



Best Management Practices (BMP's) for Idaho Riparian Areas.

Yvonne Barkley

Idaho's forested land provides us with clean water and air, wildlife habitat, timber, multiple recreational opportunities, and beauty beyond compare. The practice of forestry has been described as being both an art and a science and those who own and manage forestland know this to be true. Some things can be measured, calculated, predicted, and formulated, while other things cannot - we can only forecast the weather, estimate growth, and predict forest health conditions. When it comes to forest management, one of the things we do know for sure is that "it depends". What happens in a forested ecosystem so often depends on past uses, current conditions, and future decisions. It depends on how much moisture we get and when, on dry lightning and fuel conditions, on soils, nutrients, and species compositions. As with other land management decisions and outcomes, in forestry "it depends".

But forestry is also a science. We have come a long way in understanding forested ecosystems. We have found our way through research and trial and error. And we are always learning something new. Best Management Practices (BMP's) were developed as recommendations for Idaho's forest owners and managers to follow, not only to comply with the Idaho Forest Practices Act, but also to enable us to be better land managers and stewards. BMP's have been determined to be the most effective and practicable means of preventing or reducing the amount of non-point pollution generated by forest practices. BMP's apply to all aspects of forest management - road planning, design, construction, and maintenance, timber harvest planning and execution, and streamside management. This article addresses BMP's in riparian areas and stream protection zones (SPZ's).

Riparian areas are directly adjacent to bodies of water and have many important functions. They act as a filter and effectively trap sediment from entering stream environments from adjacent roads and uphill areas. Trout and other fish reproduce by laying their eggs in stream-bottom gravel. When too much sediment enters the stream environment, it fills the gaps in the gravel and suffocates eggs and fry of reproducing species. Excessive sediment also has an abrasive effect on sensitive gill tissues, kills

aquatic insects and algae, fills in resting pools, and interferes with recreation.

Riparian areas provide shade to the stream environment. By maintaining vegetation along streams, water temperatures remain more constant. Without streamside vegetation, water temperatures would be higher in the summer and lower in the winter. Aquatic species have a small temperature and dissolved oxygen range in which they successively reproduce and thrive. Warmer than average water temperatures decreases dissolved oxygen, increases algae growth, and effects spawning behaviors and success.

Vegetation along streambanks reduces bank degradation and provides habitat to a multitude of wildlife species. Streambanks are stabilized by the root systems of trees and shrubs that line the banks. Dense vegetation slows water velocities, which is especially important during flooding, and bank overhangs provide hiding places for fish where they can rest and feed with less pressure from predators.

In the Northern Rockies, 59 percent of land birds use riparian areas for breeding, 39 percent of which breed in no other habitats. Food and cover are abundant in riparian areas, not only for land animals, but also for those that live in the stream as well. Leaves and insects dropping into streams from overhanging vegetation provide 90 percent of the food that enters streams in forested environments. Dense riparian vegetation also serves as well-traveled wildlife corridors that connect one area with another.

Stream Protection Zones (SPZ's)

The Idaho Forest Practices Act (FPA) states that streambeds and streamside vegetation shall be protected during and after forest practice operations, leaving them in the most natural conditions as possible to maintain water quality and aquatic habitats. To sum it up, stream protection zones are meant to "keep the dirt out of the creek". Forest owners and managers know that riparian areas often support the best tree growth - trees respond to the deep fertile soils and moisture available in riparian areas. But the SPZ does not have to be a timber harvest "keep out" zone. With the right planning and execu-

tion, some trees in the SPZ can be harvested without damaging riparian habitats and other benefits of healthy riparian systems.

As defined by FPA, Class I streams are used for domestic water supply or are important for the spawning, rearing, or mitigation of fish. Class II streams are usually headwater streams or minor drainages that are used by only a few, if any, fish for spawning and rearing. Streams do not have to have water in them to be classified as streams by the state. FPA defines a stream as "a natural water course of perceptible extent with definite beds and banks which confines and conducts continuously or intermittently flowing water. Definite beds are defined as having a sandy or rocky bottom which results from the scouring action of water flow." Any reference in the FPA rules to Class I streams also applies to lakes.

Class I SPZ's are a mandated 75-foot minimum slope distance on each side of the ordinary high water marks. Class II SPZ's are a mandated 30-foot minimum slope distance on each side of ordinary high water marks. For Class II streams that do not contribute surface flow to Class I streams must be treated to provide soil stabilization and water filtering effects by leaving undisturbed soils in widths sufficient to prevent washing of sediment. In no case will this width be less than five feet slope distance on each side of the ordinary high water marks.

In addition:

- SPZ's must extend beyond the 75-foot minimum when steep or erosive soils border the stream corridor. The steeper the slope, the wider the SPZ.
- SPZ's also extend beyond the 75-foot minimum when wetland areas lie adjacent to a stream. Boundaries then need to loop out to include any wetlands in the SPZ.
- Lakes require an approved site specific riparian management prescription prior to conducting forest practices within the SPZ.
- SPZ's boundaries should be clearly marked with plastic flagging, paint, or signs.
- Equipment is not allowed in SPZ's or wet areas, but harvesting is allowed.

BMP's CONTINUED ON PAGE 7

Wood for Wildlife

Chris Schnepf

When foresters talk about leaving organic debris, they often focus on feeding forest soils, minimizing fire risk, and avoiding bark beetle problems. But if they are looking at broader ecosystem functions, they will also look at organic debris for wildlife. Many forest owners value wildlife for their own sake, but even where management focus is primarily on timber, wildlife can contribute to those objectives. For example, the owls that use snags left on a site will prey on pocket gophers – a chief nemesis of tree planters everywhere.

For the most part, wildlife biologists looking at organic debris concentrate on material larger than 3 inches in diameter, known as *coarse woody debris* (CWD). Slash (organic debris smaller than 3 inches in diameter) ultimately helps wildlife to the extent it enriches forest soils, which in turn feeds the plants, trees, and fungi that wildlife depend on. Slash piles may also shelter small mammals. But inadequate coarse woody debris is often more limiting to wildlife. Species ranging from bears to rubber boas use CWD for many purposes. For example:

- both birds and mammals use CWD as a place to forage for insects or fungi;
- martens, fishers, bobcats, and black bears use CWD for dens and shelter;
- many small mammals use CWD for hiding cover and protection;
- small mammals also use logs as runways;
- many amphibians benefit from CWD because it provides a cooler, moister habitats with more stable temperatures for breeding and other activities;
- birds use CWD for lookout posts and reproductive displays; and
- predators such as martens and weasels use CWD for access under snow to their prey.

Managing CWD for forest nutrition is relatively straight-forward. Determine how many tons of CWD you need per acre and when and how to treat it to minimize insect and fire concerns. Managing CWD for wildlife is more complicated. The size, distribution, and orientation of logs are more important than sheer quantity. Also, different wildlife species have different habitat needs, some of which may conflict. For example, heavy log concentrations may be good for small mammals but limit elk movement. Since many, if not most, wildlife species of interest cross property boundaries, you also have to factor in what needs are being met by nearby forests. More research is needed, but some general strategies for managing CWD for wildlife can be grouped into three categories: snags, size and characteristics, and arrangement.

Snags. The primary focus in this article is logs on the ground. But before a tree can become log habitat, it must die. Sometimes green trees are blown down by the wind and immediately provide CWD, but more commonly, the dead trees remain standing for decades. This dead, standing tree is called a snag. Snags are a valuable resource for a whole host of wildlife species and are often the first thing that biologists look for when evaluating forest wildlife habitat quality. For a good summary on snags, read *Managing Small Woodlands for Cavity Nesting Birds*, downloadable at <http://www.>

WILDLIFE CONTINUED ON PAGE 8

Silvicultural Decisions XI: Can Fire Hazard Reduction Treatments Help Achieve Other Silvicultural Objectives?

Ron Mahoney

Pacific Northwest forests are generally managed to meet landowner objectives, whether held by a private individual or family, a business or trust such as industry or tribal lands, or public land. These objectives may be narrowly focused on specific products such as timber, but more commonly broadly focus on natural resource management that integrates timber and other products including wildlife and special forest products (floral greens, mushrooms etc.) along with less measurable assets often collectively described as *aesthetics*. Increasingly, social impacts and values are included as priority objectives.

Widespread recognition of the biological and financial hazards of decades of fire suppression and resultant high fire-risk forest conditions has led to extensive fire hazard reduction practices. Specifications for hazard reduction are often based solely on producing a more fire resistant forest stand or landscape. Plans for reducing and managing fuel hazards may meet other forest management (silvicultural) objectives such as forest health, aesthetics, and productivity with modifications and additions, or poorly address them.

Recently, I visited the *Coeur d'Alene Tribal Forestry Fuels Treatment Project* with Tribal Fuels Forester Eric Geisler and several other UI professors. The Tribe had implemented treatments that tested the fuel hazard reduction effectiveness of several machines and different mechanical cutting tools. We now are collaborating to develop a post fuels-treatment project that will measure the effectiveness of alternative vegetation management methods to maintain effective fuel hazard reduction. During our field examinations of the Tribe's fuels treatment project, it was very apparent that multiple silvicultural objectives were simultaneously achieved. A silvicultural prescription for multiple objectives, including timber production, in these stands would have paralleled the fuel hazard reduction plan that was applied. In this instance, the mechanical fuel treatment specifications developed by the Tribe and Tribal natural resource managers showed that they recognized and included many timber and social considerations in developing treatments that met multiple resource objectives under the primary objective of fuels reduction. While other site and forest vegetation situations, and certainly other ownership's constraints especially on public lands, will make this approach of meeting multiple objectives with fuels treatments unrealistic, this specific situation is an excellent example of where it works and why. Hopefully, the information presented in this article will help other landowners and resource managers think more broadly about good silviculture on a stand and landscape level when managing fire risks through fuels reduction.

The Coeur d'Alene Tribe owns some 30,000 acres of trust land, and currently intends to treat the majority of the forested land in their fuel reduction project. Much of the 20,000 acres in these initial priority treatments are in small blocks of forests bounded by roads, homes and other tribal structures, cultural areas, and riparian and other sensitive sites. Consequently, there are many potential sources for ignition as well as many ecological, financial, social and cultural properties and resources to protect. Although some of the treated areas serve essentially as fire-resistant buffers for these other values, entire forest stands will be treated, following current trials to show which mechanical treatment is the most effective and efficient. Following initial fuel reduction treatments a new Tribal project in part-

nership with the University of Idaho will conduct experiments to test alternative strategies to maintain desired fuel levels. Post-treatment management would seem to be an obvious requirement, but many land owners and managers have made fuels reduction treatments with no provision for continued maintenance. The amount and species composition of re-growth and in-growth of vegetation, including invasive species, is a critical aspect of sustaining targeted fuel levels.

It is no accident that the Coeur d'Alene Tribal forest was much closer initially to the "prescriptive ideal" for the sites we visited than many other forests on similar habitats. The Tribal forest has sustained fire suppression for a much shorter time (about 40 years vs 80-100 years for much of the regional forest landscape). Historically, both Tribal Trust lands and individual forest land allotments were regularly under-burned by tribal owners and managers until the later 1960's. At the same time, Tribal cultural values and ecological understanding led to favoring large, healthy trees. In this landscape, that meant the seral species including ponderosa pine, Douglas-fir, western larch, and western white pine, species that continue to be favored to retain in fuels treatments and other Tribal management specifications. Consequently, a well-stocked overstory of seral species was present on all of the forest sites we visited. The understory is composed of diverse, largely native species that will be retained or removed to sustain wildlife and cultural values while reducing fire hazards.

A closer look at some of the stand conditions and fuels treatments, and their silvicultural implications, illustrates how compatible these management goals are, and reveals factors other land owners and managers might consider in fire hazard reduction prescriptions:

- The habitat types in this situation are primarily in the grand fir series ranging from its drier to wetter phases. The climax species, grand fir, is near the margin of its ecological limits for growth and will be the first species to experience stress and associated forest health problems. Some of the hazard reduction sites are at the wetter end of the Douglas-fir series or at the drier end of the western redcedar series but in general, the species designated to leave under fire hazard reduction, ponderosa and white pine, western larch, and Douglas-fir, are the same tree species I would prefer under a silvicultural prescription where the objective is forest health, sustainable timber production, stable, diverse habitats and consideration of appearance, accessibility, and resistance to fire.
- The tree species designated to remove in the fuel treatments are all grand fir, and commercial-sized lodgepole pine, along with any other species of poorer form, smaller, or less healthy than the nearest designated leave tree within 15 feet. This provides some commercial harvest during the treatments, and future harvest while suppressing establishment and growth of undesirable understory vegetation and conifer regeneration. This designation is compatible with most silvicultural goals, but the spacing of leave trees, 15 feet, would be more variable and likely wider depending on tree size, if timber productivity was a primary objective.
- The pre-treatment understory in these forests is a diverse composition of native species

DECISIONS CONTINUED ON PAGE 8



University of Idaho
Extension

Strengthening
Forest
Stewardship
Skills
2005-2006



Strengthening Forest Stewardship

Landscaping for Fire Prevention

This program helps forest homeowners make their homesites less likely to burn and easier for firefighters to access in the event of a local forest fire.

Sessions of this program can be scheduled for interested groups of 10 or more.

Forestry Shortcourse

This multi-session program enriches private forest owners' basic understanding of forest ecology, silviculture, insects, disease, goal setting, record keeping, and other forest stewardship issues. In the process, participants work on a management plan for their forest (UI credit available).

Coeur d'Alene, November 7 - December 12, 2005 (6:30 pm to 9:30 pm)
Sandpoint, June 14 - July 19, 2006 (9:00 am to 12:00 pm)

Logger Education to Advance Professionalism

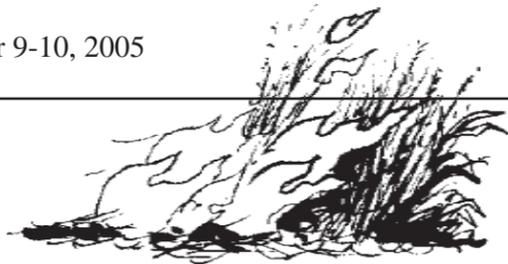
Logger Education to Advance Professionalism (LEAP) is a nationally acclaimed Extension program that helps loggers improve their skills related to forest ecology, silviculture, and water quality through presentations, discussion, videos, and other learning experiences.

Coeur d'Alene, November 2-4, 2005
Orofino, April 12-14, 2006
Coeur d'Alene, April 19-21, 2006

Inland Northwest Wildland Urban Interface Conference

This program, offered jointly by UI Extension and WSU Extension, is designed to give rural policy makers, local agency staff, contractors, realtors, foresters, and rural residents an opportunity to learn about current research and experience related to fire, growth, planning, rural infrastructure, and other topics, and apply them to policies and activities in the wildland urban interface.

Worley, November 9-10, 2005



Forest Taxation & Estate Planning Conference

This program is offered every other year and features nationally recognized experts on federal and state tax and estate planning related to forests. The sessions are intended primarily for foresters, accountants, and forest owners who understand basic aspects of forest taxation.



Coeur d'Alene, December 6-7, 2005

Current Topics in Forest Health

Animals, plants, insects, and fungi can sometimes impede forest stewardship goals. This annual program updates forest owners, operators, and natural resource professionals on methods to manage these organisms. Pesticide recertification credits will be available.

Orofino, Thursday, December 8, 2005 (8:00 am to 4:00pm)
Coeur d'Alene, Friday, December 9, 2005 (8:00 am to 4:00 pm)

Family Foresters Workshop

This annual program, offered jointly by the UI and WSU Extension systems, updates consulting foresters, state-employed service foresters, and other natural resource professionals on emerging technology and knowledge applicable to family forests.

Spokane, Friday, January 20, 2006 (9:00 am to 4:30 pm)



An Introduction to Conservation Easements

This 2-hour evening program will feature a short introduction to conservation easements followed by a panel of representatives from public and private institutions that set up conservation easements and at least one landowner who has enrolled in one.

Bonnors Ferry, Saturday, February 11, 2006 (1:00 pm to 3:30 pm)

Scaling and Marketing Private Timber

Marketing timber is not a task most individual forest owners do every

For more specific information on these and other UI Extension Forestry programs in your local area:

Benewah, Bonner, Boundary, Kootenai, & Shoshone counties:

Chris Schnepf
Area Extension Educator - Forestry
UI - Kootenai County Extension Office
UI Coeur d'Alene Center
1000 West Hubbard Avenue, Suite 140
Coeur d'Alene, ID 83814-2277
Phone: (208) 446-1680 Fax: (208) 446-1690
E-mail: cschnepf@uidaho.edu

Latah, Clearwater, NezPerce, Lewis, & Idaho counties:

Randy Brooks
Extension Educator - Forestry/4-H/Agriculture
UI - Clearwater County Extension Office
2200 Michigan Ave.
Orofino, ID 83544-9010
Phone: (208) 476-4434 Fax: (208) 476-4111
E-mail: rbrooks@uidaho.edu

Landship Skills - 2005-2006

day. This program will help landowners understand basic log scaling practices and how to manufacture and market logs for the best return.

Grangeville, Friday, February 3, 2006 (8:00 am to 4:00 pm)
St. Maries, Friday, February 24, 2006 (8:00 am to 4:00 pm)

LEAP Update

This program is designed to deepen and expand the training provided in Logger Education to Advance Professionalism (LEAP). LEAP updates are co-scheduled with spring first aid training, so participants can get all 16 credits required by the Idaho Pro-Logger program within 2 days. Specific program details will be announced this winter.

Orofino, March 1-2, 2006
Coeur d'Alene, March 7-8, 2006
Deary, March 9-10, 2006
St. Maries, March 14-15, 2006
Bonnors Ferry, March 21-22, 2006

Family Forest Landowners Workshop

This 2-day program, held annually in Moscow, Idaho, features presentations and exhibits on a variety of topics of interest to private forest owners.

Moscow, March 27-28, 2006

Habitat Field Day

This field session will focus on wildlife habitat, rare and threatened animal and plant species, and ways to improve habitat for them all.

Coeur d'Alene, Friday, June 9, 2006 (8:00 am to 4:00 pm)

Using your GPS

A Global Positioning System or GPS unit is becoming as common to work and play in forests as a compass. This one day program will introduce participants to the science underlying GPS, and feature field exercises to acquaint them with basic tasks that can be done with a GPS, such as measuring acreages of tree planting units.

Moscow, Friday June 2, 2006 (8:00 am to 4:00 pm)
Coeur d'Alene, Saturday, June 10, 2006 (8:00 am to 4:00 pm)

Pruning for White Pine Blister Rust

This indoor/field program will help you reduce white pine mortal-

ity from blister rust. It will cover blister rust disease cycles, blister rust hazard assessment, canker identification, and blister rust pruning methods.

Coeur d'Alene, Friday, June 16, 2006 (8:00 am to 4:00 pm)

Thinning and Pruning Field Day

This program will feature 2-3 hours indoors discussing basic concepts of thinning and pruning, followed by a hands-on field tour to learn about thinning, pruning, forest genetics, and chainsaw safety firsthand.

Orofino, Friday, June 9, 2006 (8:00 am to 4:00 pm)
Sandpoint, Saturday, June 17, 2006 (8:00 am to 4:00 pm)

Managing Forest Organic Debris

There is growing discussion about leaving more material in the woods for forest nutrition. But how do you minimize fire or insect hazards? This program will feature cutting-edge science on forest organic debris, followed by a tour of slash treatment experiments on the historic Priest River Experimental Forest.

Priest River, Friday, July 21, 2006 (8:00 am to 4:00 pm)

Forest Insect & Disease Field Day

This program will feature a full day giving participants first-hand contact with a variety of insects and diseases that can affect forest growth and health, integrated with discussions of related management strategies.

Moscow, Friday, July 21, 2006 (8:00 am to 4:00pm)
Coeur d'Alene, Friday, August 4, 2006 (8:00 am to 4:00 pm)



For more information, dial www.cnr.uidaho.edu/extforest on the World Wide Web, or see the contacts listed below:

All other Idaho counties:

Ron Mahoney
Extension Forester
P.O. Box 441140
University of Idaho
Moscow, ID 83844-1140

Phone: (208) 885-7642 Fax: (208) 885-6226

E-mail: rmahoney@uidaho.edu

All other Idaho counties:

Yvonne C. Barkley
Associate Extension Forester
P.O. Box 441140
University of Idaho
Moscow, ID 83844-1140

Phone: (208) 885-7718 Fax: (208) 885-6226

E-mail: yvonnec@uidaho.edu

Accommodations need to contact these individuals at least one week prior to these programs. The University of Idaho, U.S. Department of Agriculture, and Idaho Counties cooperating. Equal opportunity/affirmative action employer and educational institution.

Strengthening Forest Stewardship Skills

2005-2006

Idaho has abundant forest land. Many people do not realize that over 2 million acres (11% of Idaho's forests) are owned and managed by thousands of **family forest owners**.

Each landowner has unique goals for his or her forest property, ranging from timber income to simply "a place to get away from it all". However, one goal common to most forest landowners is to **steward** their forest land, for their own goals and future generations.

The educational programs listed herein are designed **to help private forest owners and those who work with them strengthen their forest stewardship skills.**

All programs require pre-registration (including a small fee to off-set program costs). To register for a program, contact the UI Extension office in the county where that program will be held. For specific program information, dial **www.cnr.uidaho.edu/extforest** on the World Wide Web, or see the contacts listed inside this flyer.



These educational programs are being supported in part by the **Idaho Forest Stewardship Program**, a cooperative effort of the following agencies and organizations:

University of Idaho Extension
Idaho Department of Lands
Idaho Department of Fish and Game
U.S.D.A. Forest Service
U.S.D.A. Natural Resources Conservation Service
U.S.D.I. Fish and Wildlife Service
Consulting Foresters
Idaho Association of Soil Conservation Districts
Idaho Forest Owners Association
Idaho Riparian Cooperative
Idaho Nature Conservancy
Idaho Tree Farm Committee
Idaho Association of RC&D Councils
Intermountain Forest Association
Nez Perce Tribal Forestry
Idaho Native Plant Society
Idaho Forest Products Commission
Idaho Sustainable Forestry Initiative State Implementation Committee

Silvopasture – Growing Trees in Your Pasture, or Vice-Versa

Randy Brooks

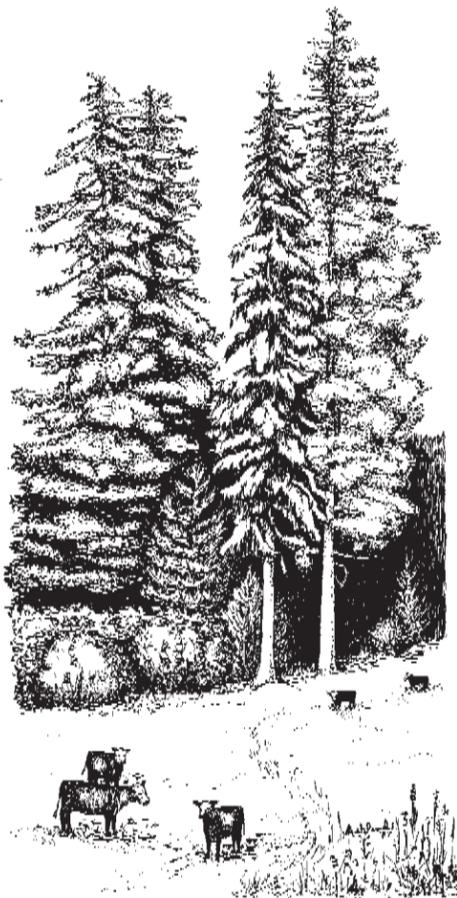
Forestry and livestock production are mainstays of the natural resource based economies of North Central Idaho. There is also a strong tradition of livestock grazing in other forests across the West. Silvopasture, the combination of forest management and improved forage species, is a more intensive, controlled application of this traditional use of livestock grazing and growing trees. Silvopasture is the deliberate introduction of timber into a forage production system, or vice-versa. With silvopasture, timber and pasture are managed as a single integrated system. It is not utilized as much in the West as it is in the Southeast, but is most often implemented to increase profitability, reduce risk, and augment environmental benefits from land management. Silvopasture systems are designed to produce high-value timber while providing short term cash flow from livestock.

The ability of recently forested land to grow trees can be predicted by the performance of the previous stand. However, the ability of pasture or rangeland to support commercial timber production is harder to predict. Many forage plants are more shallowly rooted than trees are, and a productive forage pasture may have soils that are too shallow to support commercial tree production. Since soils can change significantly over a short distance, the presence of trees near a proposed silvopasture is no guarantee of successful tree establishment and growth. Local University of Idaho Extension and Natural Resource Conservation Service offices are good sources of information about soil suitability for specific pasture and tree species.

Most folks would prefer planting trees into an existing or recently seeded pasture due to ease of operation. However, vegetation control is critical, especially when planting trees into an established pasture where grass roots form a fibrous mat throughout the upper soil layer. This can allow grasses to out-compete tree seedlings for moisture. In dry summer climates, conifer seedlings grow best when competing vegetation is removed for the first three years. This can be accomplished through various means of site preparation. Apply an herbicide or plow a two to four foot wide strip for each row of trees to be planted. In some areas, a prescribed burn or pesticide application may be needed to control rodents prior to and after tree planting. Follow-up with a selective herbicide may be needed for the next two to three years until trees are well established.

The desired pasture mix will vary with site characteristics and the desires of the land manager. Orchardgrass, tall fescue, and perennial ryegrass along with a clover species are commonly used silvopasture forages. Nitrogen fixing clovers are often seeded to provide high quality feed for livestock and to serve as a biological source of

nitrogen for trees and associated grasses. Legumes often have more exacting nutrient requirements than do grasses, making a soil test and possible subsequent fertilization an important part of the management plan. The forage composition will change over time as trees grow and modify the environment. Trees generally have little impact on forage production until shading becomes dense enough to limit sunlight to the understory. Forage production of warm season species can be reduced somewhat. Orchardgrass seems to tolerate the environment under trees better than perennial ryegrass or Kentucky bluegrass. Although



tall fescue does well under trees, it has the lowest forage value and highest degree of competition of the forages.

Douglas-fir and ponderosa pine are the two predominant timber species that grow best in our area. Larch, as well as western white pine can also be grown, but western white pine is subject to white pine blister rust. Regardless of what species is used, it is generally recommended that seedlings are purchased locally or from a locally adapted seed source. Such seedlings are both quicker to establish, grow faster, and can be more tolerant of browse and other damage.

Silvopastures are generally planted at about 200-300 trees per acre, and can be planted in grids or in single rows, multiple rows, or even clusters. This planting style provides for wide open alleys for forage production and easy access for livestock grazing, hay harvesting, fertil-

izer spreading, spraying, and other agricultural practices. Alley width should be determined by width of farm equipment. For example, a 20 foot alley provides easy access for cutting hay with a 16 foot swather. This same spacing allows for mechanized harvesting later when trees mature. There is plenty of room for creativity when it comes to planting trees in combinations, however, rows of three or more are generally not recommended as the inner rows of trees may be out-competed by the outer rows.

Trees may be damaged by livestock or wild animals which can eat, rub, or step on them. Multiple damage events may kill trees, but single events generally only slow growth. Conifers are especially sensitive to the removal of the top-most leader (terminal bud). This is the most palatable, nutrient packed portion of the seedling. Leader loss results in dramatic loss of height and diameter growth and stimulates production of multiple leaders or forked tops. Most tree damage is likely to occur in the first two to three years when they are small and do not have their resinous chemical defense well established. The best way to reduce the risk of damage during this period is by haying rather than grazing. This approach does not resolve the problem of damage by native wildlife herbivores like deer and elk. Young trees may be protected with chemical repellants, mesh tubes, or some type of appropriate fencing. Sheep, goats, and deer are more likely to eat needles than are cattle or elk. Established conifers are not as attractive to large herbivores when other forage is present. If heavy browsing is observed there may be a deficiency in the livestock diet.

Trees that provide shade or wind protection can have a climate stabilizing effect by reducing heat stress and wind chill of the livestock. Protection from trees can reduce the direct cold effect by 50% or more and reduce wind velocity by as much as 70%. Livestock require less feed energy, so their performance is improved and mortality is reduced. In contrast to concentrated livestock operations, silvopastoral systems are less likely to raise environmental concerns related to water quality, odors, dust, noise, disease problems, and animal treatment.

For more information on silvopasture, contact your local University of Idaho Extension Office or Natural Resources Conservation Services Offices.

For more information on silvopastures, visit the following websites:

- <http://www.unl.edu/nac/silvopasture.html>
- <http://smallfarm.ifas.ufl.edu/Forestry/Silvopasture.htm>

BMP's CONTINUED

- When harvesting within a SPZ, leave 75 percent of current shade cover adjacent to streams. This can be in the form of hardwoods, unmerchantable trees, and shrubs. You must also provide for large organic debris, soil stabilization, wildlife cover, and water filtering effects of vegetation.
- Directional falling and/or mechanical feller bunchers allow the removal of some SPZ trees without damaging the SPZ. Avoid falling trees into streams or water bodies.
- Suspend the lead end of the log when skidding trees out of the SPZ whenever possible. Ground based skidding in or through

streams is not permitted.

- Keep slash out of streams by limbing or topping trees above the high water mark. Whole-tree or tree-length yarding can reduce slash disposal in the SPZ.
- Hand-scalp and plant trees by hand in SPZ's.

Best management practices are part of the tool kit provided to forestland managers through research, trial, and error, that, when applied correctly, allows us to practice the art and science of forestry.

For more information on BMP's, contact your Idaho Department of Lands Forest Practices

Advisor (listed in your phone book) or the UI Extension Forestry office (208-885-7718) for a copy of the following publications:

- "Rules Pertaining to the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code"
- "Forestry BMP's for Idaho".

WILDLIFE CONTINUED

woodlandfishandwildlife.org

Coarse Woody Debris Size and Characteristics. Wildlife biologists often emphasize large pieces of organic debris for wildlife, as they can benefit a wider range of species. For example, black bears can den in the stump of a large windthrown tree. Obviously bears cannot use a 6-inch tree for the same purpose. But those small logs still benefit other species – maybe even bears, if they can forage grubs from the decayed log. Longer pieces of CWD are also preferred because they provide a wider range of diameters, in turn benefiting a wider range of wildlife species.

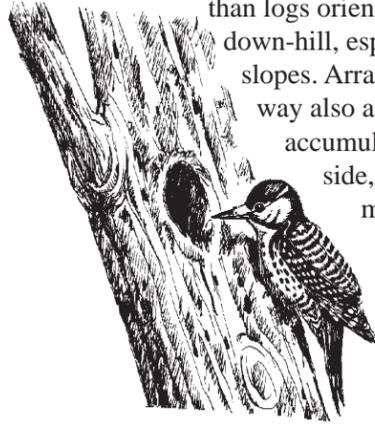
Hollow logs (formed by stem decay fungi such as Indian paint fungus that decay the tree's heartwood while it is still standing) are particularly useful to many wildlife species (e.g., pine marten).

Downed logs provide the widest variety of habitat if the bark is attached, as some wildlife species or their prey will live in the space between the wood and the bark as the latter starts to loosen. Try not to roughen up downed logs any more than you have to if you want to keep that habitat.

Coarse Woody Debris Arrangement. Arrangement of fallen logs is critical to some species, particularly small mammals and their prey. For example, martens and fishers like logs that are “jackstrawed” or loosely piled up across the

forest floor. When these log piles are covered by snow they create a complex of snow-free spaces and runways that provide protection and foraging.

Log orientation matters too. Logs lying parallel to slope contours may be used more by wildlife than logs oriented up- and down-hill, especially on steep slopes. Arranging logs this way also allows soil to accumulate on the uphill side, which traps moisture, hastens decay, and reduces fire risk.



Balancing competing objectives. Several researchers have

pointed out that the species that depend on CWD in forests managed for timber are currently relying on material left in historical logging. This often involved cutting in older forests that had more stem-decayed wood. Current harvests in second growth stands often do not have as much malformed wood and are made for markets that take logs down to a smaller top diameter (e.g., down to a 4 inch top rather than an 8 inch top). These harvests do not leave as much CWD as past timber harvest practices.

So with all the varied habitat needs of different wildlife species, plus all your other forest management objectives, how do you make decisions that benefit wildlife? Unfortunately, there is not much authoritative research that gives precise recommendations of how much and what kinds of CWD to leave for specific species of wildlife. Barring more prescriptive research results, the best strategy may be to leave a variety of species, degrees of decay, and distributions of CWD to benefit a broad range of species. How much depends on your other objectives, but wildlife biologists rarely talk about a site having too much CWD.

At a minimum, pay closer attention to leaving low value (cull) pieces of stem wood out in the woods rather than burning them in one big pile, or worse yet, hauling them to a mill that won't pay you for them. Also remember, the only sizes of woody debris that fire wardens measure in assessing fire hazard are those smaller than three inches in diameter.

For more information on CWD, see *Trees and Logs Important to Wildlife in the Interior Columbia River Basin* available at <http://www.fs.fed.us/pnw/pubs/gtr391>) and *Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests* available at <http://www.fs.fed.us/psw/publications/documents/gtr-181>).

DECISIONS CONTINUED

typical of the grand fir habitat types and is dominated by tall and medium height shrubs, with forbs and grasses and few invasive weed species. The understory also has significant conifer regeneration that is highly variable in distribution and species. The preferred shrub species to leave include large scattered clumps of Rocky Mountain Maple as the highest priority species, along with service berry and chokecherry, bittercherry and other fruiting species for wildlife habitat. In addition, riparian areas are designated as preferred habitats to leave clumps of these taller species, along with shrub willows, aspen and lower, moist-site vegetation. Snowberry is left where it is shorter (<15”), but is designated for removal where it is taller and/or forms large blocks of continuous cover.

- Tall, dense clumps of shrubs are left primarily for wildlife habitat, particularly in riparian areas. Riparian vegetation, whether along streams or on seeps and other wetter, microhabitats, will also stay more green and have higher moisture content through the typically dry summers. Retaining this vegetation in scattered, more green and moist clumps, will add little to the fire risk on these sites and add greatly to wildlife habitat and visuals. Retaining tall, dense clumps of maple also increases site stability. Rocky Mountain maple typically grows on spots with subsurface irrigation from cresting water tables. It is also found on seeps that may form vernal pools in the spring (important habitat for many amphibians). Maple clumps stabilize wet-soil microsites that would be subject to compaction or slumping if removed with mechanical equipment or located in or just above roadbeds. These are important factors to consider in silvicultural prescriptions for any objective.
- Removing undesirable tree species and excess, defective trees in the overstory certainly accomplishes fire reduction and timber goals. Treating clumps of young conifer regeneration and scattered, suppressed trees is equally important. Tribal specifications designate

pinus, larch and Douglas-fir as preferred seedling/sapling leave trees, and require a spacing of about 15-18 feet, and a little closer in a few evenly-spaced plantations. This treatment also meets the objectives of managing the composition of the current forest and its options for future regeneration, and of maintaining a healthy, productive and diverse forest.

- Removing shrub species with lower wildlife value and higher fire-risk characteristics, especially ninebark, oceanspray, and taller snowberry, also removes a major component of competition for more desirable, less hazardous understory vegetation and tree seedlings. It also removes the lower level of “ladder” fuels which can lead to devastating crown fires, should ignition occur. Ladder fuel reduction is further achieved through the spacing of overstory and understory conifers, especially by removing grand fir and lodgepole pine, which retain long crowns either as green foliage (grand fir) or through poor self-pruning (both species).
- The treatment specifications also require vegetation designated for removal to be cut at low levels to discourage rapid sprouting or retention of any green growth, and to break both live and dead material into pieces that will put most debris in contact with the ground to encourage decomposition, sustain nutrient cycling, and reduce fuels' continuity and burn rates. A silvicultural prescription should consider the quality of understory and overstory for wildlife habitat as well as timber and other productivity, the need to reduce competition for desired tree, shrub, and lower vegetation, and the reproduction of desired tree species. Silvicultural objectives also may include recreation access and forage production for livestock and wildlife. These fuel treatment specifications achieve these goals, and more importantly, make them economically feasible. In many silvicultural prescriptions, the objective of treating understory vegetation including excess or undesirable conifer reproduction, is often specified but not achieved because of the

significant cost of these treatments relative to the value of commodity production alone. This leads to the final point I would like to make about merging fuel reduction objectives with other silvicultural objectives: *the economic and other benefits of fuel reduction treatments on many forest stands will justify the cost of high-priority silvicultural treatments for many additional management objectives that are often not achieved when the timber cost/benefit ratio alone is considered.* In many cases, reducing understory competition, managing vegetation composition including conifers and desirable native species of shrubs etc., and discouraging or eliminating invasive species, are recognized as priority objectives from an ecological and long-term productivity and sustainability perspective, but are not accomplished due to financial constraints.

The huge financial and ecological costs of ignoring unhealthy, high fire-risk forest conditions, especially where they could impact structures and threaten human lives, has led to a new era where investments in fire hazard reduction treatments are being made. In some current forests, conditions are such that fuel treatments will do little to address other silvicultural objectives. But many forests designated for fuel reduction present an opportunity to economically address many other silvicultural objectives addressing recreational, ecological, and sustainable timber management goals. At a minimum, fire hazard reduction plans should not only address immediate catastrophic fire risk, but also consider setting the initial conditions that will help resource managers move towards more comprehensive plans and specifications to achieve a broader array of integrated objectives.