EB2016

FOREST STEWARDSHIP PLANNING WORKBOOK

AN ECOSYSTEM APPROACH TO MANAGING YOUR FORESTLAND

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AN ECOSYSTEM APPROACH TO MANAGING YOUR FORESTLAND

Washington State University Extension
Pullman, Washington

No other living planet has yet been found in space and
ours is very small. We tax it sorely with our bombs,
wars, fumes and fires, our cutting down and building up,
our teeming cities and plundered fields,
our grasping and our greed.

And that is why you will sit down with your planning
sheets, your computers, and your maps, and do your
work—so that when the paintings in their galleries and
the poems on their shelves have gone to dust, the earth,
your piece of land, will abide.

—Sam Bingham
Holistic Resource
Management Workbook,
Center for HRM

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INTRODUCTION

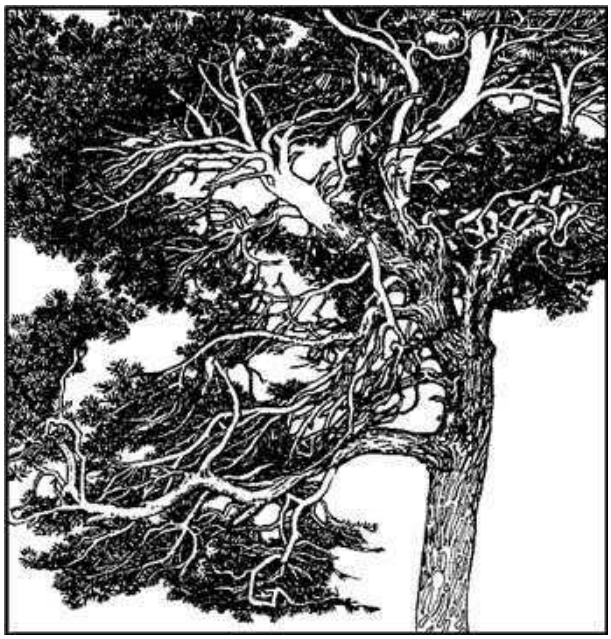
Purpose of this Workbook

The purpose of this workbook is to provide you with a format to organize, develop, and record the elements of a Forest Stewardship Plan for your property. The workbook is not intended to be a "stand alone" document. To successfully complete the sections of the workbook you will need to use other reference materials, consult with natural resource professionals and, if possible, attend Forest Stewardship Education Programs offered in your area.

Forest Stewardship Coached Planning Workshops are offered to assist landowners in developing plans using this workbook. Your local state forestry agency or Extension office can advise you of the availability of such programs.

This workbook will help you to analyze your property's resources and understand how they are connected. It will also help you examine how your property fits into the "bigger picture," as part of a watershed and the larger surrounding landscape.

Why Develop a Forest Stewardship Plan?



Your Forest Stewardship Plan will help you integrate the management, protection, and enhancement of all the forest's resources, in a manner which meets your individual needs and ownership objectives. Your plan will allow you to examine current resource conditions on your property and develop an organized strategy for management.

You may want to develop a plan simply as a guide for future forest management decisions. You also may want to submit the plan to your state forestry agency in order to qualify for participation in cost-share programs which provide financial assistance for a variety of forest stewardship practices. Once you actively implement your Forest Stewardship Plan, your property becomes eligible for recognition as a "Stewardship Forest." Additionally, an approved Forest Stewardship Plan normally meets the forest management plan requirement to qualify for forestland property tax rates at your county assessor's office. Publications are available from your state forestry agency and Extension offices that outline the specific requirements for an approved Forest Stewardship Plan and provide more information about the cost-share programs that can support implementing your plan.

Forest Stewardship and Ecosystem Management

Forests are a vital part of Northwest landscapes. Regardless of the size of an individual holding, or whether it is private or public, each part of the land is integrated with ever larger ecosystems (see Fig. 1). To perpetuate and enhance the biological, social, cultural, and economic values of forest ecosystems, we must be stewards of each part. The goal of ecosystem management is to create positive biological, social, and economic cumulative effects. We must improve forest conditions and conserve future options.

Ecosystem management focuses on small to large landscape units. The desired condition and potential of the larger ecosystem, as well as a site's own intrinsic value, influences management actions on a site. Conserving larger ecosytem values when making management decisions at individual sites ultimately increases flexibility in management on all scales. If everyone across the ecosystem works together to ensure all processes in the ecosystem are functioning, no landowner will be forced to completely shift his or her management to provide that function.

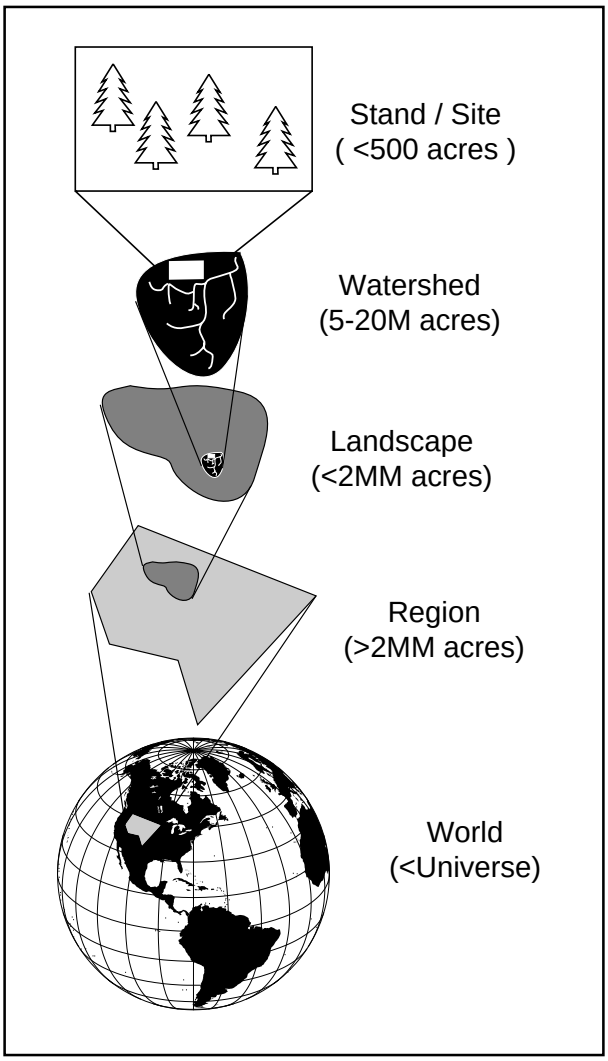


Figure 1. Smaller ecosystems exist within larger ecosystems

Vegetation Patterns and Disturbances

Northwest ecosystems contain many different vegetation patterns, ranging from brush fields to old-growth forests, and including every successional stage in between. Collectively, the types, amounts, and distribution of vegetation patterns define water quantity and quality, timber resources, wildlife habitat, and many other important ecosystem characteristics. Vegetation patterns also impact forest processes such as streamflow, erosion, and succession.

Sustainable Northwest forest landscapes are created and maintained through a balance of disturbance and recovery processes, with sufficient time between disturbances to restore biological capacity. Disturbances can remove varying portions of the current forest stand. A new forest grows, declines, and is again replaced. Ultimately, all living biomass is recycled. Disturbance and restoration processes create a sustainable cycle that conserves biological capacity and options for future forests. Disturbance requirements within ecosystems vary greatly in intensity and frequency. The most common forms of disturbance that have influenced Northwest forest ecosystems are fire, insects, and disease.

We have altered historical vegetation structure, composition, and patterns by allowing excessive disturbance, such as heavy logging and overgrazing, while also suppressing fire. Consequently, altered forests have different fire, insect, disease, and hydrologic disturbance cycles and processes. Fires have become larger and more severe. Insect attacks last longer and spread wider. Sites favorable for tree disease are expanding. Vegetation cover in riparian areas has been diminished and stream structure has grown less complex, reducing fisheries habitat.

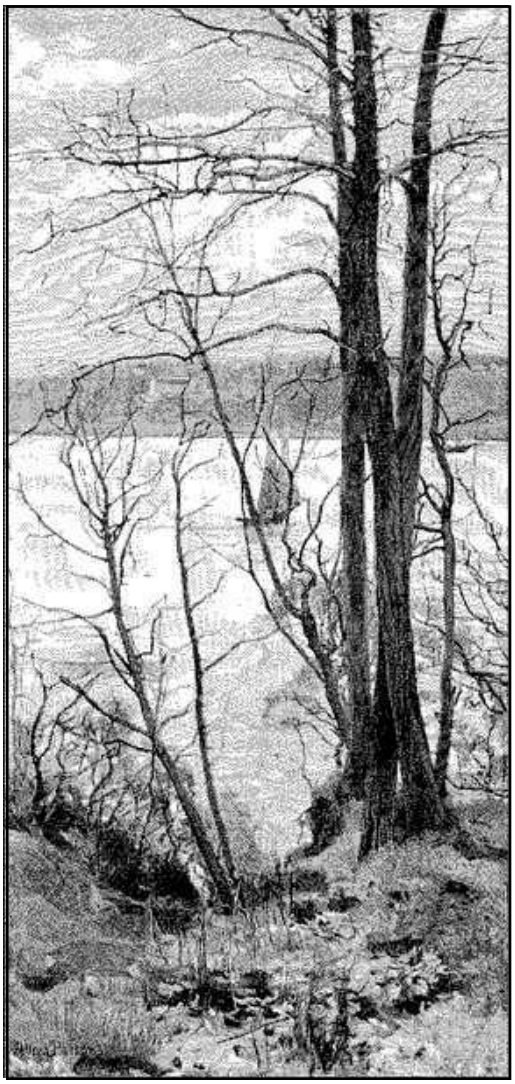
Required Disturbance and Restoration

The goal of ecosystem management is to conserve biological capacity, to reduce fire risk, to reduce insect and disease epidemics, and to produce commodities continuously over the long term by restoring sustainable vegetation patterns across ecosystems. If these ecosystem processes are not restored first, we will always be treating the symptoms and not the problem. Restored processes lead to sustainable forest structure and function.

To create sustainable forest ecosystems, conserving disturbance processes is as important as conserving individual species. Timber harvests and prescribed fires can mimic many effects of wildfire and other disturbances. However, we need to balance such disturbances with needs for wildlife, aquatic resources, and sustainable commodity production. Ultimately, these goals may depend on sustaining the broader ecosystem through managed disturbance.

Managing Across Ownerships

Physical and biological elements of ecosystems cross ownerships. Landowners and managers are entrusted with water, air, wildlife, fisheries, and other public resources that flow through or reside on lands they manage. Management activities, or their absence, on one land ownership may affect nearby ownerships. When the size of required disturbance activities exceeds single ownerships, local landowners must work together to achieve positive cumulative effects at larger ecosystem levels.



Both private landowners and public land managers share a common goal of providing stewardship and conserving the land's biological capacity, but they may have different approaches to managing the ecosystem. Voluntary cooperation of private landowners and state or federal land managers is a prerequisite for effective ecosystem management. Ecosystem management must protect individual property rights.

Dynamic Processes and Resources

Forests are dynamic. Changing vegetation patterns caused by disturbance or succession produce a continual gain and loss of different forest benefits and values. Ecosystem management anticipates and plans for change rather than simply responding to undesirable events.

Understanding succession and actively managing forests to create desired vegetation patterns in ecosystems makes future conditions more predictable. Nature will continue to provide unplanned disturbances, but even rough estimates of landscape pattern changes over time provide insight into the benefits and values of future ecosystems. Insight into potential vegetation patterns across adjoining land should help landowners, managers, and other ecosystem management cooperators plan how to best interact for their own needs.

Where Do People Fit into Ecosystem Management?

Ecosystem management includes stewardship of the land's biological capacity and people's economic, social, and cultural support from the land. Ecosystem management recognizes rela-

tionships between ecosystems and people. To be succe[illegible] must be accepted by the general public, as well as lan[illegible] As the range of interested publics increases from local, [illegible] levels, the issues become fewer and broader in scope. [illegible] cumulative effects on larger ecosystem scales, and wi[illegible] increases flexibility in local management decisions.

No ownership can be continually disturbed, and anoth[illegible] tected from disturbance if we want to fulfill the biolog[illegible] forest ecosystems. Ecosystem management allows mu[illegible] and managers to achieve mutual benefits and positive [illegible] tive effects on shared landscapes. In short, ecosystem management is landowners working cooperatively with their neighbors. Together, you can achieve greater resource management goals.

Preparing a Forest Stewardship Plan

What will you do with your forestland? As one who owns forestland, you have decisions to make. You can do nothing. You can occasionally generate income or improve the property's appearance. You can become a forest steward by actively managing your land for personal benefits, while protecting the quality of the natural resources—soil, water, wildlife, trees and other native plants. Or, you can combine two or more of these options.

Forests are a renewable resource, but they require many years to mature. Decisions you make now about timber harvesting, tree planting, or insects and disease can influence the character of your forest for many decades, even centuries. In managing a forest, plan for the long term since whatever you do (or do not do) will have long-term impacts.

A Forest Stewardship Plan will guide and help you define your personal objectives, manage your land efficiently, avoid costly errors, make knowledgeable decisions, and evaluate your progress. This section describes how you can create a plan for your forest. You will need to work with a forester to carry out certain steps.

Step 1: Decide What You Want

The first step in planning how to manage your forest is to develop a list of objectives (see Forest Owner Values, Goals, and Objectives section, p. 10). What do you want from your forest? How much do you want? When do you want it? For example, "to improve the forest for wildlife" may be too vague an objective to guide you toward sound decisions. On the other hand, an objective "to increase the number of American goldfinch on the property" may lead to some very specific management practices.

When you have multiple objectives, be sure to set priorities. Some objectives may be compatible given your resource base; others may be incompatible. Often, only one objective can be maximized. You may not be able to develop realistic objectives until you have learned more about the character of your forest by conducting an inventory.

Step 2: Find Out What You Have

The second step is to inventory your forestland to determine what resources you have (see Resource Description form in each of the separate sections, e.g. Soil Resources, p. 27; Forestland Grazing, p. 39). Since a forest is dominated by trees, an inventory usually assesses the tree species present, stand density and age distributions, as well as tree diameters, heights, quality, and growth rates. Other resources can also be inventoried depending on your objectives. Working with a forester, or other natural resource specialist, you can expand your inventory to assess your soils, wildlife and fish habitat, or other renewable natural resources. For example, the inventory can identify important sites for wildlife breeding, nesting, water, food, and cover. Even nonrenewable resources, such as cultural resources, can in some cases, be inventoried.

Although your forest is just one part of a broader landscape, or ecosystem, cumulative effects of management decisions by you and other landowners can greatly alter the landscape over time. Thus, as part of the inventory process, you should identify current and potential land uses on properties adjacent to yours. This will enable you to evaluate the potential impact of your forest management activities on the landscape. Coordination among neighbors can produce a landscape that meets individual landowner objectives without adversely affecting the environment.

Your inventory results will come in handy in several ways. A forester can use them, along with your objectives list, to advise you about alternative management practices and their consequences.

Before you begin an inventory, accurately locate and clearly mark property boundaries. You can mark boundaries using a fence, paint marks on trees, rock piles, stakes, or other means. Clear brush from your property lines to avoid trespass when you or your neighbors carry out forestry operations. If boundaries are not clearly identifiable, you may want to have your land surveyed.

Next, draw one or more maps of the property (Fig. 2), approximately to scale, showing the following:

* property boundaries
* forest boundaries
* land use
* roads, trails
* utility wires, pipelines, or other rights-of-way
* buildings
* water resources
* unique natural, historical, or archeological resources.

This map will help you and your forester locate forest accesses and important resources that may influence forest stewardship management activities.

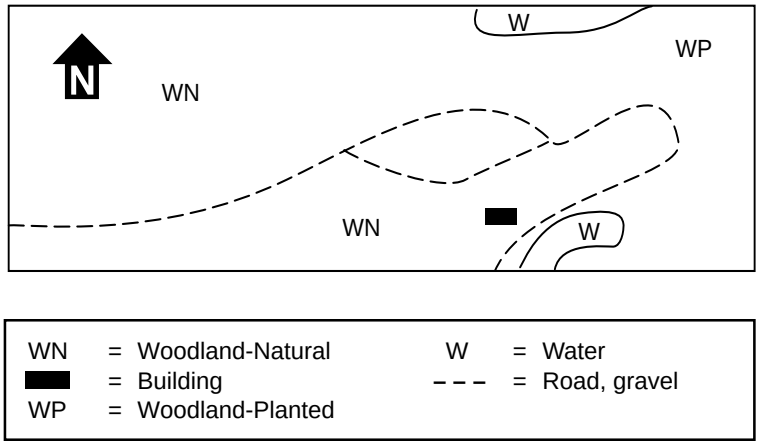
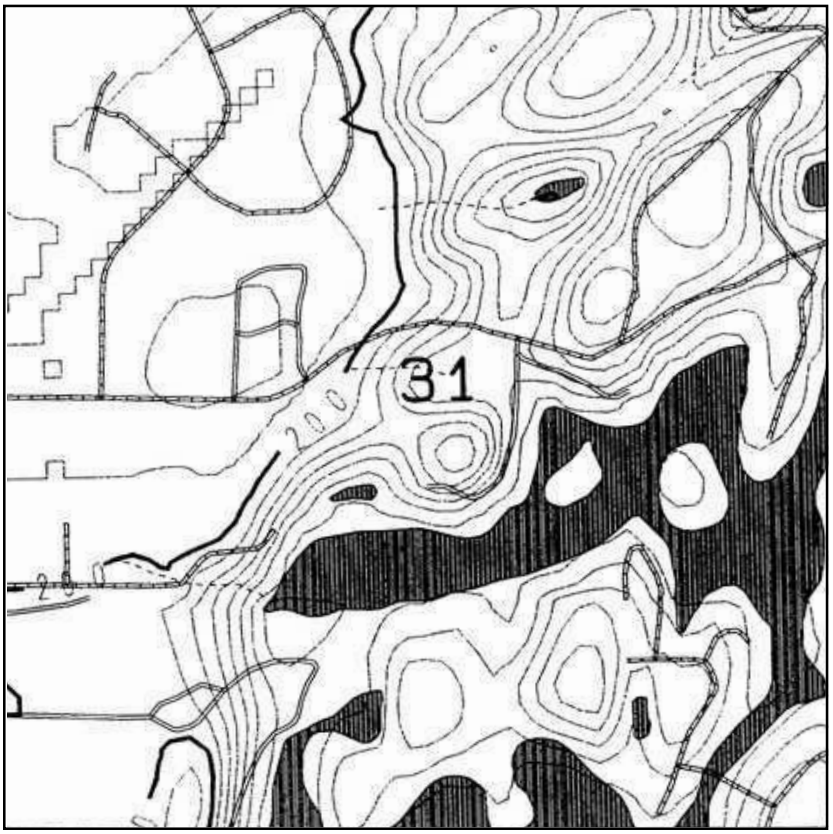


Figure 2. A base map showing land uses

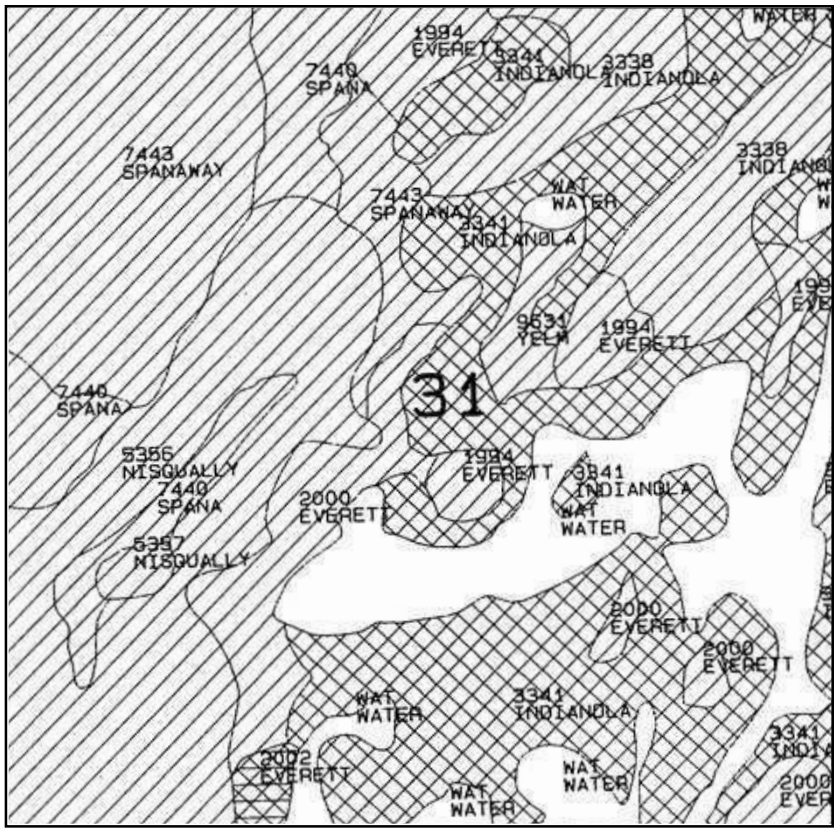
Aerial photographs, with property boundaries drawn on them, are especially helpful as a foundation for the map (Fig. 3). They usually are available from your state forestry office, or your local office of the USDA Consolidated Farm Service Agency.

Figure 3. An aerial photograph helps identify land uses
(photo credit: Washington DNR, 1989)



If the property is large and has significant elevation changes, topographic maps (Fig. 4) may help you assess slope and aspect as they relate to your forest access and tree growth. Such maps are available from a large number of sources, including book, map, and outdoor stores.

Figure 4. A topographic map has contour lines that show elevation changes
(courtesy of Washington DNR)



Soil information can help you determine the suitability of your land for different tree species, road sites, or other land uses. Soil type maps (Fig. 5) and interpretive information about them (Table 1) are available from your local USDA Natural Resources Conservation Service office. A forester can assist you in locating these data.

Figure 5. A soil type map
(courtesy of Washington DNR)

SOIL NAME & MAP SYMBOL	EROSION HAZARD	EQUIP-MENT LIMITS	SEEDLING MORTALITY	WIND-THROW HAZARD	PLANT COMPETI-TION	COMMON TREES	SITE INDEX	SPECIES TO MANAGE
Renha 383	Severe	Moderate	Slight	Moderate	Moderate	Grand fir Douglas fir Lodgepole pine Ponderosa pine	85 85 — —	Douglas fir, Western larch,
Oxerine	Severe	Moderate	Slight	Moderate	Moderate	Douglas fir Ponderosa pine Western larch	88 69 95	Ponderosa pine, Western larch, Douglas fir
Republic 385	Slight	Moderate	Slight	Slight	Moderate	Douglas fir Ponderosa pine Western larch	76 91 —	Ponderosa pine, Douglas fir
Republic 387	Severe	Severe	Slight	Slight	Moderate	Douglas fir Ponderosa pine Western larch	76 91 —	Ponderosa pine, Douglas fir

Table 1. A typical soil interpretation for forest stewardship management

For your inventory, gather facts about previous land use or management activities that could have influenced your forest. Such activities might include livestock grazing, agricultural cropping, timber harvesting, tree planting, mining, fires, and pest outbreaks. Foresters use information about these events and their timing to analyze existing forests and to predict the results of future management practices.

During the inventory, prepare a map that separates the forest into individual units (Fig. 6). Each stand will be an area that is relatively uniform in tree species composition, tree size distribution, number of trees per acre (density), and site quality. Each stand is a management unit. Silvicultural practices are carried out more or less uniformly within a management unit. A more detailed description is presented in the Timber Management section (p. 30).

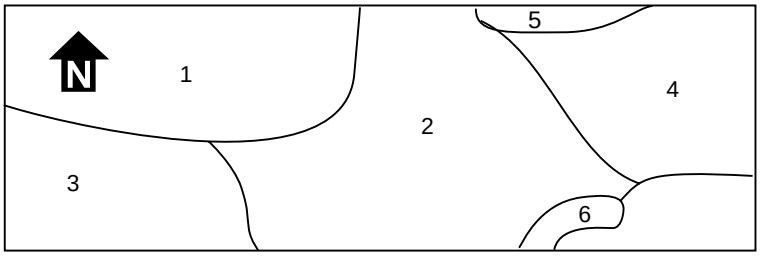


Figure 6. A timber unit map

STAND NUMBER	DESCRIPTION
1	Douglas fir and ponderosa pine; 6- to 12-inch diameter; needs timber stand improvement.
2	Ponderosa pine and lodgepole pine; mixed sizes; needs group selection harvest and timber stand improvement.
3, 5	Lodgepole pine and western hemlock; 10- to 12-inch diameter; let grow another 10 to 15 years, then harvest.
4	White pine plantation; 5 years old. Monitor for blister rust and let grow.
6	Wetland area; exclude equipment and grazing.

Step 3: Identify Potential Management Practices

After you identify your objectives and have an inventory of your forest, consider all reasonable management practices that will help you meet your goals. Some of the practices you might consider include:

* planting trees to improve tree stocking,
* improving the standing timber (thinning, weeding, pruning),
* harvesting timber to return profit,
* fencing property to improve forestland grazing,
* improving wildlife habitat,
* installing erosion control structures on roads,
* constructing access roads,
* developing trails,
* developing recreational facilities,
* establishing fire protection or controlled burning measures,
* controlling pests (insects, diseases, animals), and
* controlling brush and weeds.

Seek professional advice on which practices are appropriate for your forest.

Step 4: Assess Labor And Financial Resources

Once you have developed a list of potential management practices to reach your objectives and goals, evaluate your labor and financial resources available to carry them out. Assess your ability and interest in various forestry operations. How much time are you willing to devote to forest management, when is that time available, and how long do you plan to own the land? What is the availability, cost, and quality of contract labor? Consider your financial situation: available capital, cash flow requirements, planning period, lowest rate of return you would accept on invested funds, and the need for income or products from the forest. You must decide which alternatives to pursue.

Finally, assess the availability of needed equipment, facilities, and material. All of these factors will influence what you can do in your forest. The section on Forestland Financial Management (p. 52) provides more detailed information about evaluating the financial efficiency of alternative investments.

Step 5: Develop An Activity Schedule and Begin Implementation

Next, prepare an activity schedule that lists management activities and approximately when you expect to perform them. This schedule should cover 10 years (see Ten-Year Activity Plan, p. 60). If your forest is large, perhaps several hundred acres, activities may occur every year. If it is smaller, management activities will occur less often, perhaps only once every 10 years. Inspect your forest at least annually, regardless of its size. Walk through the forest and look for damage by pests, fire, wind, trespass and unauthorized harvest, damaged fences, and soil erosion.

Step 6: Keep Good Records

It is difficult to update your plans and make sound decisions about the future unless you keep accurate records of what has been done and when. Records also help when filing income tax reports and perhaps for settling an estate. Management records might include:

* management plan
* timber inventory
* management activities accomplished
* sources of forestry assistance
* deeds and easements
* suppliers of materials and equipment
* contracts
* insurance policies
* forestry income and expenses
* grazing records where appropriate

Forest Owner Values, Goals, and Objectives

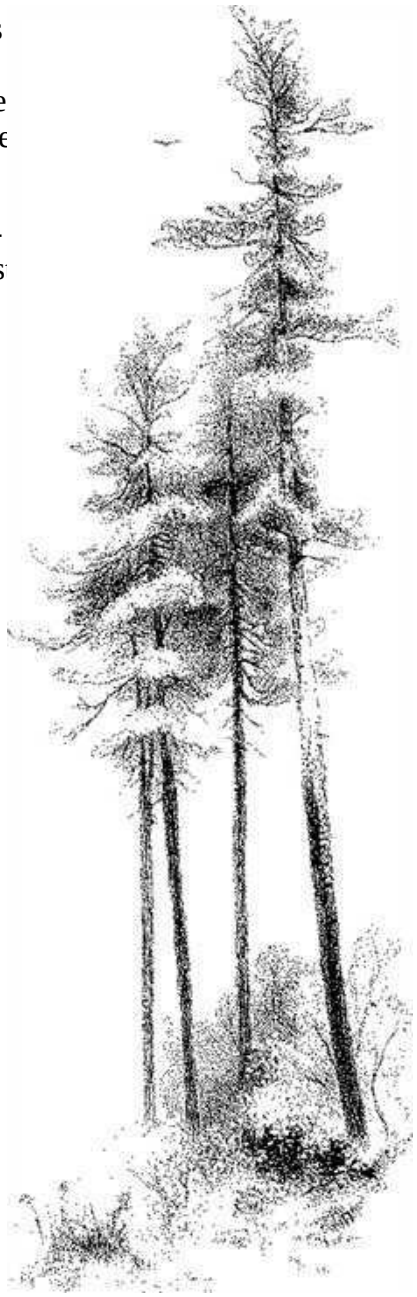
Landowners have many reasons for owning forestland, ranging from simply having a place to enjoy solitude, to realizing commodity income. Odds are that you would like some combination of benefits from your forestland.

Forest management can be complicated. What you do when managing for one value of your forest property (e.g., income from timber) can positively or negatively affect other values of your property. You may not consciously realize you valued some aspects of your forestland until you altered them (e.g., aesthetics).

Understanding what you value most on your forestland becomes even more critical when you consider the long time frames associated with forest management. Practices that you or your neighbors implement may not affect other resources on your property for another 20 years. For example, trees you plant this year may obstruct a valuable view in 20 years.

When preparing a forest stewardship plan, you must be aware of your values property. Once you have articulated your values ("I like tree diversity"), you begin to design goals that reflect these values ("I want a diversity of tree spe on my property") and, later, more specific objectives ("I want to have a highe percentage of white pine in the south unit of my property").

Following is a cover page and a worksheet. Cover pages are helpful for providing a quick means of identifying the landowner, the location of their fores and a few other important elements about the plan. A cover page is particularly important if you are going to submit your Forest Stewardship Plan for review by your county assessor's office, State Stewardship Forester, or others. The worksheet helps you to articulate and weigh the importance of what you value on your forest property. From there, you can write down your major goals for the property and then identify specific objectives.



NOTES

Forest Stewardship Management Plan

Cover Page

Landowner(s)	
Address	
Phone No. **E-mail**	
Property Location (acres, legal description, and general location of the property—if the full legal description is extemely long, an abbreviated description, i.e, Part of the SW1/4 of Section 33, Township 35 North, Range 15 East, W.M. in Skagit County, WA)	
Plan Preparer Name Address Phone No. E-mail	
Date Completed	

My Forest Stewardship Values

How important are each of the following forest values to you?

	Very Important	Important	Undecided	Unimportant	Very Unimportant
Personal residence	❑	❑	❑	❑	❑
Vacation property	❑	❑	❑	❑	❑
Aesthetic enjoyment	❑	❑	❑	❑	❑
Keeping it “natural”	❑	❑	❑	❑	❑
Personal or sentimental attachment to land	❑	❑	❑	❑	❑
Income from grazing	❑	❑	❑	❑	❑
Income from timber harvest	❑	❑	❑	❑	❑
Income from special forest products	❑	❑	❑	❑	❑
Income from recreation	❑	❑	❑	❑	❑
Personal recreation	❑	❑	❑	❑	❑
Fishing	❑	❑	❑	❑	❑
Hunting	❑	❑	❑	❑	❑
Nongame wildlife	❑	❑	❑	❑	❑
Satisfaction from owning land	❑	❑	❑	❑	❑
A legacy for my children	❑	❑	❑	❑	❑
Real estate speculation	❑	❑	❑	❑	❑
Long-term financial security	❑	❑	❑	❑	❑
Other:	❑	❑	❑	❑	❑
Other:	❑	❑	❑	❑	❑
Other:	❑	❑	❑	❑	❑
Other:	❑	❑	❑	❑	❑

Describe something on your property that makes it unique or special to you (a special tree, a heron rookery, etc.):

My Forest Stewardship Goals

Describe what your property would look like and function, ideally, in 20 years?

What are your most important goals in managing your forest land? (*write out at least five)*

1.

2.

3.

4.

5.

6.

7.

Property Description

Legal Description: *(e.g., NE NE Section 36, Township 40, Range 40 East W.M., 40 acres) (Long complicated legal descriptions can be attached in an appendix if desired.)*

Total Ownership Acres: ☐ **Forested Acres:** ☐ **Other Acres:** ☐

Location and Nearby Geographical or Other Features: *(e.g., Property is in the Illabot Creek watershed which drains into the Skagit River; four miles east of Tarheel Flats.)*

Adjacent Land Use: *(e.g., On the north side of the property lies pasture, the other three sides are in timber. Adjacent ownerships are 10 to 40 acres, and have single family dwellings. The ownerships within the drainage are a mix of timber companies, state land, and small landowners with both timber and agriculture.)*

Accessibilty: *(State how one accesses the property from public and private roads, and what type of traffic is suitable for roads on the property.)*

Topography, Elevation, and Aspect: *(e.g., The topography is rolling, and the elevation is between 1,850 and 2,000 feet above sea level. The aspect is varied, with the majority facing south.)*

Current Conditions: *(Is the forest currently being grazed? Give a brief description of the general condition and past history of the property.)*

Weather: *(e.g., The precipitation is about 22 inches per year. The site has about 100 frost free days.)*

Other Items: *(You may want to consider harvest history, property boundaries, how your property fits into the surrounding landscape, and the presence of water on or near your property.)*

Forest Health

Many of us would agree that, whatever our personal objectives for the stewardship of our forestland, the end result we seek is a healthy, sustainable forest. In a healthy forest, the risk of present or future damage from natural or human-caused agents is minimized. Forest health has been defined as the condition of a forest when it:

* functions in an ecologically appropriate manner, (e.g., large area, protects productive soils, provides a sustain fish, wildlife, and humans),
* resistant or resilient to insects, disease, fire, wind, and
* meets landowner objectives.

A healthy forest is made up of trees and other organisms all de dent on each other. The presence of a single or small group of unhealthy trees does not necessarily mean that you have an unhealthy forest. For example, bark beetles are a natural part of forest systems, and a small occurrence of beetles can actually promote forest structural diversity (see Wildlife Habitat and Threatened & Endangered Species section, p. 33). A professional forester can help you determine the severity of a forest health concern.

Just as humans need a certain combination of food, water, and exercise to maintain physical health, forests and the trees therein require certain inputs to maintain their health and growth. If one or more of these inputs is missing or insufficient, trees experience stress. Forest managers can influence these inputs through silvicultural practices (see Timber Management section, p. 30).

A major health concern in forests is stress to trees caused by having too many trees per acre, or overstocking. Overstocking stresses trees because it forces them to compete for limited light, water, and nutrients. Many silvicultural practices are effective because they reduce the number of trees per acre and, thus, the competition for these essential elements.

The first requirement for healthy tree growth is light. Plants manufacture their own food by using the sun's energy to convert carbon dioxide and water to food. Heavy shade, found underneath the closed ***canopy*** of a forest, provides insufficient energy for the smaller, less dominant trees to grow. Shade-intolerant species have great difficulty growing under these circumstances. These include pines and larches. Other species, such as Douglas-fir, Engelmann spruce, and most hardwoods, are considered moderately shade tolerant. They can grow in partial shade. The tolerant species, grand fir, hemlock, and western redcedar, can grow under conditions of heavy shade, although not very fast. A thinning operation can release slow-growing (suppressed) trees by providing them more light and space in which to grow.

The second requirement for healthy tree growth is water. Tree species vary considerably in their water needs and drought tolerance. Shade-intolerant species commonly grow in hot, sunny areas and are more drought resistant. Shade-tolerant species, on the other hand, often grow naturally in the cool, moist forest understory. When drought occurs (which happens frequently in all western states), shade-tolerant species get more stressed than the shade-intolerant species.

The third requirement is a good nutrient supply. Trees take up minerals through their roots and incorporate them into developing cells. One of the basic determinants of potential tree growth is the level of nutrients available in the soil. Nutrient-poor soils will never produce large trees, but even rich soils cannot produce large trees if the forest is overstocked. A forest manager may thin a stand to reduce competition for nutrients. Although it is not always cost effective, using a fertilizer on forest soils can provide needed tree nutrients.

A healthy tree is free from agents of stress, while also having the light, water, and nutrients essential for growth. The following is a discussion of the typical agents of stress.

Temperature Extremes: Either very high or very low temperatures can injure trees. The problem is worse when the temperature extreme occurs suddenly. Late frosts or sudden high temperatures in spring can kill emerging shoots. Early autumn frosts can injure shoots that have not entered dormancy. In the winter, very cold temperatures can kill trees outright, or periods when the soil is frozen followed by sudden warming trends can severely stress or kill trees. Additionally, heavy snows and ice storms can break tree tops or limbs. After a thinning or pruning operation, the newly exposed southwest side of the tree may become sunburned; this is called "sunscald." The bark may crack or scale off as it slowly heals, or the tree may die.

Flooding: Too much water can be as much of a problem as not enough. Tree roots must "breathe." Air spaces occur in soils, even muddy soils. However, during floods these air spaces fill with water, and tree roots can literally drown. Trees that are naturally adapted to riparian, or streamside, areas usually are able to survive a lengthy period of flooding, but most upland trees may suffer damage or die. Local flooding is not simply restricted to storm conditions, but can occur as a result of beaver dams.

Fires: Fires can be beneficial or highly damaging, depending on their intensity. A low intensity fire can thin a stand by removing shorter trees and species that are not fire resistant, such as grand fir and western hemlock. However, trees that remain after a fire may be injured and stressed. Scorched pines often are attacked by bark beetles, which can kill them. Although periodic fires can be beneficial to the forest, they can have disastrous effects on your home, especially homes located in a forest. Plan adequate fuel reduction around structures on every home site. Check with local fire districts for home protection information (see Home Fire Safety Checklist, p. 21).

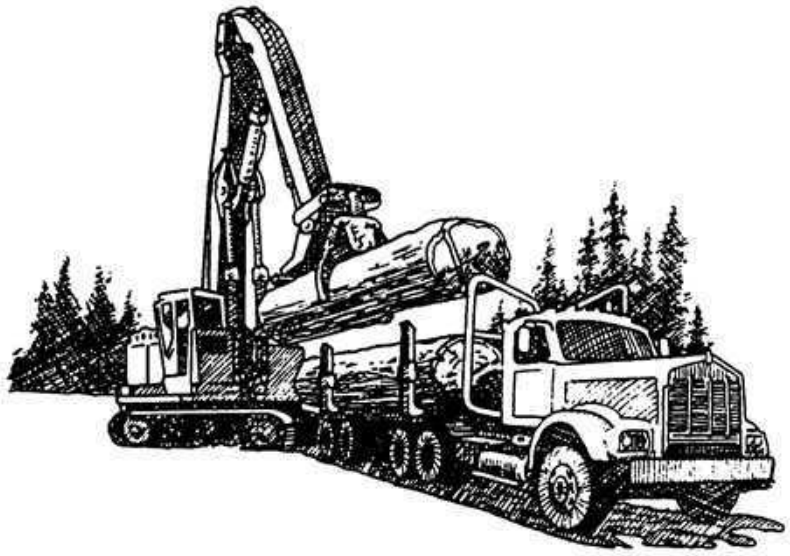
Wind: Wind can be a problem in crowded stands that have recently been thinned or are adjacent to clearcuts. The trees in those stands have developed with surrounding trees acting as windbreaks. When nearby trees are removed, the trees left may not be strong enough to hold themselves up, especially during a wind storm. Thin regularly, permitting trees to grow strong, but avoid heavy thinning operations. When preparing to harvest, a forest manager can design small clearcuts that will not expose a great deal of the adjacent forest to the effects of wind.

Insects and Diseases: Many insects and diseases can stress trees. Insects are more likely to attack if the tree is already under stress from insufficient light, water, or nutrients. Likewise, a tree that has tolerated a disease for a long period may be overwhelmed or killed if another stressor weakens it. Introduced pests, those not native to the area, create special management challenges (see Forest Health Concerns, Symptoms, and Treatments, p. 18).

Pollutants: Airborne or waterborne pollutants can negatively impact the growth of a tree. They are particularly troublesome near large cities. Gaseous pollutants cause foliage damage, thus preventing normal tree growth. Pesticides may damage trees growing near roadsides or fields.

Noxious Weeds: A polluter of sorts, introduced weeds (those not native to the area) displace tree-growing ground and render large areas unproductive. Weeds displace native vegetation, promote erosion, and degrade forestland. Some weeds can poison livestock and humans, creating a formidable forest health concern.

Logging Damage: Heavy equipment in the w
can cause very serious damage. Important root
be severed or broken. Trees hit by passing equi
or other falling trees can receive extensive wou
which can lead to decay, scarring, and growth
Additionally, heavy equipment compacts the s
crushing the air spaces that tree roots need to
breathe. For this reason, it is difficult to
preserve trees near construction sites, as
is often tried when new home sites are
developed on forestlands.



Animal Damage: Feeding damage
caused by bears, deer, gophers, porcupines,
etc., can put a tree under stress as it strives to h
the damage. Young trees often succumb to poc
gophers, while older trees may have reduced g
for some years as they recover from a bear or a

Forest Health Concerns, Symptoms, and Treatments*

Forest Health Concern	Symptoms	Treatments
Stem Decay	Not readily visible, confined to center of trunk—usually visible conk on bole.	Light infection—do nothing. Heavy infection—cut and replant. Consider opportunity for wildlife trees.
Cankers and Cambium Damage	Swelling, discoloration, blister-like or flared cankered bark.	Usually a condition of overstocked or stressed forests. Thin area and promote species diversity. Use special techniques to manage white pine blister rust.
Wood Borers and Bark Beetles	Reddish boring dust on bole (stem), pitch globs on pines. Distinctive galleries under bark.	Identify beetle species that are active and contributing factors. Light infection—do nothing. Heavy infection—species conversion. Sanitize area by removing infested trees when they still contain beetles. (Note: infested trees will still have green needles.)
Root Diseases	Windthrow with rotten, broken roots. Thinning, sickly foliage (needles). Trees appear to die out usually in pockets. Staining or pitch at base of tree, under bark.	Thorough positive ID of casual agent will determine action.
Branch and Terminals	Contorted swollen branch profusion (witches brooms), foliage discolored or shedding, dieback at terminal, defoliation, silk webbing on chewed foliage.	Identify causal agent. Assess damage and potential treatment carefully. Light damage may be tolerated.
Seeds and Cones	Damage confined to cones. Cone or seed mortality may be caused by insects.	Usually only a problem in seed orchards or collection sites. May sanitize area by removing infested trees and cones.
Abiotic and Mechanical Damage	Winter and drought damage, branch tips browning, dieback, foliage turns red from the tree top down or is mostly on one side of crown. Bark torn from rubbing, equipment damage.	Maximize tree growth on stand through stocking control that favors the most drought tolerant species. Avoid equipment damage to trees.
Noxious Weeds	Weeds invade disturbed areas and roadsides. Give particular attention to logging and road-building operations.	Contact your County Noxious Weed authority for proper weed identification and treatment options.

*The above treatments are only guidelines. Always consult a forester before initiating any action.

Resource Description: FOREST HEALTH*

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Condition	
Concerns (stem decay, beetles, root disease, etc.)	
Introduced Organisms	
Fire Concerns (fuel inventory)	
Potential Benefits of Diseases and Pests	
Other Ecosystem Considerations	

* Provide a narrative description for each category.

Enhancement and Protection: FOREST HEALTH

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Forest Health Concerns	Damage Level			Action Taken	Dates		
	low	med	high				
Stem Decay							
Cankers and Cambium Damage							
Wood Borers and Bark Beetles							
Root Diseases							
Branch and Terminals							
Seeds and Cones							
Abiotic and Mechanical Damage							
Noxious Weeds							

Home Fire Safety Checklist

Activity	Dates Completed or Rechecked			
Trees and brush properly thinned and pruned within 50 feet of structure.				
Roof and gutter free of debris.				
Grass and weeds cut within 10 feet of structure.				
Firewood stacked away from house.				
Outdoor water supply available.				
Fire extinguisher checked and okay.				
Good access to home site by fire truck.				
Signs posted for identification, vehicle parking and bridge load limits.				
Fire tools available.				
Family fire drill and evacuation plan practiced.				
Is our home in a fire district?				

Keep Fire Prevention in Mind When Landscaping!

Thin and prune trees.

Mow grass and remove brush.

Plant and maintain a greenbelt or lawn around house.

Move firewood from house.

Clean leaves from roof and rain gutter.

Screen chimneys and incinerators.

BEFORE

AFTER

Water

Forests are one of the most important components in an ecosystem for maintaining water quality and quantity, and the organisms that depend on water. Water from rain and snow moves through the forest in many ways. Some of it evaporates. Some of it enters the soil where it is absorbed and used by plants, fungi, and soil organisms. After the ground has absorbed all it can, some of the water percolates through and flows underground. When rain falls or snow melts faster than the soil can absorb it, water flows overland.

At a broader landscape level, water moves in and over the forest soil surface to areas which collect water temporarily and drain into intermittent (seasonal) streams. Intermittent streams then drain into perennial (year round) streams or wetlands. Any area of land that collects and discharges water into a stream or outlet is called a ***watershed***. Descriptions of water quantity and quality are made on the watershed level. Watersheds are nested inside each other; large watersheds encompass larger drainage areas and, thus, contain many smaller watersheds (Fig. 7).

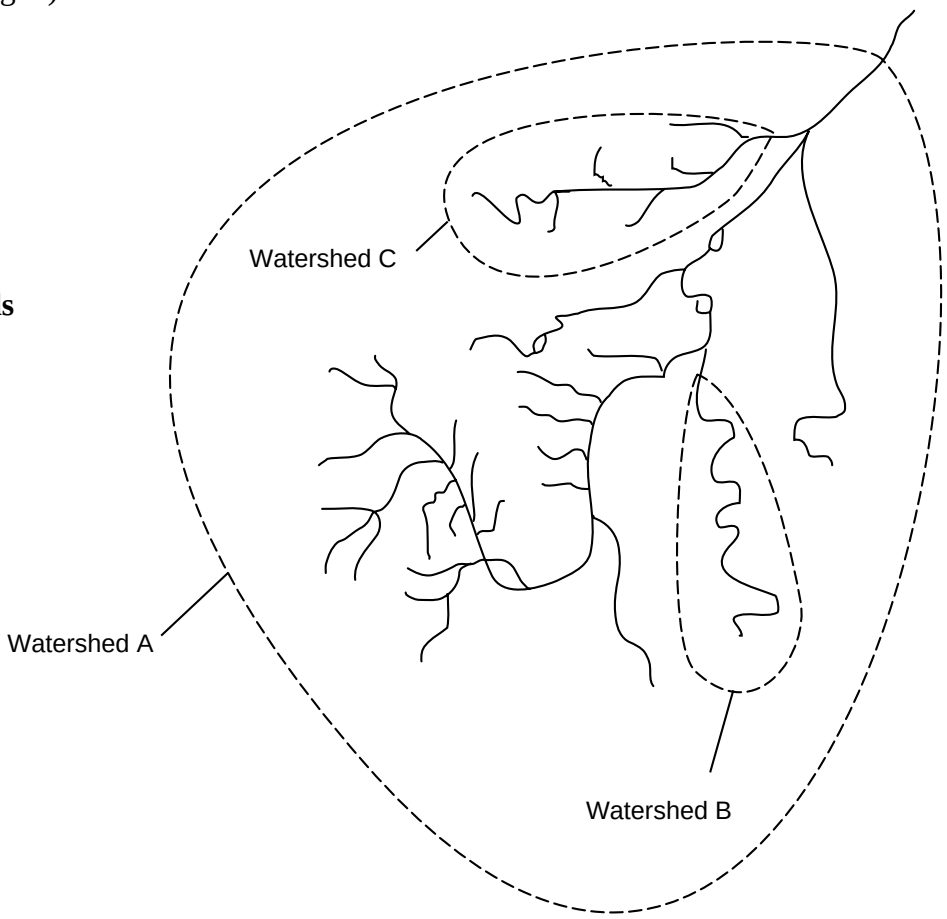


Figure 7. Nested watersheds

Sediment from forest activities affects water quality and quantity. The primary source of sediment from forested areas is roads; whether they are used to harvest timber, to access home sites, or to recreate. The best way to enhance forest water quality is planning and building roads, and implementing other forest management activities, in a way that prevents erosion and sedimentation during peak rainfall or snowmelt (see Soil Resources section, p. 27).

Riparian Zones

Where water is more concentrated, one starts to see more plant and wildlife species. These moist areas that border streams and wetlands are called ***riparian zones***. They are critical for maintaining water quality, fish and wildlife habitat, and many other forest values.

A riparian zone supports a diverse web of vegetation and wildlife. The lush vegetation in a riparian zone provides water, protection, and ***travel corridors*** for forest animals. It shades water, keeping it cool for fish. Riparian vegetation also stabilizes stream banks and traps sediment during high water flows, keeping it out of streams and integrating it into stream banks. Over time, riparian trees fall into streams, providing fish habitat and nutrients.

Forest management activities take on greater significance near riparian areas. Take care to disturb riparian zones as little as possible. Riparian areas can be enhanced by activities such as tree planting and fencing to limit livestock access (see Forestland Grazing section, p. 39).

Fish Habitat

The Pacific Northwest is blessed with a variety of aquatic life. Among the many biological organisms which depend on forest water, fish are the most readily identified. Of particular importance are fish species which migrate, such as trout, salmon, and char. Practices which minimize sediment movement into streams are the most important factors enhancing habitat for fish and other aquatic organisms. However, you also should check for the following: Do culverts permit free passage of migrating fish? Is vegetation in the riparian area adequate to shade and moderate stream temperatures? Have a sufficient number of large diameter trees been left i le pool habitat? If you are cons aking place in the watershed? a period of a few years, incre

Resource Description: WATER RESOURCES

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Perennial Streams	
Intermittent Streams	
Wetlands	
Road Systems	
Culverts and Other Water Drainage Devices	
Applicable Laws Related to Water Resources	
Relevant Watersheds in which this Unit Lies	
Other Ecosystem Considerations	

Resource Description: RIPARIAN AREAS AND FISHERIES HABITAT

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Stream Bank Stability	
Fish Species Found in Streams	
Adequacy of Trees for Future Stream Large Organic Debris	
Adequacy of Stream Shade	
Other Ecosystem Considerations	

Enhancement and Protection: WATER, RIPARIAN AREAS, AND FISHERIES HABITAT

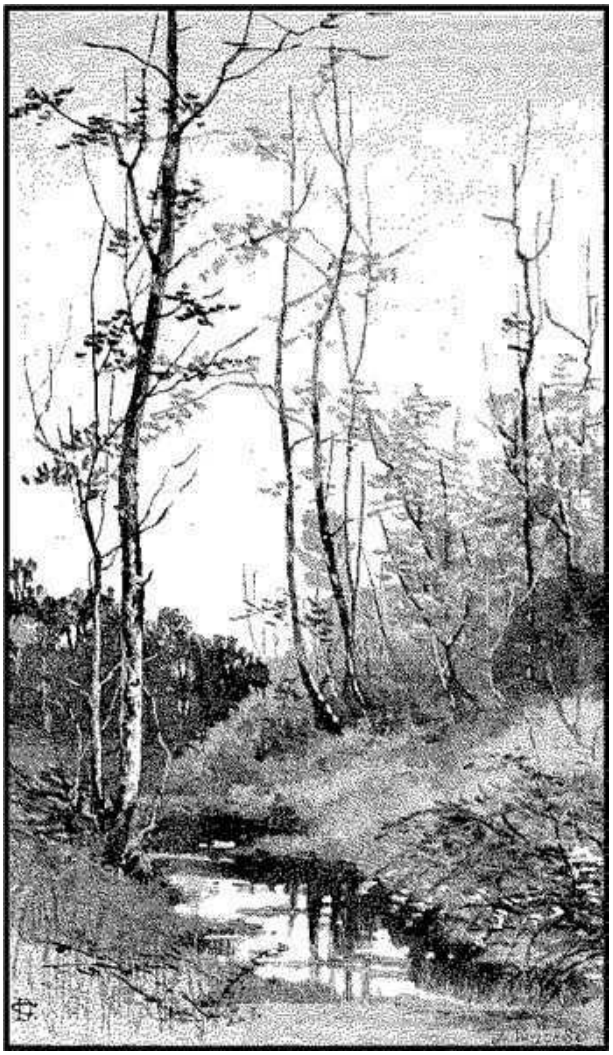
Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Activity	Priority	Comments
Minimize roads and skid trails. Communicate with neighbors to cooperate for more efficient road systems.		
Install, clean out, repair or replace culverts, water bars, cross ditches and other water drainage structures on roads.		
Close roads seasonally or permanently to prevent impact (at least during wet seasons).		
Add rock to heavily used road surfaces.		
Seed grass and legumes on road cuts, skid trails, and other bare areas.		
Plant alders or willows on bare stream banks.		
Fence to lessen impacts from grazing and other activities.		
Plant trees which increase riparian habitat diversity.		
Keep buildings and septic systems far from water and in good repair.		
Retain woody debris in streams.		

Soil Resources

Managing the soil resource is an integral part of forest stewardship. As with the other resources on your property, conduct a soils inventory for stewardship planning.

Soils on any given landscape will vary in their ability to grow and support a variety of forest vegetation. Additionally, if your ownership is small, the soil may be of one type, whereas larger ownerships may include more soil types. Each type may vary in texture and structure, and could even be of different parent material—the material from which the soil was derived. As a forest landowner and manager, it is important for you to know the productivity of your soil in terms of wood fiber and vegetation understory. It is also important for you to understand the limitations and erosion hazards associated with your soil.



The initial soil inventory on your ownership begins with the local soil survey. Private lands in the Pacific Northwest have been, or are currently being, surveyed. You may contact your local USDA Natural Resources Conservation Service (NRCS) resource professional, or have the person assisting you with your plan contact NRCS for soils information. Soil surveys allow you to predict the success or failure of many management practices based on the properties of the various soils on which your trees grow. Species adaptability, potential productivity, erosion hazard, seeding mortality, windthrow hazard, and problems associated with equipment use are some of the management items that can be inferred from soils information.

With respect to wood fiber production, each forest soil type has a site index. Site indices are a measure of site quality. The index refers to the height in feet that the dominant and co-dominant trees, such as Douglas-fir and western hemlock, can be expected to achieve in 50 years. Generally, the higher the site index, the better the productivity of the soil to produce wood fiber.

Soils vary in the type and extent of understory vegetation they support for wildlife habitat. Soil surveys also have information and interpretations for wildlife habitat components.

Forest management activities and roads are two of the primary agents of soil erosion with which you may be concerned. Conducting such activities during periods of low precipitation or snow melt can greatly decrease soil erosion. Additionally, replanting large areas of exposed soil can help to stabilize them. A professional can help determine other steps, based on information gathered from your soil inventory, which will decrease soil erosion.

Soil interpretations for potential management strategies are very useful in the planning process. These interpretations can be used as guidelines for implementing practices that are appropriate to the soil on your property.

Resource Description: SOILS*

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Soil Types	
Nutrient Status	
Water Holding Capacity	
Susceptibility to Compaction	
Soil Stability	
Productivity (Site Index)	
Road Cuts and Fills	
Past Erosion (concentrated flow points)	
Other Ecosystem Considerations	

* Information on soil type, nutrient status, water holding capacity, compaction and stability can be obtained from your local USDA Natural Resource Conservation Service.

Enhancement and Protection: SOILS

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Activity	Priority	Comments
Minimize roads and skid trails. Designate skid trails.		
Communicate with neighbors to cooperate for more efficient road systems.		
Install, clean out, repair, or replace culverts, water bars, cross ditches and other water drainage structures on roads.		
Close roads seasonally or permanently to prevent impact, at least during wet seasons.		
Add rock to heavily used road surfaces.		
Leave coarse woody debris.		
Seed grass, winter wheat or legumes on road cuts, skid trails and other large bare areas.		
Plant riparian wetland dependent trees and shrubs on bare stream banks.		
Fence to lessen impacts from grazing and other activities.		

Timber Management

Timber management is a collective term for all of the activities accomplished in a forest when the production of wood products is a desired goal. Similar terms used in forest management for other desired goals are wildlife management, watershed management, and so forth. Timber management refers, primarily, to the manipulation of overstory trees and associated understory vegetation throughout the forest to improve the growth and health of crop trees. Often this management is accomplished through the application of silviculture at the stand level. ***Silviculture*** is simply defined as the art, science, and practice of establishing, tending, and reproducing forest stands with desired characteristics, based on knowledge of species characteristics and environmental requirements. Stands are recognizable units of the forest that are managed as a single unit.

Timber management is usually compatible with other ownership goals. Do not think of these practices as a detriment to other goals, but as a tool for their achievement. For example, most wildlife species that flourish in second growth forests benefit from the environmental diversity created by timber management (see Wildlife Habitat and Threatened & Endangered Species section, p. 33).

Timber management practices are grouped into three categories: 1) regeneration practices, 2) intermediate stand practices, and 3) harvest regeneration systems.

Regeneration practices are related to harvest regeneration systems. Simply put, the provisions for regenerating a stand must be considered and planned while harvesting that stand. Quite often, regeneration is attained by natural seeding or by planting. Planting is the preferred alternative west of the Cascades because of severe competition from other plants and trees.

Intermediate treatments are those cultural practices that are used to "tend the crop" into mature merchantable trees. Common practices are weeding, ***thinning***, fertilization, and ***pruning***. All of these practices can be thought of as investments in the stand. These investments may be financial, as well as biological, in nature. Intermediate treatments can increase tree vigor producing stands free from insects and disease. Low vigor trees are usually in poor health.

Harvest regeneration systems are activities employed to harvest mature or merchantable timber. Traditionally, these systems are broadly classified into even-aged methods and all-aged methods. Common even-aged methods include ***clearcutting***, ***seed-tree,*** and ***shelterwood*** systems, whereas an all-aged method is ***selection harvesting***. In all cases, these methods have options and variations based on biological and physical limitations. There are new harvest methods that are not easy to classify. These "alternative silvicultural approaches" aspire to integrate harvest systems, regeneration provisions, and wildlife habitat requirements. Examples include ***dispersed green tree retention*** and ***aggregated green tree retention***.

Your forest's individual circumstances will dictate which practices will be applied and when. A professional forester can help you make these decisions. Do not assume that any one practice can be applied to all situations. You must consider biological, physical, economic, and social variables before a silvicultural plan is developed for timber management.

Resource Description: TIMBER

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Stand Type (seedling/sapling/pole/small sawlog/old-growth)	
Habitat Type	
Stand Age Structure (uneven, even, all, unknown)	
Tree Species Composition and Dominant Species	
Tree Diameter Distribution	
Stocking (estimated trees per acre—understocked, adequately stocked, or overstocked)	
Timber Quality and Potential Products	
Topography, Aspect, Slope Inclination and Position (ridge top, riparian, mid-slope)	
Soil Type and Limitations Site Class	
Other Ecosystem Considerations	

Enhancement and Protection: TIMBER

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Activity	Priority	Comments
Traditional Harvest Methods (clearcutting, shelterwood, seed-tree, and selection system)		
New Harvest Methods (aggregated and dispersed green tree retention)		
Thinning (precommercial or commercial)		
Other Treatments: control competing vegetation (release or weeding), pruning, and fertilization		
Wildlife Corridor Development, Wildlife Habitat Conservation Areas, Snags, and Riparian Set Back		
Slash & Fire Hazard Abatement		
Regeneration: natural seeding and planting		
Site Preparation		
Road Access and Landing Locations		
Skid Trail Access and Landing Locations		
Equipment Limitations: ground or cable based		
Aesthetic Considerations: proximity		

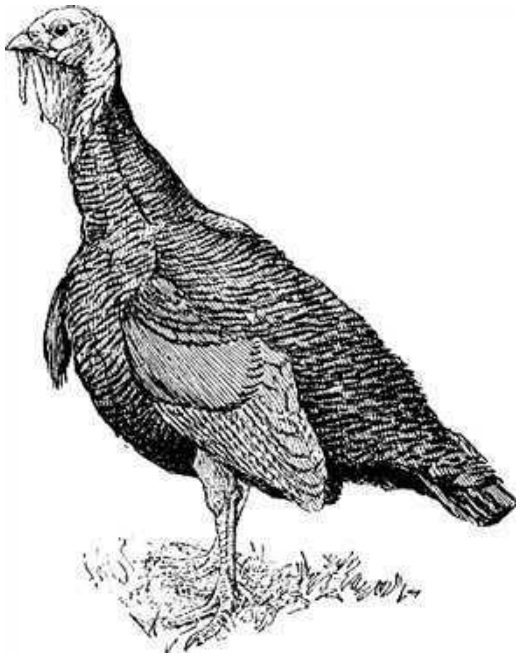
Wildlife Habitat and Threatened & Endangered Species

As a forestland owner, one of the joys of your property is probably seeing other creatures that share your forest. These animals are present on your property because of the food, water, and shelter they find there, in much the same way that you selected a home. In fact, as many as 400 species of wildlife in Washington are dependent on forestland for some or all of their life requisites. Different stages of forest development are used by different groups of wildlife that depend on common food, shelter, and cover components. As one stage is replaced by another, so are the wildlife that utilize each stage.

Most areas are filled to capacity with the animals that can survive there. When timber harvest, development, or other major disturbances alter these areas, the animals have nowhere else to go. Adjacent undeveloped areas are already occupied by other animals. However, major forest disturbances that "restart the clock" by setting back succession allow different groups or classes of wildlife to occupy the new or altered habitats if sufficient habitat components are allowed to survive and develop. To retain wildlife on your property, consider the needs of wildlife when you conduct management activities, and leave structural components that provide food, water, and shelter (or cover).

Although ownership patterns vary from state to state, approximately half of nonfederal forestlands in the Pacific Northwest exist as family forests, owned by people such as yourself. Private forestlands are often in lower elevations, including river bottoms, where they encompass riparian zones (areas with unique streamside vegetation) and other important habitat essential for wildlife. Such habitats often are limited on public lands because the most fertile bottomlands were the first to be homesteaded. These fertile lands provide corridors through which mammals travel and other important nesting habitat for species such as song birds.

As harvesting increases on lands not previously managed for timber, habitat for some wildlife species is negatively affected. As management continues, trees are cut at younger ages reducing the chance for large or older trees as in past forests. Conversion to younger forests can reduce or eliminate wildlife species that require the type of habitat found in older forests.

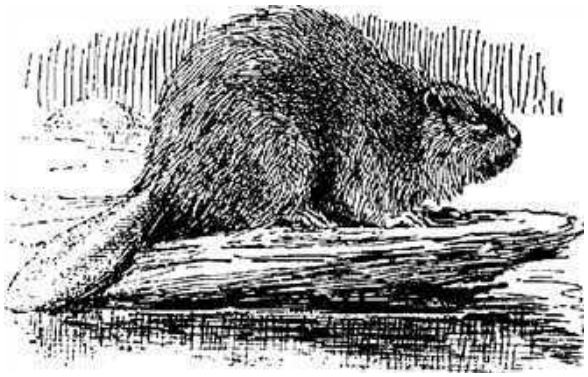


While shorter harvest rotations may provide an abundance of forage (shrubs, herbs, and grasses) for big game animals, as well as many other species, they do not always provide for sufficient ***hiding cover.*** A diversity of habitats is the key to providing for wildlife. Large trees or clumps of trees provide critical thermal cover during periods of extreme cold, deep snows, and summer heat. Lack of cover, combined with increasing numbers of roads, also makes big game animals more vulnerable to hunters. For this reason, closing forest roads to vehicle traffic is important in areas where cover is limited.

As forests are intensely managed for timber production, the structural components that supply food and cover for many species that live in the understory are often reduced or completely eliminated. Understory dependent wildlife species, such as

grouse, thrive in disturbed or early successional sites that contain a large amount of berry and seed (mast) producing trees and shrubs. These species also prefer sites with forbs, low growing branches, and substantial defects in existing conifers. Pruning all conifers removes branches used by many species for perching and roosting while intensively managing the forest floor eliminates their food and nesting habitat. Even larger trees that are infected with dwarf mistletoe and that contain large mistletoe brooms are used for nesting, perching, roosting, and even denning by some mammals while the mistletoe berries are relished by many bird species. Retaining some areas with these structural components and understory plants is important in maintaining wildlife species diversity.

In western coniferous forests, species receiving protection under the Endangered Species Act include the northern spotted owl, marbled murrelet, bald eagle, grizzly bear, wolf, Canada lynx, Columbian white-tailed deer, and the mountain caribou. Other animals that have not received this protection have diminished in numbers, or even disappeared from forested areas. These animals include birds that depend on dead trees called ***snags.*** White-headed, black-backed, hairy, downy, and pileated woodpeckers and flickers (among others) excavate new nesting cavities every year as a part of their courtship ritual. Cavity nesting birds play an important role in maintaining the health of forests by feeding on forest pests such as bark beetles. Research has found that for dead trees to be useful to many woodpeckers and other cavity nesting birds and mammals, snags ideally should be at least 12 inches in diameter at breast height (DBH), and at least 10 feet tall but snags of all sizes are important.



Past forest management principles dictated that most dead trees be felled as hazard trees. However, other practices can retain these wildlife legacies without creating a hazardous situation. For example, leaving clumps of live trees surrounding a dead tree can reduce risk to life or property. Creating snags can be accomplished in a variety of ways.

Other wildlife structures include downed wood (referred to as coarse woody debris) that provides denning and nesting sites for many amphibians, birds, and small mammals, as well as food for woodpeckers, and display areas for grouse. Existing downed wood can be retained on site or created.

Pools may be created to provide habitat in streams where overwintering salmon occur. Where appropriate, you can construct loafing platforms in lakes for turtles or loons. Appropriate enhancement measures include protecting riparian areas by leaving riparian buffer ***strips,*** fencing out livestock, or planting areas with native shrubs and trees for the wildlife living there. Snags and coarse woody debris can be created when thinning stands. Openings that are created through variable density thinning can be planted with seed mixtures that supply food and cover for many wildlife species.

Erect perch poles in open areas to attract hawks and owls. These birds will help reduce rodent populations in new plantations. Create snags or put up nest boxes where snags are not currently available.

Forestland owners can do many things to provide habitat for wildlife. Leaving downed wood, snags, and buffers around wetlands and streams in a forest are important for a wide variety of wildlife species. These features provide cover and food for the many small animals that, in turn, provide food for animals higher up the food chain, including ourselves. In addition, it is important to work with neighbors to ensure that travel corridors remain open for wildlife to move among different areas of food, cover, and water. The task is a challenge, but not many challenges are as rewarding as protecting our wildlife heritage for future generations.

Resource Description: WILDLIFE HABITAT AND THREATENED & ENDANGERED SPECIES

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Type of Wildlife	Food	Cover	Water	Ecosystem Concerns
Waterfowl, Shore or Wading Birds				
Upland Game Birds (quail, grouse, turkeys)				
Hawks, Owls, Woodpeckers, or Song Birds				
Large Mammals (deer, elk, bear)				
Small Mammals (rabbit, raccoon, squirrels)				
Amphibians and Reptiles				
Threatened and Endangered Species				

Enhancement and Protection: MAMMAL HABITAT

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Activity	Priority	Comments
Retain patches of cover.		
Plant forage mixes along haul roads and landings.		
Retain downed woody debris.		
Minimize road construction. Close roads when and where necessary.		
Use wildlife-friendly fencing. Retain travel corridors.		
Create brush piles.		
Reduce or minimize destruction of hardwood trees and shrubs during plantation management.		

Enhancement and Protection: BIRD HABITAT

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Activity	Priority	Comments
Retain dead trees and create snags.		
Plant clover and grasses.		
Install nest boxes.		
Retain shrubby vegetation.		
Retain some trees without pruning.		
Retain large live trees.		
Plant fruits and nuts.		

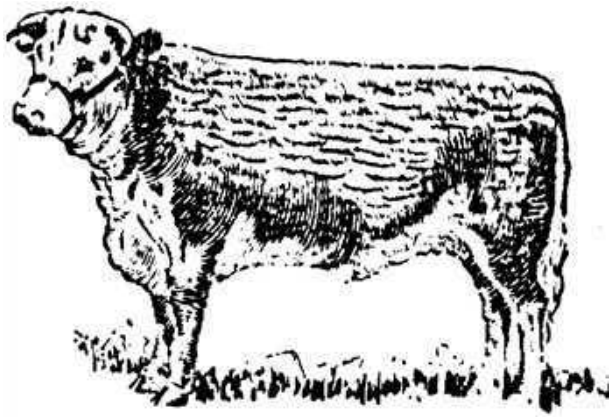
Enhancement and Protection: AMPHIBIAN AND REPTILE HABITAT

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Activity	Priority	Comments
Retain downed woody debris.		
Create brush piles.		
Retain a forested buffer around *talus* slopes.		
Create rock piles.		
Create small ponds and restore or enhance springs and seeps.		
Protect vegetation around seeps, springs, and headwaters of streams.		

Forestland Grazing

Many of the cultural practices that family forest owners use to improve forest production may be used to improve other components of their forestland. Forest owners may wish to increase production of grasses and forbs for livestock production and/or wildlife habitat improvement. Forestland grazing presents opportunities to increase land productivity, improve cash flow, and to increase the diversity of plants and animals. Most forest grazing in Washington is found east of the Cascades, as forest stocking levels tend to favor more open stands. Limited forestland grazing is found on the westside, generally on sites that promote more open stands. Grazing can benefit forest management in several ways. For example, grazing and browsing can reduce the need for herbicides and mechanical weed conrol, and manure can reduce the need for fertilizer application by promoting nutrient recycling. Forest stands that include grazing as a management option are often park-like in appearance, and generally more socially acceptable than traditional forest plantations managed exclusively for timber. Low intensity cattle grazing reduces competition for moisture between overstory trees and understory shrubs when the stand is very young. Studies in Oregon have shown up to 50% increase in forage and timber growth over 10 to 20 years with the integration of animals into the system. Also, adding nitrogen-fixing vegetation such as legumes to the forage mix combined with recycled nutrients in dung and urine increases nitrogen uptake of trees on sites that are naturally deficient of nitrogen.

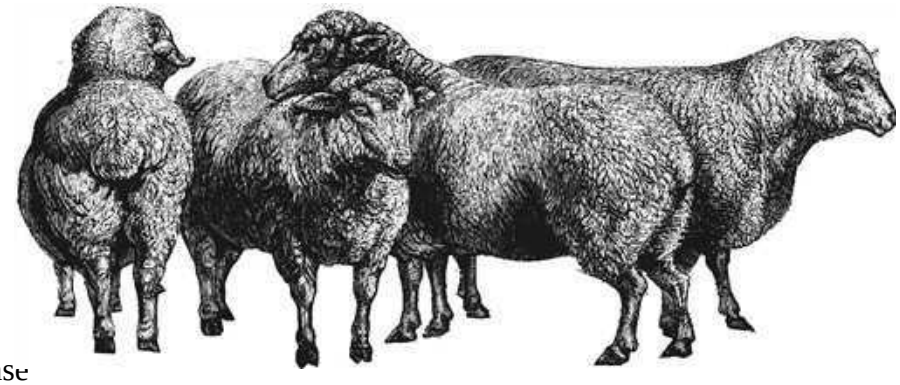


Weight gains for cattle on forested pastures may exceed those of open grasslands because: (1) prolonged spring run-off provides more available moisture to understory plants, (2) forage reaches maturity more slowly, (3) grasses are protected from sun and frost curing, and (4) forage species diversity provides a longer grazing season. Experience has shown that forests also protect cattle from weather—cutting the direct cold effect by 50% or more and reducing wind velocity by as much as 70%. Cattle protected by windbreaks gained 35 lbs more than unprotected herds during a mild winter and lost 10.5 lbs less during severe winters. Weight gains also improve with proximity to shade.

Livestock grazing in forests is much more common than many people realize. In a recent survey, 26% of Washington family forest owners reported livestock grazing on their forestland in the previous 12 months. Nationally, livestock graze about 25% of all forests. This forest area accounts for about 13% of the total land grazed in the U.S. and roughly equals the total area of improved pastures and grazed croplands, combined.

Foresters often discourage livestock grazing in timber plantations for fear that trees will be browsed, debarked, or stepped on. Once reassured that plantations can be safely grazed without damaging trees, the next silvicultural concern is often soil compaction. Cattle, sheep, goats and other livestock can exert as much downward pressure on soil as do agricultural tractors and unloaded forestry harvest equipment. When a sustainable number of animals are managed, trampling only occurs over a limited area. In addition, soil compaction by livestock is generally confined to the top few inches of soil whereas heavy equipment can compact soils to depths over a foot. Extensive reviews of published literature found that grazing does compact soil—though it is unusual for livestock grazing on drained soils to sufficiently compact soils to hinder plant growth. Forested rangelands in the western U.S. are most frequently used as summer-fall range, when soils are not saturated. It is unlikely that responsible forest grazing will sufficiently compact soils to reduce tree growth unless soils are poorly drained.

Large seedlings are cost-effective in forest grazing systems. While more difficult and expensive to plant, these trees have a higher tolerance to damage from livestock and will more quickly escape the maximum height of browsing by livestock and deer. Careful management should be the norm when grazing young stands, particularly on steep slopes to see that soil is not displaced by animal hoof action. The number of trees to plant and planting pattern vary widely with the objectives of forestland grazing. If the forest component is to be emphasized, stockings of 200 to 400 trees/acre are common, with grazing restricted to the first decade or so after tree planting. If grazing is to be maintained over the long-term, lower tree stockings will be needed to maintain forage production with subsequent thinnings that reduce stocking to as few as 50 trees/acre at maturity. Tree pattern becomes increasingly important as density increases. Conventional forests use rectangular grids of trees to minimize competition between trees at the expense of the understory vegetation. Square grids, single, double or triple rows, and cluster plantings have all been used in Washington grazed forests. The grid layouts optimize the area for tree growth, while the row or cluster plantings share the site resources more evenly with the forage crop. Rows support greater understory forage and the ease of access to row plantings for agricultural operations such as fencing, fertilizing, haying, etc., make them popular with producers.



Overgrazing can lead to removal of terminal leaders, substantial lateral branch defoliation and, more rarely, debarking. Young conifers are fairly tolerant to defoliation provided that the terminal leader is left intact. Research applicable to eastern Washington forests, reported that heavy lateral branch defoliation of 4-year-old Douglas-fir did not affect tree height and reduced the current year's diameter growth by only 1.5% compared to undefoliated trees. It takes browsing of over half of the needles produced in the current year or girdling of greater than half of the stem to visibly reduce long-term growth. Removal of terminal leaders is a more serious matter. Loss of conifer terminal leaders not only forgoes that year's height growth, it may also reduce diameter growth by as much as 30%. The risk of growth loss and tree deformation of young conifers in pastures is high enough to warrant either careful monitoring of forage availability and livestock grazing behavior, physical protection of the trees during the first few years after plantation establishment. Given the increased competition from other trees understory shrubbery on westside forests, the loss of a year's height may eventually result in competition mortality. However, to place concerns in perspective, studies in western Oregon forests report that deer inflict more damage to young forests than livestock.

While livestock can graze new plantations safely, great care should be exercised when tree terminal leaders are within the reach of livestock. Pastures can be grazed during the spring growing period with negligible defoliation of trees provided that total utilization of forage does not exceed 35% of current season's forage crop. The potential for tree damage by livestock appears to be related to several factors including season of year (spring/early summer is when other forage plants are most palatable, but compaction may be an issue), percent utilization of forage available, age of animal, and tree heights. Damage is more likely during the first

two to three years of tree growth before resinous chemical defenses are well developed. After three years, conifer foliage is not particularly palatable to cattle or elk, though sheep, goats, and deer might still be attracted. Conifer foliage is most likely to be grazed in the spring when it is newly emerged and the anti-herbivory defense compounds have not yet fully accumulated, or any time that livestock are short of other forage; however, livestock will consume conifer foliage in low amounts even when other preferred forage is available. This very low level of tree browsing often changes quickly into substantial levels as other forage is depleted. It is not unusual for over 90% of tree defoliation to occur when other forage choices are limited. Livestock grazing young forests must be checked frequently and animals promptly removed when forage is depleted and they begin to actively feed upon trees.

Minimizing Livestock Damage

In general, livestock breed is not a useful predictor of damaging feeding behavior as is age, sex, and past experience of animals. Older dry ewes do far less damage to trees than young lambs or rams. Cattle, sheep and goats that have consumed either green foliage or dry needles regularly in the past are much more likely to feed upon young trees in pastures. In every flock or herd there are individuals that seem to be predisposed to feed upon trees. Feeding behavior may be taught to others. Tree damagers should be culled as soon as they are identified. Some practitioners also report that livestock transported into grazed forests from non-forested areas will browse young trees as a “novel” food. Fencing, tubing, repellents, and livestock exclusion have all been used to control browse damage by both wildlife and livestock in grazed forests. Fencing works well when trees are concentrated in closely spaced rows to maximize grazing area and minimize fencing costs. Fencing can be permanent where continuous grazing is planned or wildlife damage to trees is a concern. Portable electric fencing has been successfully used for grazing over short time periods and prescriptive grazing to reduce invasive plants. Light-weight portable fencing is erected quickly when and where needed to protect trees from livestock, and then moved as livestock move to new areas. Fences provide a barrier between the trees and livestock, so monitoring of the grazing progress is not as critical as with open grazing. Protecting individual seedling trees with plastic mesh or rigid tubes has also been used successfully, but with problems. Cattle trampling and tube removal by sheep and subsequent browsing of the unprotected tree is a real concern, so monitoring of grazing is required. Attaching the tube firmly is another problem. Rigid stakes often break when rubbed by livestock. Resilient materials such as bamboo are more resistant to breakage.

Riparian Area Concerns

Livestock grazing becomes more complicated where riparian systems are involved. Because riparian areas remain lush and green into the summer dormancy period for upland grasses and forbs, livestock will congregate in these areas for shade, water and forage. This situation could result in overgrazing of riparian plants critical for riparian and stream function and physical damage to stream banks. Some rules of thumb include:

* Continuous, season-long grazing will damage riparian function.
* In years of good rainfall, early growing season grazing encourages cattle to graze uplands, where green forage and warm temperatures are more favorable.
* Install off-stream water and salt far away from riparian areas.
* Cull animals that prefer to “camp” in riparian areas.
* Force cattle out of riparian areas with riders or substitute with herded sheep or goats.
* Exclude riparian grazing until late in the growing season, but be careful to watch for overuse of woody plants.
* Riparian pastures in rotation systems have had mixed and very site-specific results.
* A number of successes have been observed when late winter and early growing season grazing systems were merged, but be careful to monitor compaction.

Conclusion

Livestock management is the key to successful forestland grazing. Important considerations for proper grazing management include where the livestock graze, season of use (timing), length of use (time), and the amount of plants grazed (intensity). Some rules of thumb include:

* Match the type of livestock to the forage base.
* Judicious use of fencing, salting, off-riparian water, and trails will aid proper distribution and minimize damage.
* Rotational grazing systems need to be customized to the local area and managed intensively, time and timing will vary depending on the location, year and objectives.
* Move livestock well before browsing begins on trees.

Resource Description: FORESTLAND GRAZING

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

AUMs (Animal-Unit Month) Available	
Wildlife Use	
Forage (by species)	
Effective Growing Season	
Water	
Accessibility (slope, rock, brush, etc.)	
Other Ecosystem Considerations (riparian systems, rare animals, and plants affected)	

Enhancement and Protection: FORESTLAND GRAZING

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Activity	Priority	Comments
Class of Livestock Grazing (cattle, sheep, horses, goats, etc., and wildlife)		
Fencing		
Water Trough Placement (away from riparian zones)		
Salting Placement		
Pasture Rotation Plan		
Livestock Access Improvement		
Weed Control		
Forage Enhancement Activities (tree thinning, reseeding forage species, and livestock/wildlife management)		

Aesthetics and Recreation

Among the many reasons why people own forested property are scenic beauty, wildlife viewing, and the desire to keep it natural. For many forest stewards, these reasons represent the desire to create or preserve a parklike setting. According to many surveys of family forest owners, wildlife, aesthetics, and recreation are more important than timber production or land investment.

Individuals begin to either like or dislike the aesthetic features of a managed landscape. Individuals have different visual sensitivities to natural landscape components such as trees or mountains, and to management activities such as roads or timber cuts.

Proper planning for aesthetics also must conform to ecological management, with an emphasis on the stewardship of larger or regional landscapes. Aesthetics and recreational resources are often the first to suffer when individual property, rather than the surrounding ecosystem, is the focus of management.

Management for aesthetics and recreation often is a passive activity; you may or may not manipulate your forest to develop these resources. Many landowners are interested in simply owning land with wetlands, wildlife, trees, and shrubs to view and enjoy. You can develop such resources to attract or enhance wildlife. Old logging roads and skid trails often provide adequate access for hiking, camping, wildlife viewing, and other recreational activities.

Because most landowners know that timber harvesting can dramatically impact the landscape for the short term, many are reluctant to do any timber harvesting. Yet, you can protect and enhance aesthetics during the harvest. Simply reducing the amount of soil damage, slash, and disturbance to standing timber can help protect the landscape. You can employ silvicultural practices that minimize water runoff and damage to residual trees. These practices include the use of designated skid trails, proper haul road construction, improved utilization standards and slash disposal, and the use of ***bumper trees*** during the harvest. Irregular cutting boundaries, ***leave trees***, snag retention, reduced brush control, and vegetation corridors not only provide habitat for migrating wildlife, they reduce the detection of management activities on the landscape.

Communicate your aesthetic interests to any consulting professionals while developing a harvest plan. This will better ensure outcomes that will enhance both aesthetics and recreation qualities on your property.

An ecosystem management approach could spark a coordinated effort among neighboring property owners. Together they might develop recreational trails, protect and enhance water and wildlife resources, and consider long-term effects on aesthetics or landscapes.

Resource Description: AESTHETICS AND RECREATION

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

View Shed	
Screens	
Aesthetically Valuable Species, Landforms and Water	
Types of Recreation	
Facilities and Access	
Potential for Public Viewing Neighboring Land Uses	
Potential and Desire for Commercial Recreation	
Unique Cultural Resources	
Other Ecosystem Considerations	

Enhancement and Protection: AESTHETICS AND RECREATION

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Activity	Priority	Comments
Reduce the amount of soil damage, slash, and disturbance to standing timber.		
Use designated skid trails and proper haul road construction.		
Improve utilization standards and slash disposal.		
Use bumper trees during harvest.		
Retain leave trees and snags.		
Maintain vegetation corridors as screens after timber harvests.		
Use irregular cutting boundaries when harvesting timber.		
Pruning.		

Special Forest Products

Private forestlands produce a variety of commodities for forestland owners and managers in the Pacific Northwest. Among these commodities, timber is the most well known and most managed. However, nontimber commodities—special forest products—can offer you personal use harvest and income producing potential.

Special forest products include a wide array of plants and plant parts used for personal consumption and sale. Five major segments make up the special forest products industry: floral greens, holiday ornamentals, wild edible mushrooms, other edibles and medicinals. All of these products are produced on forestlands possessing adequate climate, available seed sources, and specific management that encourages or allows the plants and fungi to grow and thrive.

Forest greens are used in the floral market. These items are generally used in floral arrangements. Floral green products include sprays of evergreen huckleberry, salal, Oregon-boxwood, beargrass, sword and deer fern, shoots of scotch broom, the leaves of Oregon-grape species, and numerous other plant parts. Floral greens are grown, harvested, and marketed across North America and the world.

Winter holidays are celebrated with a majority of these evergreen ornamentals that are used in wreaths, charms, and garlands to decorate homes, businesses, and community centers. Evergreen tree boughs commonly harvested include noble fir, subalpine fir, Pacific silver fir, grand fir, Douglas fir, western redcedar, lodgepole pine, western white pine, ponderosa pine, incense cedar, and Rocky Mountain juniper. To accentuate these boughs, many people collect the cones of western white pine, ponderosa pine, and lodgepole pine and combine them with holly and other evergreen boughs.

The competitive wild edible mushroom industry harvests edible mushrooms from our region's forests, processes them, and markets the products around the world. Our region's mushroom species desired by this industry include boletes, morels, chanterelles, matsutakes, truffles, puffballs, and dozens of others.

Other edibles and medicinals include the edible berries of evergreen huckleberry, as well as the berries of five deciduous huckleberry species, elderberries, blackberries, blackcaps, wild strawberry, and other edible "fruits" of forest plants. Medicinals cover a wide variety of products sold through health food stores and processed by pharmaceutical companies. Quinine conks, wild ginger, skunk cabbage root, and a wide variety of other plants are used in medicinal products.

You can manage your forestlands for special forest products if you recognize the ecological needs of specific plant species and how they relate to the overall forest ecosystem. When you build roads, or thin, prune, plant or harvest trees, be sure to maintain the understory conditions necessary for the mushrooms, floral greens, and berries to thrive.

Enhancement and Protection of Special Forest Products

Special forest products require specific conditions to grow, thrive, and reproduce. It is very difficult to introduce an off-site plant species to a site, then commercially harvest it. Focus on native species currently found on your site that are abundant and healthy. Create records for tracking the response of the products you are managing to avoid overharvesting and achieve long-term stewardship of your resources.

Before harvesting, record how plentiful the plants are on your property (***constancy***) and how much area the plants occupy (***coverage***). As harvest activities progress, record these data annually to determine if your harvests are damaging the plant populations. Make coverage and constancy measurements soon after the plants have completed their growing cycle in late spring.

Use the following matrix to record the plant species for which you would like to manage. Record the date of your measurements, the coverage and constancy values, and how much you harvested. Keep these data every year and make notes concerning management activities and environmental conditions (such as the amount of precipitation) that might explain variations in growth. If coverage, constancy, and harvest levels drop annually, consider reducing harvest levels. If these values increase annually, you can safely increase harvest levels until you achieve a balance.

Resource Description: SPECIAL FOREST PRODUCTS

Unit: _____ *(copy blank sheet and use one for each unit on your property)*

Floral Greens Species *	
Holiday Ornamentals	
Wild Edible Mushrooms	
Other Edibles and Medicinals	
Other Ecosystem Considerations	

* List the plant species in each category that are present at harvestable levels during the year.

HARVEST MONITORING SPECIAL FOREST PRODUCTS

Special Forest Product Species[1]: _____

(copy blank table and use one for each product being managed)

Date	Constancy[2]	Coverage[3]	Amount[4] Harvested	Other Comments[5]

[1] This table is best used for floral-greens plant species but can also be used for evergreen boughs. When using the table for wild edible mushrooms, coverage values can be ignored.

[2] Constancy is measured by estimating the percentage of land that has the plant growing on it. For instance, if one plant occurs on each acre of a 20-acre parcel, then its constancy is 100%. If it occurs on only 5 acres of the 20, then its constancy is 25%. Occurrence only requires one plant on each acre.

[3] Coverage is measured by estimating the percentage of land that the plant covers over a given acre. On the ground, this is generally done by measuring off a fifth-acre and then estimating how much area the plant species in question covers.

[4] Record the number of gross pounds harvested from the site or unit and the date of the harvest.

[5] Include comments on precipitation, animal damage, management activities, or other conditions that might help explain variations in harvest levels or plant population numbers. Also comment on general plant species health.

FORESTLAND FINANCIAL MANAGEMENT

Financial records are a way of life for most of us. We keep records of checking and saving accounts, retirement plans, Federal and State Income tax information, and various other financial records. However, many of us overlook forestland ownership records. Financial records kept on forestland investments can have very long-term effects on taxes and management decisions.

Tax Treatment of Timber

Very few sections of the Internal Revenue Code are written specifically for timber. This means there is a considerable amount of interpretation involved. **The National Timber Tax Web Site** was developed to be used by timberland owners, as well as a reference source for accountants, attorneys, consulting foresters, and other professionals who work with timberland owners by answering specific questions regarding the tax treatment of timber related activities. This site also provides information and links related to taxes in individual states. The National Timber Tax Web Site is available on-line at: www.timbertax.org.

Forest Landowners Guide to the Federal Income Tax, Ag. Handbook No. 718 is available at the National Timber Tax web site and is also available in hard copy. Details for ordering are available on this web site.

Recording Your Level of Activity

The Internal Revenue Service has defined three basic types of forestland ownership for tax purposes. These include, in order of increasing activity with their forestland, 1) investment, 2) passive business or trade, and 3) active business or trade. Basically, someone who owns forestland for investment purposes will purchase the property, hold it for some period of time, then realize a profit through a timber or land sale. Their involvement with the management of the property is minimal, if any. Landowners who hold their property under a business or trade classification carry out the venture for profit on a more regular basis.

Active business or trade interest is achieved if you "materially participate" in conducting activities; you must personally participate on a regular, continuous, and substantial basis. Conversely, passive business or trade owners define their relationship with their property as involved in its management, but not to the degree of the active business or trade owner. The distinction between the two is sometimes difficult to prove or disprove; however, the Internal Revenue Service has provided landowners and taxpayers with criteria that help define differences between active and passive owners. The distinction between owner classifications becomes important for the taxpayer when advantageous deductions are considered. *Active ownership is more beneficial than passive and investment ownership.*

Formal records of your forestland ownership involvement are critical to correctly applying federal income tax laws. They are also necessary to make long-term management decisions. For the average forestland owner, one set of records should be adequate to provide information for both management decisions and federal tax regulations.

A well kept, complete set of records enables the forest manager to identify activities, prescriptions, and other inputs that have a real, measurable effect on the forest. This effect may be measured through changes in wood volume, wildlife use, biologic diversity, or forest health. The value of your property is enhanced when you can provide the purchaser or heir with a complete set of records specifying what has been done on the property to date.

The following information should always be included in a forestland record-keeping system: the date of every financial transaction; revenue information; and a description of management activities, including the portion or unit of property affected, type of activity (e.g. harvest, fertilization), personal time expended

(including spouse), hired labor time, and costs/expenses. Consider developing a line entry system where you describe each activity that has occurred. Also consider attaching a more detailed written summary of each activity to the permanent records. The written description can be as detailed or general as you desire. It is much easier to glean from an over-detailed account than to try to fill in missing data later.

One rather efficient and comprehensive method of record keeping for personal activities is also very simple to maintain. Create a file folder with a tablet of paper attached to one cover and contour maps of the property attached to the other. Take the folder to the property whenever you work on the site. Record the date, times of arrival and departure, and a brief description of actions taken—such as cleaning out a culvert, looking for beetle attack, checking on possible trespass. Complete a detailed log for recording labor expenses and other necessary information while still on the site. When used regularly, this set of records is sufficient to demonstrate your active involvement.

In many cases, a forestland owner can keep and maintain records for a parcel of land with an annual investment of less than 10 hours, including auditing and verification. Other parcels might need the advice and input of either a certified public accountant (CPA), a consulting forester, or both. In many instances, the professional advice of the CPA and consulting forester is worth more than the fees they charge.

Are You Paying Too Much in Taxes?

Forestland investments have always been unique. Like most investments, the value of the asset increases over time but, unlike the case with most investments, the change in value comes both from changes in the timber market and changes in growth. Special tax treatment has existed for forestland investments at the federal and state levels for some time. Significant tax advantages accrue to taxpayers who purchase, hold, and sell timber. Taxpayers can treat the proceeds from a timber sale as ordinary income or as capital gain income. *The benefits of capital gain income are significantly greater than those of ordinary income.*

How To Qualify

With all of the advantages to capital gain income, you may want to make certain that your actions qualify your timber harvest as a capital asset. The IRS considers three items when determining the treatment for capital gains: 1) your purpose for holding the timber, 2) the length of time you held the timber before a sale or disposition, and 3) the method used to sell your timber.

The first set of criteria relate to your purpose for holding the timber. You can qualify for long-term capital gains if your timber is held 1) as a capital asset (if it is not used in a trade or business, or held for sale to customers in the ordinary course of business), 2) for use in a trade or business, or 3) primarily for sale to customers in the ordinary course of a trade or business. These criteria relate to your level of activity as active trade or business, passive trade or business, and investment.

The second requirement involves the length of time you hold the timber before sale or disposition.

Another item involves how the timber is disposed of or sold. The IRS recognizes three methods of selling timber. The first is a lump-sum sale or exchange: the amount the seller receives is established before harvest begins, and it is not based on how much is actually removed. This form of a timber sale is allowed only for owners who hold their forestland as an investment; it is not available for owners who hold their timber as a trade or business. The second form of timber harvest is called a 631(a) harvest: the landowner cuts his or her own timber, or hires loggers to do it, and then sells the logs to area mills. The third form of a timber sale is a 631(b) harvest: the seller sells the timber for a predetermined price, where the amount the seller receives from the timber sale is based on the amount of timber actually cut during the harvest. The timber not cut belongs to the seller, not the buyer.

The Mechanics of Financial Management

When you purchase your property you need to develop some records about the value of your new investments. These records will help you reduce your income tax charges when timber or land is disposed of or sold. First, make a list of the costs of acquisition, including purchase price, timber cruises, legal land surveys, attorney fees, and other similar expenses (Table 2).

Table 2. For Recording Expenses When You Acquire Forestland

BLANK FORMAT

Expense	Cost ($)
Cost of Land & Timber	
Consulting Forester Fees	
Professional Land Survey	
Title Search & Insurance	
Attorney Fees	
TOTAL	

EXAMPLE FORMAT

Expense	Cost ($)
Cost of Land & Timber	225,000
Consulting Forester Fees	640
Professional Land Survey	1,000
Title Search & Insurance	250
Attorney Fees	500
TOTAL	$227,390

Next, you need to determine the volume of timber that could have been cut and sold from the property on the date of acquisition, including an appraisal of its value in terms of stumpage (what you would receive after logging, hauling, and other expenses have been deducted). Base this value on the total volume of timber on the site at the time of acquisition. You also need to determine the value of the property's bare land at the time of acquisition. These values are necessary to determine your original basis. The original basis will be the amount that you invested in each type of investment on your property, including bare land, timber, depreciable property, and equipment. When you sell or dispose of any of these assets, you will be allowed to deduct the amounts, in the different accounts, from the proceeds to reduce your income taxes owed (Table 3).

Table 3. Accounts to Create After You Acquire Forestland

BLANK FORMAT

Capital Account	Fair Market Value ($)	Percent of Total
Land		
Depreciable Property		
Timber		
Equipment		
TOTAL		

EXAMPLE FORMAT

Capital Account	Fair Market Value ($)	Percent of Total
Land	60,000	26.7
Depreciable property	———	———
Timber	165,000	73.3
Equipment	———	———
TOTAL	$ 225,000	100

Using the data collected above, you can now determine the original basis for each asset you have acquired. In our example, the property was purchased for $225,000, but when the costs of acquiring the property were added in, the property really cost the new owner $227,390. Since the land portion of the cost accounted for 26.7 percent of the fair market value of the property, we will assign 26.7 percent of the total cost, or $60,713, to the original basis of the land account (Table 4). In our example we would do the same for the timber account. The original basis might exist on the books for only one day. You will maintain an “adjusted basis” as you add expenses to your accounts, or deduct costs as the assets are used up in the production of income.

Table 4. Assignment of the Original Basis to Each Account

BLANK FORMAT

Capital Account	Fair Market Value ($)	Percent of Total	Original Basis ($)
Land			
Dep. Property			
Timber			
Equipment			
TOTAL			

EXAMPLE FORMAT

Capital Account	Fair Market Value ($)	Percent of Total	Original Basis ($)
Land	60,000	26.7	60,713
Dep. Property	———	———	———
Timber	165,000	73.3	166,677
Equipment	———	———	———
TOTAL	$ 225,000	100	$ 227,390

A Timber Sale Example

This original basis information will be very valuable for you when you decide to harvest timber or sell your land. For example, let us assume that you harvest timber at some point in the future, after the minimum time holding requirements have been met for long-term capital gain treatment. First, we will assume that you are completing a section 631(b) harvest, where the purchaser of your timber completes all of the logging and hauling of the timber products.

Determine the total volume of the timber on your property just before harvesting begins. The exact total volume of timber on the property will determine your depletion unit. A depletion unit is a term used to describe how much of your original basis can be used to offset the income from your current timber sale. The total volume of your forest is divided into the total adjusted basis, giving you your depletion unit (Table 5). In our example, let us assume that the total volume of the timber on the property was 1,960 MBF. Because our original basis has not changed, it will equal our adjusted basis at $166,677. Divide this amount by the total volume on the property to get an $85.04 depletion unit. This means that if we harvested 200 MBF from the property, our depletion unit would be $17,000 (200 MBF x $85/MBF). Use the depletion allowance to reduce the gross gain from your timber sale by the amount of $17,000, in this example.

Table 5. Calculation of Depletion Units Before a Timber Sale

BLANK FORMAT

Capital Account	Acres or Volume	Adjusted Basis ($)	Depletion Units
Land			
Dep. Property			
Timber			
Equipment			

EXAMPLE FORMAT

Capital Account	Acres or Volume	Adjusted Basis ($)	Depletion Units
Land	120 acres	60,713	505.94
Dep. Property	———	———	———
Timber	1,960 MBF	166,677	85.04
Equipment	———	———	———

After the timber sale is completed, and all of the depletion deductions have been calculated, you need to adjust your basis. In our example the adjusted timber basis was $166,677. If we deducted $17,000 of it for the timber sale, in the form of a timber depletion, then we would need to reduce the adjusted basis figure by $17,000. Our new adjusted basis would be $149,677.

Estate Planning

The following material will acquaint you with some of the aspects of estate planning. It is not legal advice. Estate planners and attorneys are qualified to provide the specifics for carrying out your wishes for the disposition of your property. Just as with income taxes, estate planning for timber assets requires special consideration.

What will become of your forestland after you die? Many forestland owners want to pass the fruits of their stewardship on to future generations. Others may want to capitalize on their forestland investment. Disposition of your forest property can take several different routes.

You may elect to sell the property for retirement income or to create a cash estate for your heirs. In community property states such as Idaho and Washington, your spouse may already hold half the assets you acquired in common. You may want to will your estate to your spouse, children, or other family members. You may elect to gift a portion of your property to heirs before you die.

Several options exist for keeping the property in the family. All have both advantages and disadvantages. A common way to pass on property is to will it to your heirs in undivided shares. However, this can have disadvantages such as liability considerations, as well as the complications of passing the property on to the generation following your heirs. The property can be divided and willed to heirs by individual parcel. However, this method tends to fragment the property due to differing goals of individual heirs.

To keep the property in one piece and to aid in passing it onto successive generations, you can establish the property as a corporation or company and then will, or gift, shares of that corporation or company to your heirs. Four common types of multiple-party ownership are partnership, Subchapter S corporation, “C” corporation, and limited liability company. A partnership is relatively simple to establish. However, it provides little liability protection to the individuals involved. Incorporation is more complicated, but may have advantages over a partnership. With a corporation, shares, rather than physical assets, exchange hands. This simplifies transfer of ownership.

The two most common types of incorporation are Subchapter S and the “C” corporation. With a Subchapter S corporation, profits are taxed on individual shareholder returns. Profit is usually not taxed at the corporation level. A disadvantage of Subchapter S is that it severely limits those who can hold stock. Taxation rules for “C” corporation can result in taxation at both the corporate level, and at the personal income level for the shareholders. If the heirs decide to sell the property, they may have to pay taxes on the increased value of the property at both corporate and personal income levels. However, rules of stock holding are less restrictive for “C” corporations. Two classes of stock can be established to distinguish between stockholders actively engaged in managing the property and nonparticipatory stockholders.

The “limited liability company” (LLC) is yet another way to set up multiple ownership of forest property. How well an LLC works for the shareholders depends on how well the company is set up. It is important to use advisors who have expertise in LLC law when setting up such a company. An LLC can have substantial tax advantages, as well as management and stockholder options not possible with other types of organization.

You may also want to transfer title to a government or private-nonprofit land management organization to insure that your property will remain in forest cover. When you pass a title in this manner, you may want to retain certain rights, such as access or a residence on the property, for yourself or your successors. Another alternative is to keep the property in the family, but sell or gift a conservation easement to the county, state, or nonprofit organization for a certain length of time. Such an arrangement can result in property tax savings.

It is important to recognize that your forest property is part of your whole estate and should be considered as part of that whole. For instance, to minimize the burden to heirs, it may be prudent to dedicate a portion of your life insurance to cover the costs of settling your estate.

The above material is certainly not meant to be a comprehensive discussion of all the facets of estate planning. Estate planning can have significant impacts on what happens to your property after you die. The subject is very complex. It is important that you secure competent legal and financial counsel to set up an estate plan.

NOTES

ESTATE PLANNING CHECKLIST*

_____ Know requirements for cash in event of spouse's death.

_____ Know federal and state death taxes, debts, and other costs payable at that time.

_____ Have plans to meet financial needs in event of spouse's death.

_____ Have set objectives for estate plan. Discuss plan for continued management of forestland with spouse.

_____ Have complete and up-to-date wills for both self and spouse.

_____ Understand reason for probate and how it functions.

_____ Understand how to use trusts as an estate planning tool to save taxes, reduce probate costs, and manage assets.

_____ Understand how to use marital deduction for federal estate tax savings.

_____ Aware of tax savings from using gift provision of tax law.

_____ Understand importance of life insurance in estate planning.

_____ Know spouse's life insurance policy and how to shelter from federal estate tax.

_____ Understand ways to hold forest property in estate, and the advantages and disadvantages of doing so.

_____ Know family income that will come from retirement plans, social security, annuities, and other sources.

_____ Self and spouse know how to contact attorney, banking office, and life insurance agent. Know where important documents are stored.

_____ Know that the stewardship ethic passed on to heirs is as valuable as the actual property.

* Adapted from Harry L. Haney, Jr. and William C. Siegel. *Estate Planning for Forest Landowners.* USDA Forest Service, GTR S097 (1993).

Ten-Year Activity Plan

Activities to be Conducted in the Next 3 Years:

Management Activity	Unit	Priority	Comments

CONTINUES ON NEXT PAGE

Ten-Year Activity Plan

Activities to be Conducted in the Next 4–7 Years:

Management Activity	Unit	Priority	Comments

CONTINUES ON NEXT PAGE

Ten-Year Activity Plan

Activities to be Conducted in the Next 7–10 Years:

Management Activity	Unit	Priority	Comments

FOREST STEWARDSHIP PLAN SIGNATURE PAGE

Signature *Date*

Print Name

Title

Agency/Company

Address

( )

Phone

Plan Preparer is:

- ❏ Private Natural Resource Professional
- ❏ Agency Representative
- ❏ Landowner who completed a coached stewardship planning course
- ❏ Landowner who is a natural resource professional

List other professionals and their affiliations who contributed to this plan. If this was a Coached Plan, list the natural resource professionals who served as coaches.

LANDOWNER SIGNATURE: The contents of this plan are acceptable to me/us. I/We intend to manage this property in a manner consistent with the objectives of the Forest Stewardship Program and to implement this plan to the best of my/our ability.

Landowner Signature(s) *Date*

Print Landowner Name(s)

APPROVAL SIGNATURE: I have reviewed this plan and approve it as meeting the standards for a Forest Stewardship Plan.

Signature of Designated Service Representative *Date*

Print Name of Designated Service Representative

Title *Agency*

Address

( )

Phone

GLOSSARY

aggregated green tree retention: A “new forestry” silvicultural practice where standing live green trees are retained in a group or aggregate. These trees are retained to provide biological and stand structure diversity over time. The retained trees are aggregated to provide cover for wildlife.

all-aged stand: A forest stand which supports trees of all ages and usually all sizes. This stand type is rare.

AUM (Animal-Unit Month): The amount of forage a 1,000-lb. animal will eat in one month.

bumper tree: Trees left standing during harvest to minimize damage to residual trees. These are removed after harvest is complete.

canopy: The tree crowns in a stand.

clearcut harvest: A harvest and regeneration technique which removes all the trees (regardless of size) on an area in one operation. Commonly used with shade-intolerant species such as Douglas-fir or lodgepole pine, where they require full sunlight to reproduce and grow well. Clearcutting produces an even-aged stand.

co-dominant species: Trees whose crowns form the general level of the stand, receiving full light from above, but comparatively little from the sides.

crown: The branches and foliage of a tree.

dispersed green tree retention: Similar to Aggregated Green Tree Retention except that the reserved trees are uniformly dispersed within the stand.

dominant species: Trees with crowns above the general level of the canopy.

equipment limitations: Limits are usually based on equipment operation that is both safe and economical. Factors to consider include: timber size, production requirements, costs, silviculture system employed, topographic conditions, soil stability and compaction potential, and site disturbance.

even-aged stand: A stand in which trees are essentially the same age (within 10 to 20 years).

habitat type: A physical area of the forest that possesses similar environmental conditions. This ecological land classification recognizes the climax tree species and the dominant understory vegetation as the primary characteristics. This classification is commonly used in dryer forest ecosystems of the Pacific Northwest.

hiding cover: Vegetation used by wildlife for protection from predators.

leave trees: Trees left standing by design after a harvest or thinning.

mistletoe brooms: A parasitic plant which occurs on trees, causing growth reduction and deformities.

pruning: Removing live or dead branches from standing trees to improve wood quality.

riparian buffer strip: A protective strip of land or unharvested timber adjacent to a stream.

riparian zone: That area adjacent to, or on the bank of, rivers and streams. Identified by vegetation, wildlife, and other characteristics unique to these locations.

seed-tree harvest: Removing nearly all trees from the harvest area at one time, but leaving a few scattered trees to provide seed for a new forest stand. Usually 5 to 10 trees/acre are retained. These are removed later, after sufficient regeneration is established.

selection harvest: Harvesting individual trees or small groups of trees at periodic intervals (usually 8 to 15 years) based primarily on their vigor and age. Selection harvesting perpetuates an uneven-aged stand.

shelterwood harvest: Harvesting trees in a series of two or more operations. New seedlings grow and become established in the partial shade and protection of older trees. Harvests are usually 5 to 10 years apart, yielding an even-aged stand.

silviculture: The art, science and practice of establishing, tending and reproducing forest stands with desired characteristics, based on knowledge of species characteristics and environmental requirements.

site index: An expression of forest site quality based on the height of the dominant and co-dominant trees in the stand at a specified age, usually 50 or 100 years.

site preparation: Preparing an area of land for forest establishment. Methods used may include clearing, chemical vegetation control or burning.

skid trail: A road or trail over which horses or equipment drag logs from the stump to the landing.

slash: Nonmerchantable residue left on the ground after logging, thinning or other operations. This residue includes tree tops, branches, defective logs or bark.

snags: Standing dead and dying trees.

talus: Rock fragments of any size or shape derived from, and lying at the base of, a cliff or steep slope.

thermal cover: Vegetation used by wildlife to provide protection from extreme weather conditions.

thinning: Tree removal in a forest stand that reduces tree density and tree-to-tree competition. Thinning encourages increased growth of fewer, higher quality trees.

travel corridor: A forestland area that is primarily for wildlife habitat. Often these corridors link stands together to provide more diverse wildlife habitats.

uneven-aged stand: A stand which supports trees of several age classes (technically, more than two age classes).

watershed: An area of land that collects and discharges water into a single stream or other outlet.

Wildlife Habitat Conservation Areas (HCA): Those forest areas that are reserved from timber harvest to protect threatened and endangered species.

wolf trees: A low-value tree occupying more space in the forest than its economic value justifies. Usually older, larger or more branchy than other trees in the stand.

Important Addresses and Telephone Numbers

Extension Area Forester:

_____ _____

_____ _____

_____ _____

_____ _____

State Forestry Office:

_____ _____

_____ _____

_____ _____

_____ _____

Consulting Forester:

_____ _____

_____ _____

_____ _____

_____ _____

USDA Natural Resource Conservation Service:

_____ _____

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_____ _____

Other Important Agencies and Organizations:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

For More Information

For a complete list of forestry-related publications available through Extension, or to order an Extension publication, contact:

Extension Publications
Cooper Publications Bldg.
Washington State University
PO Box 645912
Pullman, WA 99164-5912
Phone: (509) 335-2857
Fax: (509) 335-3006
Toll-free: (800) 723-1763
E-mail: bulletin@wsu.edu
http://pubs.wsu.edu

NOTES

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