needed to make this position more current and relevant to today's issues. Among the lessons of OSAF's 10 years of experience with multiple position statements is that the content and focus of the statements can become dated or less appropriate within just a few years.

Members are encouraged to use OSAF's position statements to help convey their professional forestry views to key decision makers and the interested public. All of the active statements are on the OSAF website (www.forestry.org). Contact: Paul Adams, OSAF Policy chair, 541-737-2946; paul.adams@oregonstate.edu.

Forest Issues Limited in Oregon Legislative Session. The 2005 Session of the Oregon Legislature began with only limited attention to forest issues. Beyond the usual "housekeeping" bills drafted with the help of state agencies, few bills under consideration have been focused on issues of direct concern to forestry professionals. Among these few are SB 345 and SB 530, which were sponsored by a committee (Environment and Land Use) whose majority members represent districts in the Portland Metro area. SB 345 would direct the Board of Forestry to establish permanent conservation reserves on state forestlands. It would also designate certain state lands in Tillamook and Clatsop counties as permanent reserves, including those within 300 feet of several major rivers. SB 530 would alter some key language of the Forest Practices Act so that the composition and focus of the Board of Forestry could shift from traditional forest products to broader interests.

To track these and other bills, SAF members should visit the Oregon Legislature website at www.leg.state.or.us/bills_laws/. A search engine provides a tool for finding bills using one or more key words. Contact: Paul Adams, OSAF Policy chair, 541-737-2946; paul.adams@oregonstate.edu. ◆

Alaska to Meet in Fairbanks

The Alaska SAF and Alaska Chapter of the Wildlife Society are holding their second joint annual meeting April 21-23 at the Wood Center Ballroom, University of Alaska in Fairbanks.

The meeting theme describes the need for innovative thinking by forestry and wildlife professions to resolve interrelated issues of hazardous fuels, wildlife habitat, fiber supply, and sustainable development of communities in both mainland and coastal forests of Alaska.

The organizers of this meeting have invited speakers from several organizations and different regions of Alaska and the western U.S. for panel discussions to help define opportunities for implementing potential solutions.

The Thursday morning session includes a panel discussion about hazardous fuels and habitat needs in mainland forests. After lunch on your own, the afternoon session covers the topic of "Dense regeneration and habitat issues in coastal forests." The evening offers a social mixer and poster session, followed by banquet dinner with keynote presentation by Paul Alaback of the University of Montana.

Friday's session will include concurrent sessions (36 in all) from a variety of speakers generated from a Call for Papers.

Registration information (including special lodging rates) and the full meeting agenda is available online at http://mercury.bio.uaf.edu/ak-tws/. Full-time students will be admitted free for all technical sessions and are encouraged to participate. ◆

Classified Ads

HELP WANTED—FORESTER

Inland Empire Paper Co. manages 115,000 acres of timberland and is accepting resumes for a FORESTER. Qualified applicants must have a BS in Forest Management and 2-3 years woods experience. Job will consist of 70-80% field work including timber sale set up, tree marking, sale admin and contractor supervision. Applicants should have experience with a team approach to problem solving and have good interpersonal communication skills. Send resume with cover letter to: Tom Brown, Inland Empire Paper Co., N. 3320 Argonne, Spokane, WA 99212. EOE

Classified advertising rates are 75 cents per word with a minimum $25 charge and are perfect for job positions, equipment for sale and general forestry-related announcements. Contact Lori Rasor at 503-224-8046 or rasor@safnwo.org by April 18 to reserve your space in the next issue.

SOCIETY OF AMERICAN FORESTERS
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