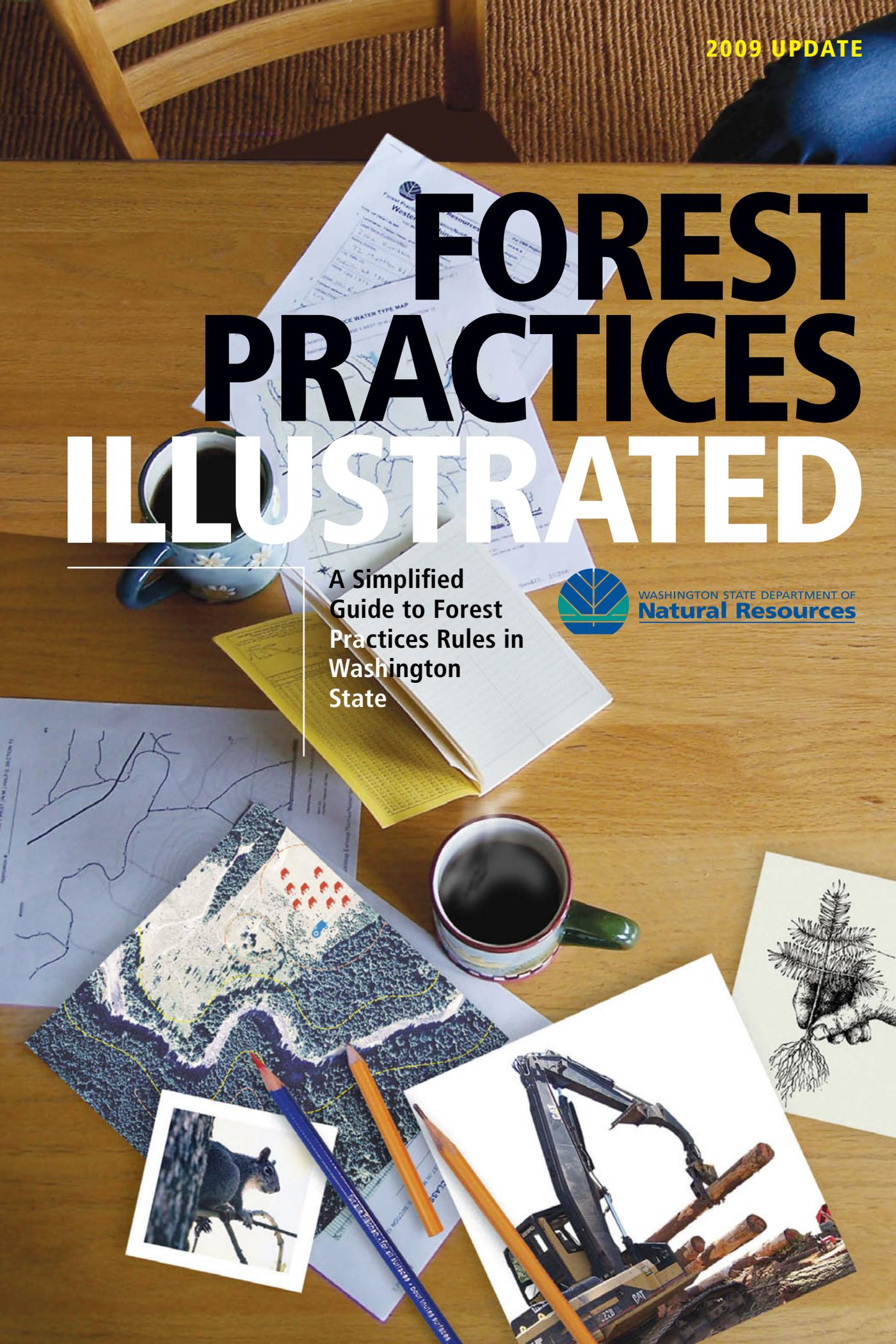


FOREST PRACTICES ILLUSTRATED

A Simplified Guide to Forest Practices Rules in Washington State



WASHINGTON STATE DEPARTMENT OF **Natural Resources**





FOR MORE INFORMATION, CONTACT THE NEAREST DEPARTMENT OF NATURAL RESOURCES REGION IN WHICH YOUR PROPERTY IS LOCATED

Olympia Headquarters

Forest Practices Division
1111 Washington Street SE
PO Box 47012
Olympia, WA 98504-7012
(360) 902-1400
information@dnr.wa.gov

Northeast Region

225 S. Silke Road
PO Box 190
Colville, WA 99114-0190
(509) 684-7474
northeast.region@dnr.wa.gov

Northwest Region

919 N. Township Street
Sedro-Woolley, WA 98284-9384
(360) 856-3500
northwest.region@dnr.wa.gov

Olympic Region

411 Tillicum Lane
Forks, WA 98331-9797
(360) 374-2800
olympic.region@dnr.wa.gov

South Puget Sound Region

950 Farman Avenue North
Enumclaw, WA 98022-9282
(360) 825-1631
southpuget.region@dnr.wa.gov

Pacific Cascade Region

601 Bond Road
PO Box 280
Castle Rock, WA 98611-0280
(360) 577-2025
pacific-cascade.region@dnr.wa.gov

Southeast Region

713 Bowers Road
Ellensburg, WA 98926-9301
(509) 925-8510
southeast.region@dnr.wa.gov



Visit Our Website
www.dnr.wa.gov



Call Us
360-902-1400



Request a Disk
Contact your local region office

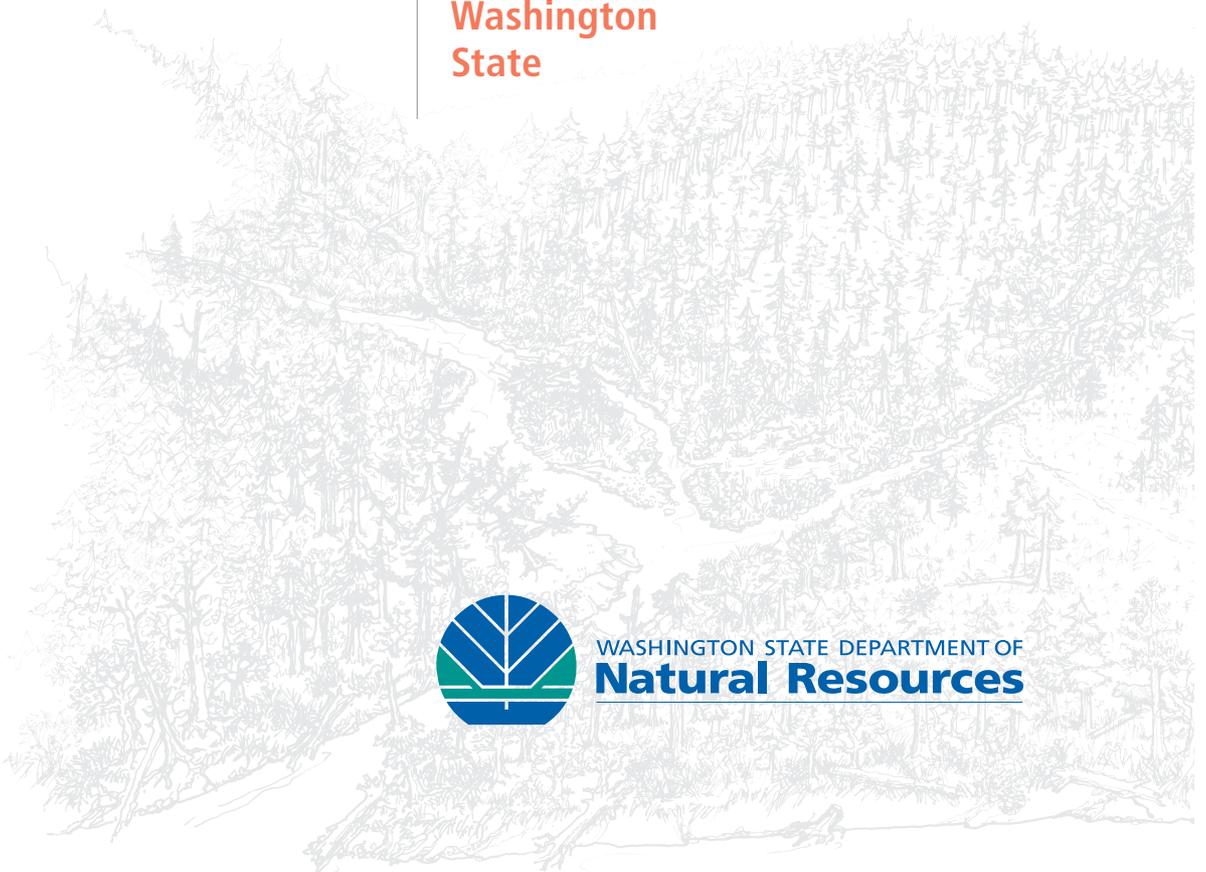


Come In
See Addresses at Left



FOREST PRACTICES ILLUSTRATED

**A Simplified
Guide to Forest
Practices Rules in
Washington
State**



WASHINGTON STATE DEPARTMENT OF
Natural Resources

How to Use This Book

These first few pages contain answers to the most commonly asked questions about the Forest Practices Rules and the application filing, review, and approval process.

The rest of the book is divided into four chapters:

- ▶ Introduction
- ▶ Cultural Resources
- ▶ Forest Roads
- ▶ Timber Harvest

Each chapter has a helpful “Suggestions for Success” section which corresponds to the information, illustrations and photographs in the text.

At the end of the book you’ll find a glossary of terms commonly used in forestry and forest practices. You’ll also find a reference list of sources for additional information and assistance. We hope you will find this book useful in successfully planning and carrying out your forestry operations. We welcome your suggestions for improving this book. Comments about this publication should be addressed to:

Washington State Department of Natural Resources
Forest Practices Division
PO Box 47012
Olympia, WA 98504-7012
(360) 902-1400

Additional copies of this publication are available through DNR region offices, and on the Department of Natural Resources internet website on the Forest Practices program webpage: <http://www.dnr.wa.gov/BusinessPermits/ForestPractices/> and on CD, available upon request at region offices.

SYMBOLS FOUND THROUGHOUT THE BOOK



Forest Practices Application/Notification



Forest Practices Application Activity Map



Forest Practices Board Manual



Forest Practices Rules



Avoid/Do Not Symbol

Disclaimer: The State of Washington’s Department of Natural Resources (DNR) makes no warranty that the thoughts and ideas expressed here are adequate for the reader’s purposes in general or for the reader’s compliance with local, state or federal laws concerning forest practices. The thoughts and ideas in this publication are intended as forest practices assistance. This book is not meant to interpret the Act or rules or make enforceable those suggestions which exceed legal requirements. Further, DNR makes no express or implied warranty concerning the thoughts and ideas expressed herein. Any use of trade, product or business name is for descriptive purposes only and does not imply endorsement by the State of Washington or DNR.

To reproduce or copy any portion of this publication please notify the Department of Natural Resources, Forest Practices Division. Please acknowledge this publication as a source in your materials.

© 2007 Washington State
Department of Natural Resources
Forest Practices Division



Contents

- 7** LETTER FROM THE COMMISSIONER OF PUBLIC LANDS
- 9** INTRODUCTION
- 10** FREQUENTLY ASKED QUESTIONS
- 16** WATERSHEDS AND FOREST PRACTICES
- 18** FOREST PRACTICES HABITAT CONSERVATION PLAN

20

Cultural Resources

Protecting cultural resources helps preserve human traditions, culture, and history. This chapter explains what they are, offers general guidance to state laws, and answers common questions.

28

Forest Roads

Proper planning is required to protect resources when constructing and maintaining new and existing roads. This chapter presents information regarding new and existing roads, landings, road maintenance, and stream crossings.

50

Timber Harvest

Thoughtful planning is required to protect resources when harvesting timber. This chapter touches on riparian and wetland management, threatened and endangered species, reforestation, forest chemicals, and harvest systems.

- 130** RESOURCES
- 139** ACRONYMS
- 140** GLOSSARY
- 151** ACKNOWLEDGMENTS

Note: This update contains new material in page 67



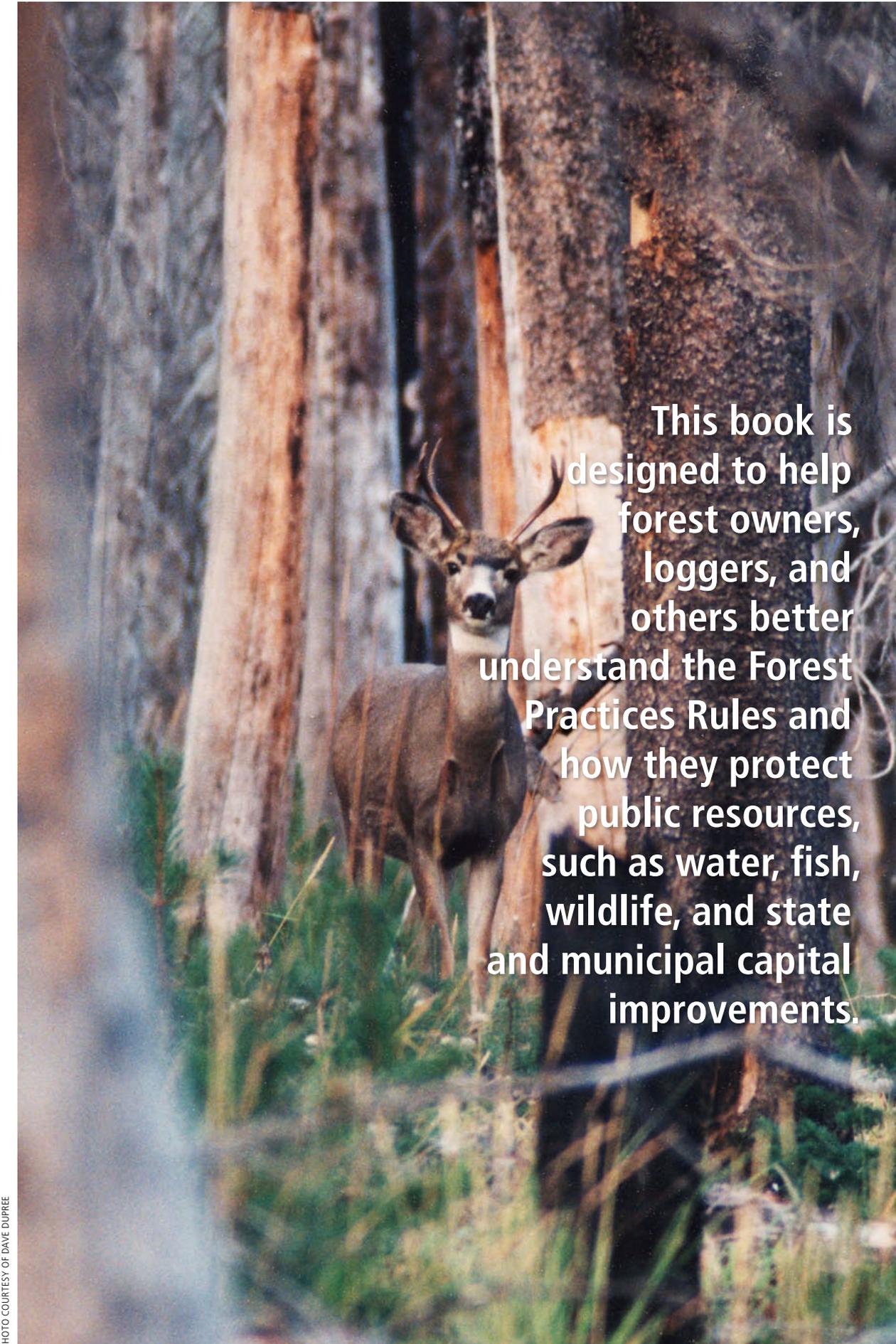


WASHINGTON STATE DEPARTMENT OF
Natural Resources

The Washington State Department of Natural Resources (DNR) produced this publication. The Commissioner of Public Lands, a statewide elected official who chairs the state Forest Practices Board and the state Board of Natural Resources, administers DNR.

The Department:

- ▶ Administers the state Forest Practices Rules and provides forest fire protection, prevention and regulation on more than 12.7 million acres of non-federal, public, and private lands.
 - ▶ Assists non-industrial private forest owners through the Forest Stewardship Program.
 - ▶ Provides urban forestry assistance to municipalities through the Community Forestry Program.
 - ▶ Manages more than 5 million acres of forest, range, agricultural and aquatic (submerged) lands to produce income to support state services and to provide many more public benefits, such as recreation.
 - ▶ Manages nearly 3 million acres of state trust lands to help support public schools, universities and colleges, Capitol buildings, prisons, state institutions, local services in many counties, and the state general fund.
 - ▶ Provides many other public benefits, such as outdoor recreation, fish and wildlife habitat, clean air and water.
- ▶ Protects 12.7 million private and non-federal public forested acres from wildfire with more than 1,200 firefighters and support staff, including 500 permanent DNR employees who have other duties in the agency.
 - ▶ Manages 94,479 acres of conservation lands and 35,361 acres of Natural Area Preserves. Natural Resources Conservation Areas are managed as opportunities for outdoor environmental education and appropriate low-impact use, while protecting outstanding scenic and ecological values. Natural Area Preserves are used for scientific and educational purposes and protect high quality native ecosystems and rare plant and animal species representing Washington's natural heritage.
 - ▶ Provides geologic education, regulation and research that reduces hazards to the public from natural disasters, such as earthquakes and landslides.

A photograph of a deer with small antlers standing in a forest. The deer is the central focus, looking towards the camera. The background consists of several tall, charred tree trunks, suggesting a fire-damaged forest. The ground is covered with green grass and some small plants. The lighting is natural, possibly from the side, creating some shadows on the deer's body.

This book is designed to help forest owners, loggers, and others better understand the Forest Practices Rules and how they protect public resources, such as water, fish, wildlife, and state and municipal capital improvements.



Introduction



Washington's forests provide abundant resource benefits: timber and wood products, fish and wildlife habitat, clean air and water, opportunities for outdoor recreation, and natural beauty. Since 1974, the state has regulated forestry activities on non-federal public and private lands through the Forest Practices Act. This law and its corresponding rules are designed to protect Washington's public resources and maintain a viable forest products industry.

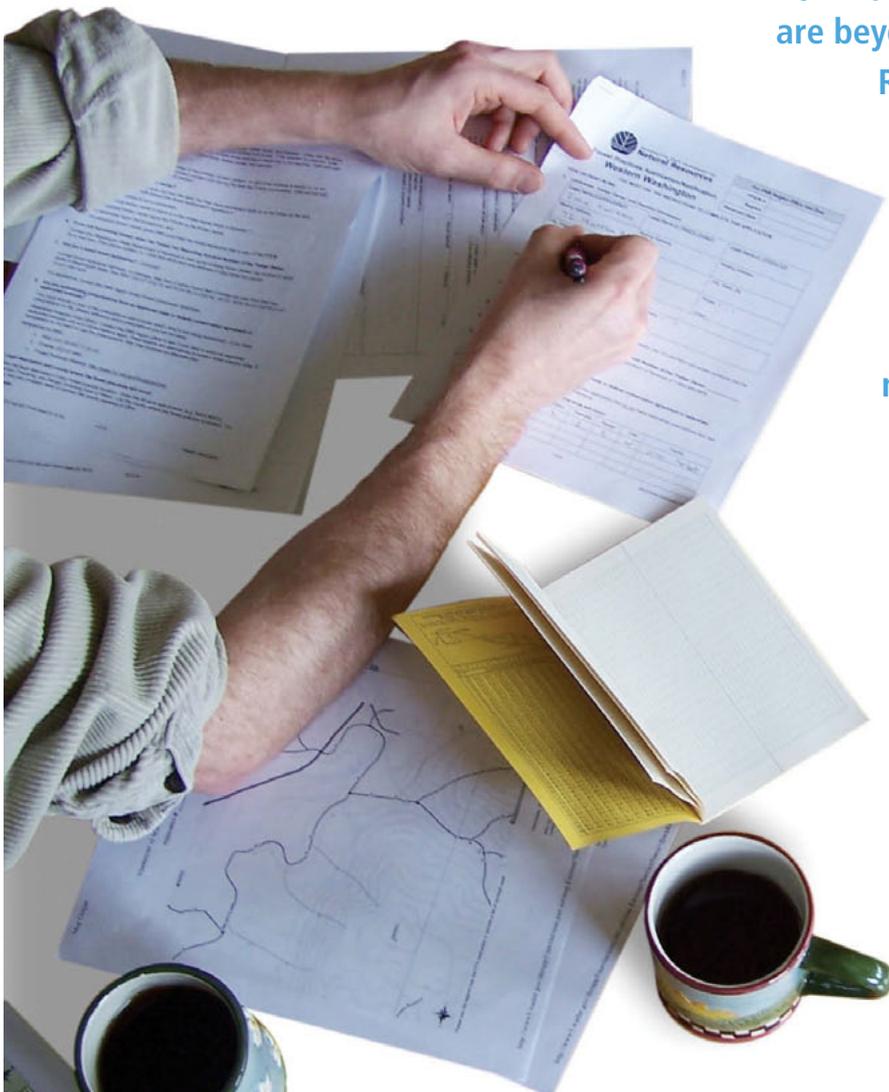
This book is designed to help forest owners, loggers, and others better understand the Forest Practices Rules and how they protect public resources, such as water, fish, wildlife, and state and municipal capital improvements. In it, you'll find commonly encountered rules, with photographs and illustrations that show what these operations look like. Rules that apply only to special or limited circumstances are not included. In addition to information about the rules, this book contains supplemental information to help you plan and conduct your forestry operations to be more successful.

This book is not a substitute for either the Forest Practices Rules or for professional expertise. You must refer to the rule book to know how to comply with the Forest Practices Act and the Forest Practices Rules. If you are not experienced in forestry operations, the professional expertise of a consulting forester can be very helpful, particularly if your activities will include timber harvesting or road construction.

See the Resources section, beginning on page 130, for more information.

Frequently Asked Questions

This book provides many helpful suggestions that are beyond Forest Practices Rules that you might want to consider. This book does not interpret the rules or create additional requirements that you have to abide by in your forest practices activities.





What are forest practices?

Practices related to growing, harvesting, or processing timber, including but not limited to, road construction and maintenance, thinning, salvage, harvesting, reforestation, brush control, and using fertilizers or pesticides. The Washington State Forest Practices Act and its corresponding rules regulate these practices.

What are Forest Practices Rules?

They are rules that protect soils, water, fish, wildlife, and capital improvements (roads, power lines) from impacts related to forest practices on private, county, and state forest land. The Forest Practices Rules were adopted by the Legislature in 1974 and published as Title 222 of the Washington Administrative Code (WAC).

Does the *Forest Practices Illustrated* book cover all of the Forest Practices Rules?

No. This book includes selected Forest Practices Rules that relate to timber harvest, road construction, reforestation and use of pesticides or fertilizer. It is not a substitute for the Forest Practices Act, Rules, or Board Manual. This book is not a guide on how to fill out your Forest Practices Application/Notification (FPA/N), but provides many helpful suggestions that you might want to consider. If you have questions regarding compliance with Forest Practices Rules, refer to the rule book. The Forest Practices Illustrated does not interpret the rules or create additional requirements that you have to abide by in your forest practices activities.

Where possible, additional information has been included that landowners stated would be helpful to them. Contact your regional DNR office for a copy of the Forest Practices Rules, Board Manual and Act, or access them on the DNR Internet Forest Practices webpage at <http://www.dnr.wa.gov/BusinessPermits/ForestPractices/>.

Activities related to growing, harvesting, or processing timber are regulated through the Forest Practices Act and its corresponding rules.

Why do we have Forest Practices Rules?

In 1974, the Washington State Legislature passed the Forest Practices Act, Chapter 76.09 of the Revised Code of Washington (RCW). The purpose of the Act is to protect public resources while maintaining a viable forest products industry.

The Legislature also required the Forest Practices Board to adopt Forest Practices Rules to carry out the objectives of the Forest Practices Act.

Who makes the Forest Practices Rules?

Rules are developed through a political and technical process. This process involves stakeholders such as state agencies, Tribal governments, landowners, environmental groups, and others. The Forest Practices Board adopts the Forest Practices Rules. This board consists of twelve people representing a variety of interests. See RCW 76.09.030

Who enforces the Forest Practices Rules?

The Washington Department of Natural Resources (DNR) regulates forest practices on private and state land.

When do I need to file a Forest Practices Application/Notification (FPA/N)?

Forest practices that may require a FPA/N include: harvesting timber, salvaging standing and down wood, constructing forest roads, installing and replacing stream crossings on forest roads, and applying forest chemicals with an aircraft.

Some counties and cities issue permits for forest practices activities. For a list of counties that have jurisdiction, please visit <http://www.dnr.wa.gov/BusinessPermits/ForestPractices/jurisdiction.pdf> or contact your local DNR region office or county planning department for more information.

Who is responsible for filing the FPA/N?

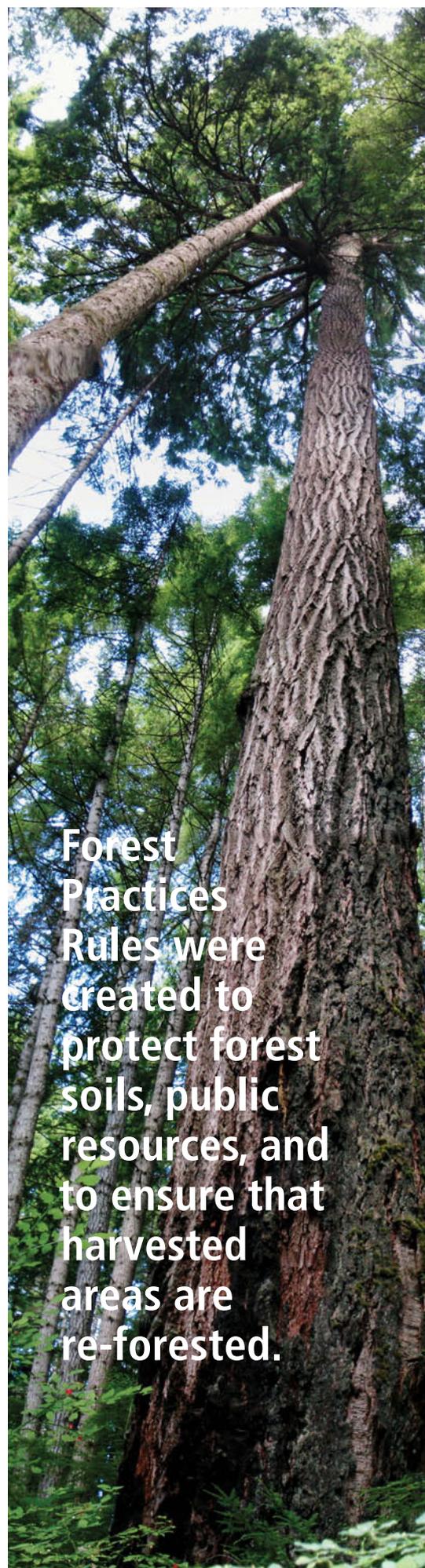
The landowner is responsible, although a landowner representative can file the FPA/N.

Who is responsible for signing the FPA/N?

The landowner, timber owner, and operator must all sign the FPA/N.

Where do I obtain a FPA/N?

On the DNR internet webpage at: <http://www.dnr.wa.gov/BusinessPermits/ForestPractices/> or at the DNR region office which serves the area where your forest land is located. The Forest Practices Application/Notification also has a set of instructions that is beneficial to look through prior to filling out the FPA/N.



Forest Practices Rules were created to protect forest soils, public resources, and to ensure that harvested areas are re-forested.



Are there forestry activities that do not require a FPA/N?

Yes, but Forest Practices Rules must still be followed so that public resources are protected. Some examples of such practices include:

- ▶ Tree planting
- ▶ Seedling protection devices
- ▶ Seeding grasses and forage
- ▶ Hand slashing competing vegetation
- ▶ Cutting less than 5,000 board feet per year (approximately one log truck load) of timber for personal use (i.e., not for sale) when no resource issues exist.

How long will it take for my FPA/N to be processed?

DNR has 30 calendar days to approve, approve with conditions, or deny most FPA/Ns. DNR has more than 30 days to review applications that require Environmental Impact Statements.

The 30 day time period begins the day the Department receives a complete FPA/N.

Do I need to include anything with my FPA/N?

The FPA/N instructions detail how to produce a complete application. These instructions can be found at <http://www.dnr.wa.gov/BusinessPermits/ForestPractices/>. The forest landowner, timber owner, and operator each must sign the FPA/N.

Is the decision to approve my FPA/N dependent upon anything besides the information in my application?

Circumstances requiring special resource protection, such as unstable soils, threatened or endangered species, archaeological or historic sites, water quality protection and special prescriptions for sensitive areas within a watershed analysis unit may affect the application decision.

The FPA/N also serves as an application to the Washington State Department of Fish and Wildlife for a Hydraulic Project Approval (HPA) permit, if necessary.

How long is my FPA/N valid?

The standard is two years; multi-year permits are valid for three to five years. Either may be renewed for an additional two years if the proposal has not changed, there are no outstanding enforcement issues, and the rules and laws affecting the proposal have not changed.

Where do I submit my FPA/N?

Applications are received at the region office and reviewed for completeness. The region office scans complete applications on the DNR Forest Practices Review System (FPARS). Applications are posted on the Internet and are available to interested stakeholders.



If you cut or remove less than **5,000 board feet** of timber for personal use per year during any 12-month period, you are not required to submit a FPA/N.



<http://www.dnr.wa.gov>

Is there a fee for filing a FPA/N?

Fees vary between \$0 and \$500, depending on the activity. The fee is due at the time application. The amount is made payable to “Department of Natural Resources.”

Who reviews my FPA/N?

DNR Forest Practices region staff, the Department of Ecology, Department of Fish and Wildlife, Washington Tribal Governments, local governments (cities and counties), and other interested parties.

What is the appeal process for the application?

Appeals must be received by the Forest Practices Appeals Board within 30 days of the approval or denial of the application. For more information on appeals, visit the Environmental Hearings Office web address: <http://www.eho.wa.gov/>.

What is the Timber, Fish and Wildlife Agreement (TFW) and how does it affect my application?

In 1987, several public agencies, environmental organizations, Tribes, and timber landowners forged the TFW agreement as a positive alternative to confrontations between groups and potential lawsuits related to forestry issues. The goal of TFW is to protect public resources while maintaining a viable timber industry. Agencies and organizations participating in the TFW process may review and comment on FPA/Ns.

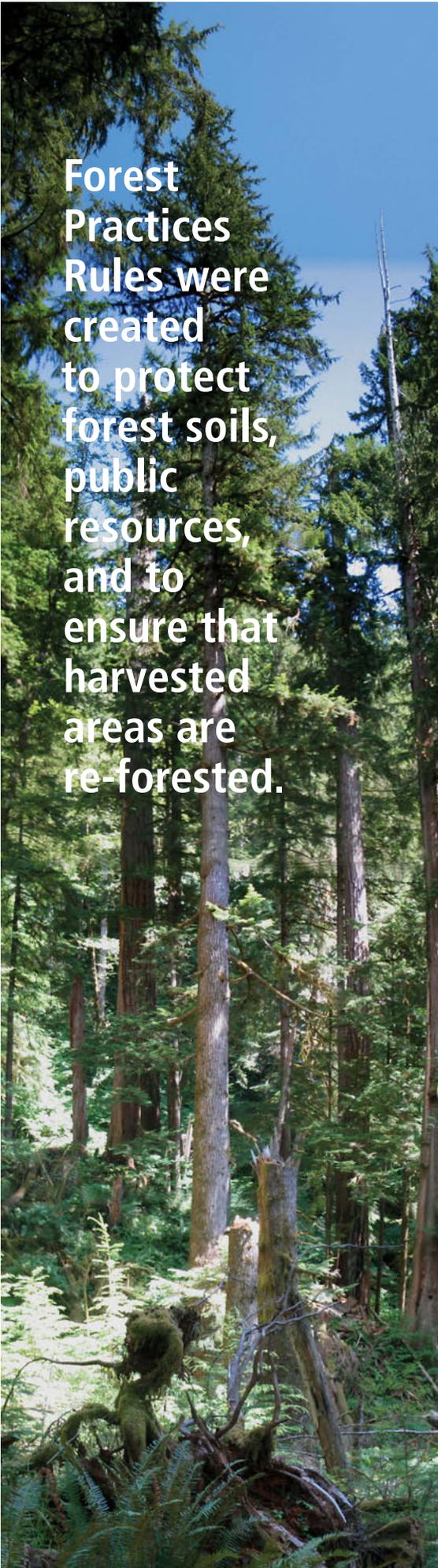
What is SEPA and how does it affect my FPA/N?

The State Environmental Policy Act (SEPA) is the process for public review of your proposed operation. It requires that projects be evaluated for their impacts to the environment. An environmental checklist is required for property that was platted, for conversions, and for operations that may have potentially significant impacts on the environment.

Are there circumstances requiring special resource protection that may affect my FPA/N?

In some cases, the following may affect the approval of your application and the activities that you may conduct:

- ▶ Unstable soils
- ▶ Threatened or endangered species
- ▶ Cultural, archaeological, or historic sites
- ▶ Special prescriptions for sensitive areas within a Watershed Analysis Unit
- ▶ Water quality protection



Forest Practices Rules were created to protect forest soils, public resources, and to ensure that harvested areas are re-forested.



When do I need a Hydraulics Project Approval (HPA) in addition to my FPA/N?

Whenever your FPA/N includes work in or over bankfull width of Type S or F streams. An HPA may also be needed for Type Np or Ns streams within 1/4 mile above Type S or F streams. Typed streams are those with defined channels, ponds, lakes, and wetlands where flowing water is present at some time of the year. The FPA/N serves as the application for a HPA.

What happens if my land is in a DNR Watershed Administrative Unit?

Contact your local DNR region office to verify whether your land is within a completed Watershed Analysis Unit and if prescriptions apply. Prescriptions are alternatives to certain Forest Practices Rules. If landowners do not want to use the prescriptions, they may propose an Alternate Plan.

What if I plan to convert forest land to a non-forestry use?

Some counties and cities issue permits for activities that convert forest land to other uses. For a list of counties that have jurisdiction, please visit <http://www.dnr.wa.gov/BusinessPermits/ForestPractices/jurisdiction.pdf> or contact your local DNR region office or county planning department for more information.

If there is a violation, who is responsible?

The landowner, timber owner, and/or the operator.

Are there other regulations and requirements which apply to forestry operations?

Yes. See the Resources section on page 130. Also refer to chapter 222-50 WAC in the Forest Practices Rules.

Where can I get information and assistance?

Your local DNR region office staff is available to answer questions about the Forest Practices Application/Notification (FPA/N) or about the Forest Practices Rules. See the Resources section on page 130.

DNR's Application/Notification Fees

(RCW 76.09.065)

\$0.00 Does not include timber harvest, but other activities that require an application:

- ▶ Road construction
- ▶ Applying chemicals
- ▶ Opening or expanding a rock pit

\$500.00 Timber harvest on forest land in the following circumstances:

- ▶ Conversion to a use incompatible with forestry
- ▶ On forest land* that is located inside the urban growth boundary (includes city limits)

***EXCEPT** the fee is **\$50.00** if the landowner can prove they will not convert by providing one of the following with the forest practices application:

- ▶ Letter signed by the landowner that states the landowner will not convert to a non-commercial forestry use for 10 years AND a DNR approved written forest management plan.
- ▶ Conversion Option Harvest Plan approved and signed by the county or city

\$50.00 For all other applications that involve timber harvest.

Watersheds and Forest Practices

This illustration represents forest practice activities in Eastern and Western Washington. If you look carefully, you can see the potential effects of these activities on the landscape. Many forest practice activities can affect the quality and quantity of water flowing through a watershed. A watershed is the area that catches snow and rain, which then drains or seeps into wetlands, lakes, streams, and groundwater.

Forest practices regulations are designed to protect natural resources. While these rules may seem complicated to the individual, when looked at in the bigger picture, it is clear the rules help provide greater public benefits.

To protect healthy watersheds, forest activities should be conducted in ways that maintain natural processes.

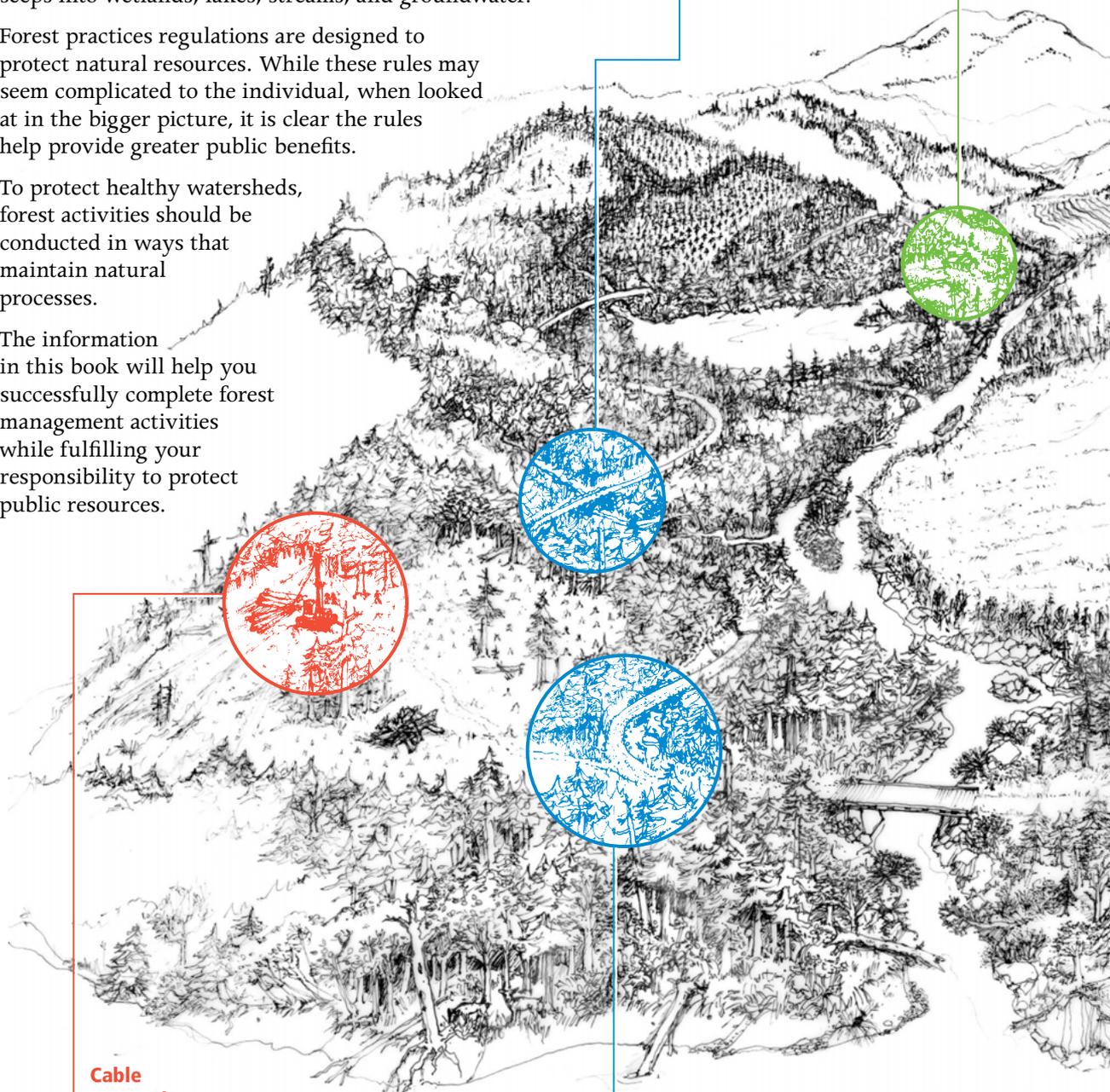
The information in this book will help you successfully complete forest management activities while fulfilling your responsibility to protect public resources.

Cultural Resources
See page 20

Stream Crossings
See page 40

Cable Harvesting Systems
See page 102

Forest Roads
See page 28



In the context of the bigger picture it is clear that the rules help provide greater public benefits.

Wetland Management Zone (WMZ)
See page 85

Riparian Management Zone (RMZ)
See page 58

Ground Based Harvesting Systems
See page 102

Threatened and Endangered Species
See page 100



Forest Practices Habitat Conservation Plan (HCP)

The Department of Natural Resources (DNR), on behalf of the State of Washington, developed the Forest Practices Habitat Conservation Plan (HCP) in response to the federal listing of certain threatened and endangered fish species. The Forest Practices HCP describes how those listed fish species would be protected. The purpose of the Forest Practices HCP is to ensure that landowners who conduct forest practices activities in compliance with the Forest Practices Act and Rules will also be following the requirements of the Federal Endangered Species Act for those species. The approved Forest Practices HCP demonstrates that state and federal laws can work together to achieve public resource protection while allowing landowners to manage their forest land effectively.

On June 5, 2006, the NOAA Fisheries Service and the U.S. Fish and Wildlife Service issued the State of Washington incidental take permits for listed aquatic species, based on the protective measures described in the Forest Practices HCP. The permits are in effect for fifty years. Landowners will now be able to plan and operate in a more stable and predictable regulatory environment. This may provide some incentive for landowners to keep forest land in forestry instead of converting it to other uses that might be less desirable for salmon recovery. Having the approved Forest Practices HCP and the incidental take permits will help protect the state and landowners, operating in compliance with the Forest Practices Rules, from Endangered Species Act lawsuits.

In addition, the State of Washington will be able to compete for funding for programs that provide landowners with technical assistance incentives, such as the Forestry Riparian Easement Program and Family Forest Fish Passage Program. Having the approved Forest Practices HCP and broad support from stakeholders helps the state obtain additional funding to support these programs, as well as DNR's Adaptive Management Research and Monitoring program.

DNR also is working with the U.S. Environmental Protection Agency and the Washington State Department of Ecology to ensure that the Forest Practices Rules meet the goals and standards of the state Water Pollution Control Act and the Federal Clean Water Act.

The plan was developed in response to the federal listing of certain threatened and endangered fish species. It describes how those listed fish species would be protected.

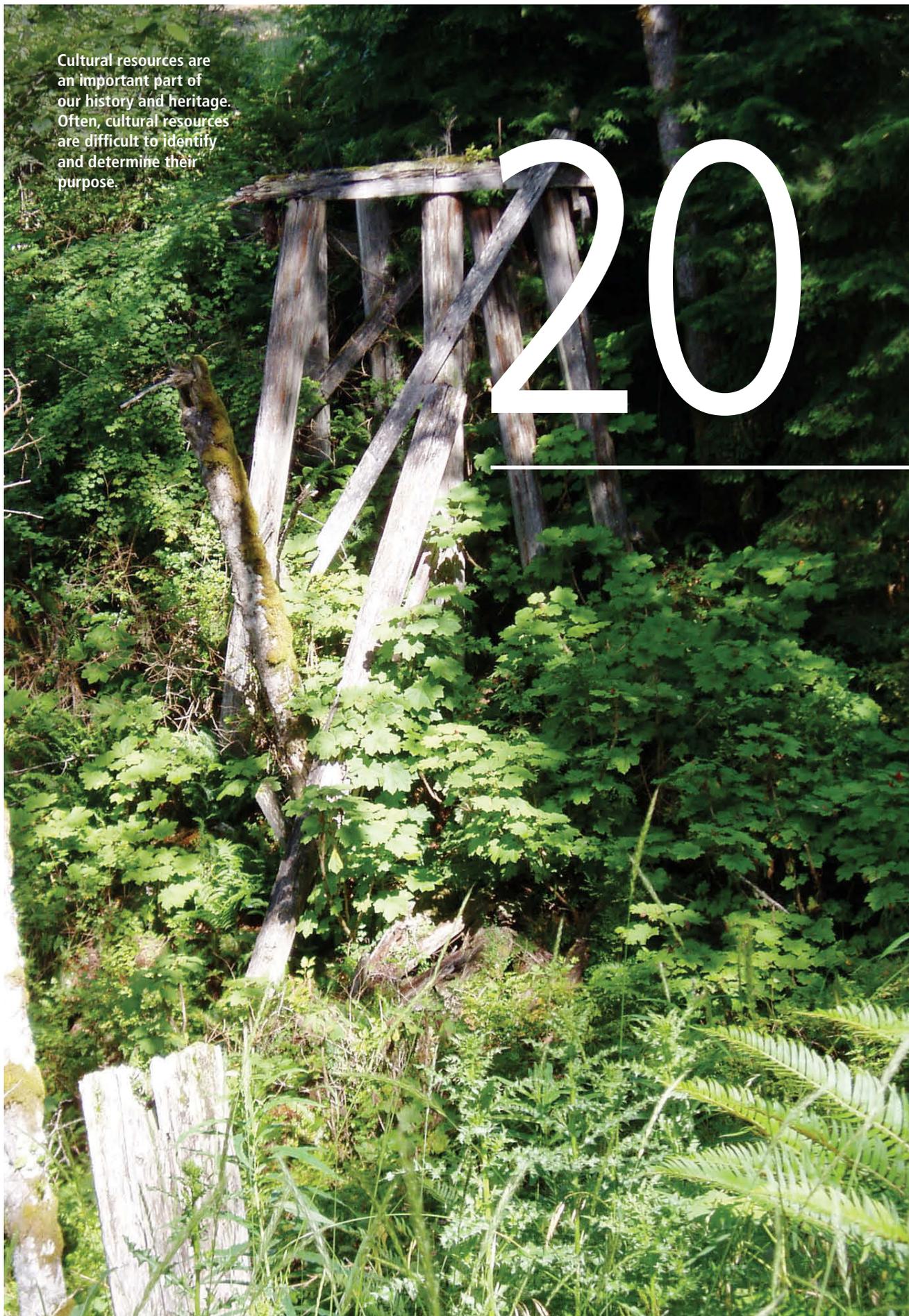




The approved Forest Practices HCP demonstrates that state and federal laws can work together to achieve public resource protection while allowing landowners to manage their forest land effectively.

Cultural resources are an important part of our history and heritage. Often, cultural resources are difficult to identify and determine their purpose.

20





Cultural Resources

Cultural resources help define human history, remind us of our interdependence with the land, and show how cultures change over time. Cultural resources are in locations where people lived every day life, leaving structures and objects as evidence of how they lived, where important events occurred, and where traditional, religious, ceremonial, and social activities took place. Protecting cultural resources preserves human tradition, culture, and history.

- 22** PROTECTING CULTURAL RESOURCES
- 23** HOW DO I KNOW IF IT'S A CULTURAL RESOURCE?
- 24** EXAMPLES OF CULTURAL RESOURCES
- 26** FREQUENTLY ASKED QUESTIONS



APPLICABLE FOREST PRACTICES RULES

WAC 222-16-010 Cultural Resources and Historic Sites Definitions
WAC 222-16-050 Classes of Forest Practices, and
WAC 222-20-120 Notification to Affected Indian Tribes

Protecting Cultural Resources

The Forest Practices Rules' definition of cultural resources includes archaeological sites and objects; historic sites and objects; as well as traditional sites and objects used by Native Americans. Archaeological sites contain artifacts of prehistoric, indigenous human activity as well as historic human activity. Washington State law defines and provides for protection of archaeological sites and resources on all non-federal lands.

Cultural resources can be found in all counties of the state, both above and below ground and at water level. Therefore, when planning and conducting your forest practices activity such as road building or creating landings, look for physical evidence that may indicate a past use of the area. Some sites date back thousands of years and might not be visible to the unknowing eye.

If cultural resources are found on or adjacent to the area where your forest practices activities are taking place, it does not necessarily mean that you cannot harvest or build roads. Decisions are based upon what the cultural resource is and its location in relationship to your forest practices activity, and whether your activity will disturb the cultural resource.

CULTURALLY MODIFIED TREE

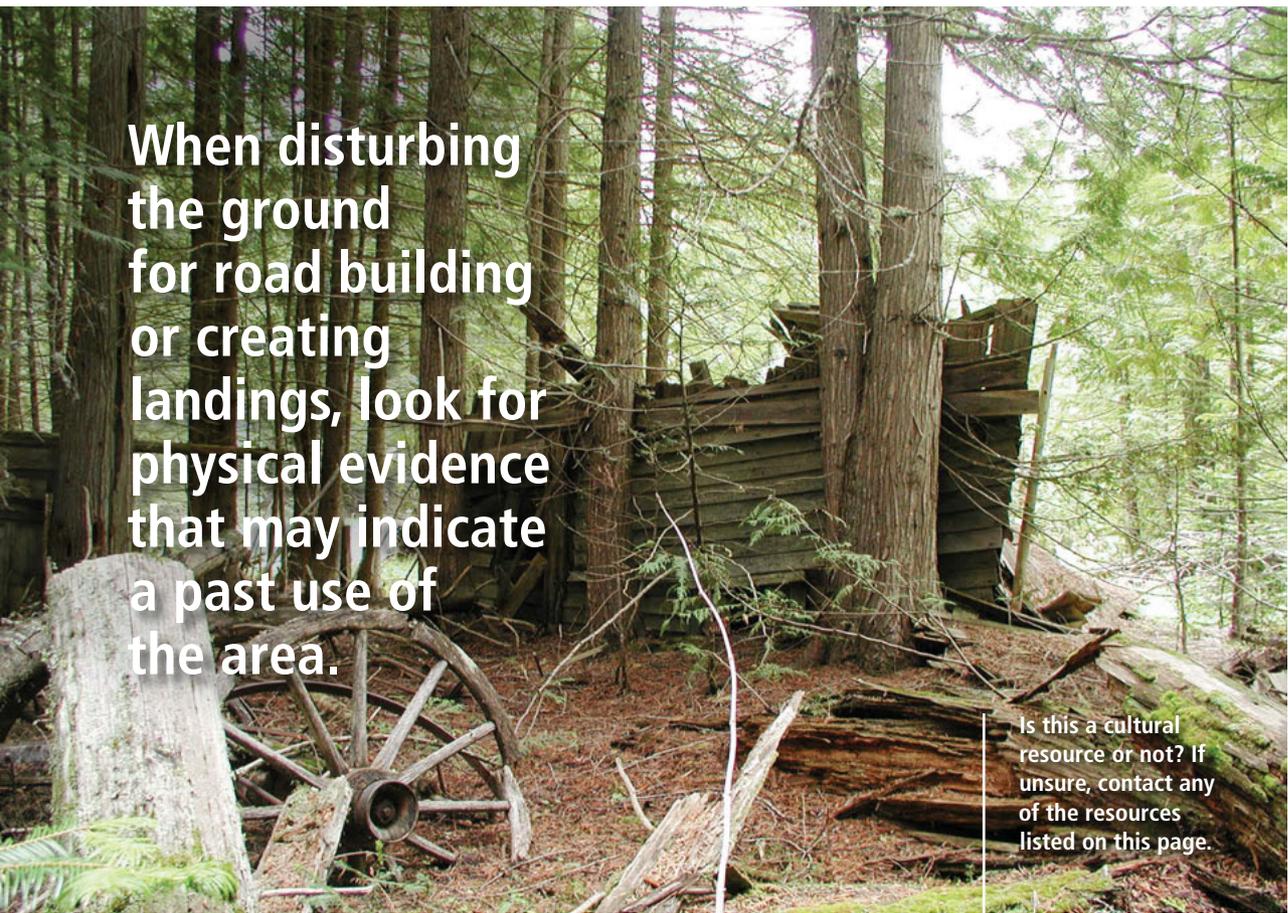
Cedar trees were often stripped of their bark for clothing and baskets.



FOREST PRACTICES APPLICATION HINT

When filing a FPA/N, you will be asked whether you have reviewed the proposed forest practices activity area for potential archaeological or historic sites. If a proposed timber harvest is in an area of particular interest to local Tribes, landowners will be notified and will be required to meet with the Tribes to determine their area of interest and to find a mutually beneficial and voluntary agreement.





When disturbing the ground for road building or creating landings, look for physical evidence that may indicate a past use of the area.

Is this a cultural resource or not? If unsure, contact any of the resources listed on this page.

HOW DO I KNOW IF IT'S A CULTURAL RESOURCE?

To help determine whether you have known cultural resources on your property or if you find cultural resources after starting your forest practices activity, contact the following for assistance:

FOREST PRACTICES OFFICE AT THE DEPARTMENT OF NATURAL RESOURCES

Contact the region office where your forest land is located <http://www.dnr.wa.gov/ContactDNR/Pages/Home.aspx>

See the inside front cover of this book for contact information

DEPARTMENT OF ARCHAEOLOGY AND HISTORIC PRESERVATION (DAHP)

<http://www.dahp.wa.gov/>
360-586-3065

LOCAL TRIBAL GOVERNMENTS

<http://www.goia.wa.gov/>

OTHER LAWS

Even if cultural resources on your property are not listed with the federal, state or local government, there still are laws and rules that require their protection and/or additional permits. Please refer to the Resource guide located on page 130 for a list of some of the other laws that may apply.

Examples of Cultural Resources

Tribal Governments would pry wood pieces out of trees to be used as building materials.

Midden deposits that contain high frequencies of shellfish remains.



Sweat Lodge



Culturally Modified Tree



Shell Midden

EXAMPLES OF NATIVE AMERICAN CULTURAL RESOURCES

- Graves
- Human remains
- Settlement and traditional sites
- Camps
- Cave/rock shelters
- Culturally modified trees

- Fishing sites
- Shell middens
- Quarries
- Hearths
- Cracked rock
- Tools
- Huckleberry trenches
- Weapons
- Trade beads

- Shells
- Bones
- Fish traps
- Drying racks
- Rock Art
- Villages
- Pit Houses



Native American fishing weight

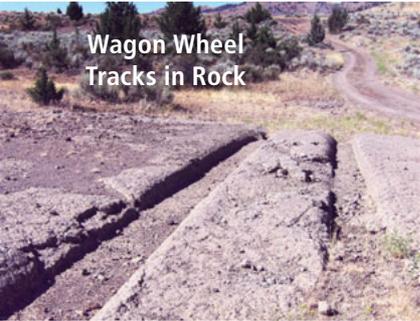
This may have been a Native American directional marker to a traditional fishing site, ceremonial site, or shallow river crossing.

Some sites date back thousands of years and might not be visible to the unknowing eye.



HISTORIC SITES

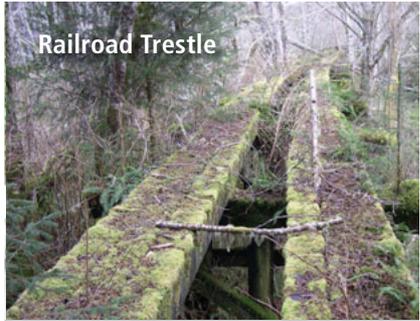
Historic sites include areas and structures or other evidence of human activities that identify the origins, evolution and/or development of the nation, state or locality. They can also be places associated with an individual important in history or places where significant historical events occurred, even though no physical evidence of the event remains.



Wagon Wheel Tracks in Rock



Gravesite



Railroad Trestle

EXAMPLES OF HISTORIC SITES AND ARTIFACTS

- Religious missions
- Graves/Cemeteries
- Military forts
- Battle sites
- Pioneer homesteads
- Cabins
- Barns
- Fences
- Tunnels

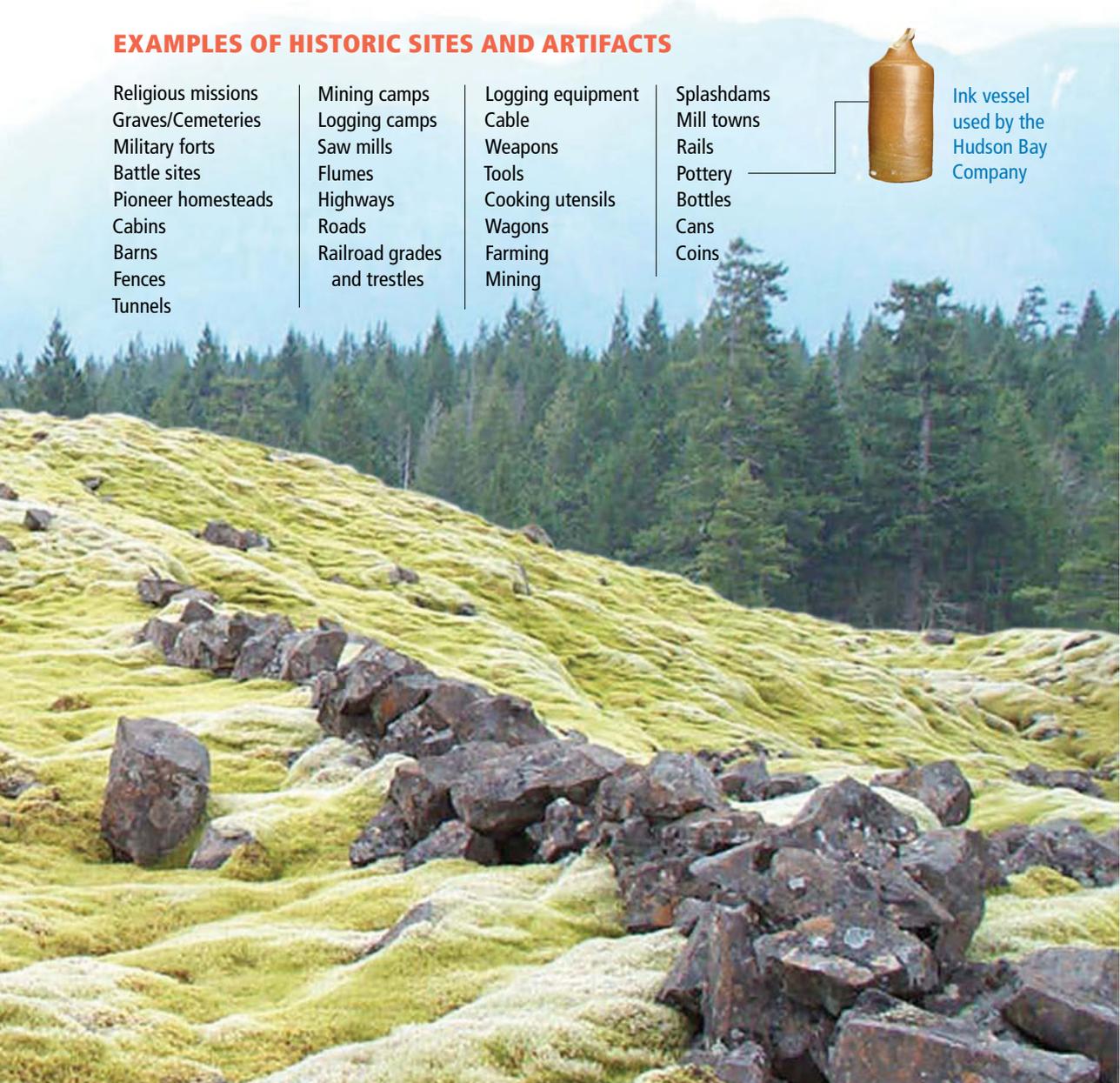
- Mining camps
- Logging camps
- Saw mills
- Flumes
- Highways
- Roads
- Railroad grades and trestles

- Logging equipment
- Cable
- Weapons
- Tools
- Cooking utensils
- Wagons
- Farming
- Mining

- Splashdams
- Mill towns
- Rails
- Pottery
- Bottles
- Cans
- Coins



Ink vessel used by the Hudson Bay Company



Frequently Asked Questions

Where can I find out if there are any known cultural resources on my property?

Contact the following:

- ▶ The local DNR region office where your forest land is located at <http://www.dnr.wa.gov/ContactDNR/Pages/Home.aspx>
- ▶ Department of Archaeology & Historic Preservation (DAHP) <http://www.dahp.wa.gov/> or 360-586-3065
- ▶ Local Tribal government <http://www.goia.wa.gov/>

Will someone come out to my property to help identify the cultural resources?

Contact the DNR region office where your forest land is located and ask for assistance. DAHP or the local Tribe may assist private landowners with identification.

How do I find out which local Tribal government I should contact?

Contact the DNR region office where your forest land is located. You can also find information (directory and maps) on the Governor's Office of Indian Affairs website at <http://www.goia.wa.gov/>

If cultural resources are found on or adjacent to my forest practices activity does that mean I can't harvest my timber or build any roads?

Not necessarily. It will depend upon what the cultural resource is and its location in relationship to your forest practices activity, and whether your activity will disturb the cultural resource.

Do I have to protect cultural resources on my property if they are not listed with DAHP or are of concern to the affected Indian Tribe?

Yes, if federal, state, or local government laws or rules require protection.

What do I do if I find cultural resources after starting my forest practices activity?

Stop the activity and contact your local DNR region office for assistance.

Cultural Resources Protection and Management Plan

The Cultural Resources Protection and Management Plan (Plan), an addendum to the Forests & Fish Report, is a consensus agreement among Tribes, forest landowners, and state agencies.

The Plan was collaboratively developed by the Timber Fish & Wildlife (TFW) Cultural Resources Committee to fulfill commitments to cultural resources protection in the 1987 TFW Agreement and in the 1999 Forests & Fish Report. Committee participants included representatives from Tribes, Washington Forest Protection Association, Washington Farm Forestry Association, DNR Forest Practices, DNR State Lands, and the Department of Archaeology and Historic Preservation.

The Plan emphasizes non-regulatory approaches to enhance cooperative relationships between landowners and Tribes to resolve cultural resources concerns in forest practices planning and permitting:

- ▶ Increased communication and mutual respect between landowners and Tribes.
- ▶ Development of cooperative processes to protect and manage cultural resources.
- ▶ Educational opportunities to foster trust, commitment, and a common understanding of cultural resources issues relating to forest management.

The Plan's effectiveness in achieving cultural resources protection is reviewed biennially by the Committee and annually by the Forest Practices Board.

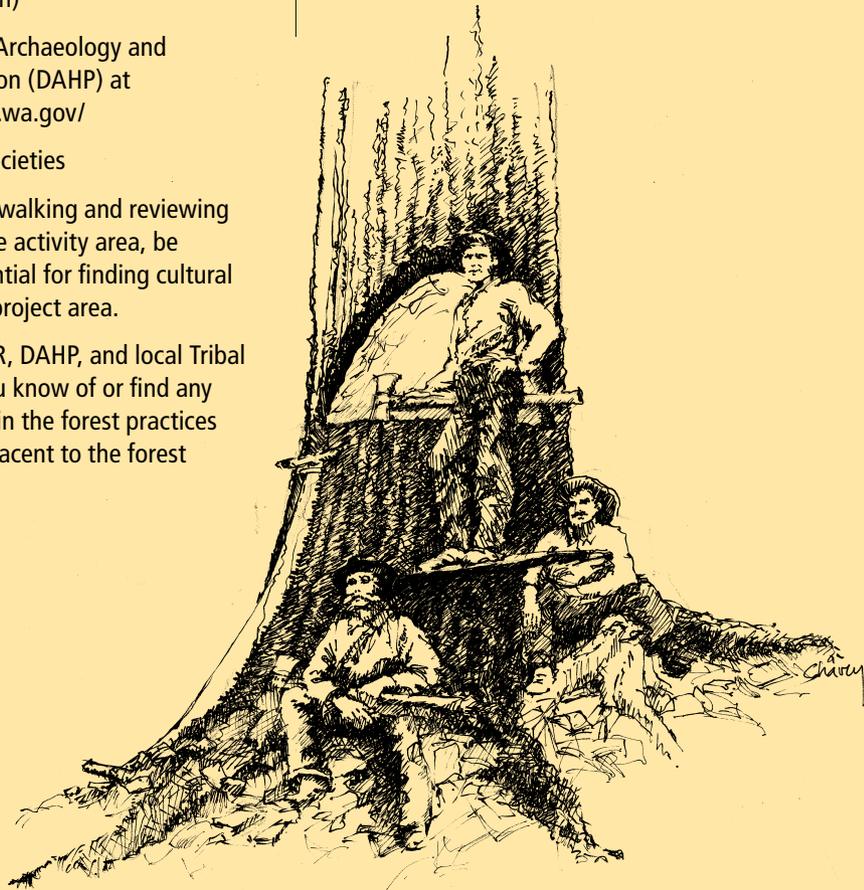


Suggestions for Success

The following list has suggestions to help you work through cultural resources issues while protecting long-term investments and public resources. These suggestions may exceed Forest Practices Rules.

- I have read the Cultural Resources Chapter.
- Check specific rules for requirements.
- In the early stages of planning any forest practices activity, contact the following for any information about cultural resources that may be on or adjacent to your activity site:
 - ▶ Local Washington Tribal Governments' cultural resources contact (there may be more than one Tribe in your area of concern)
 - ▶ DNR region office (see page 2 for region contact information)
 - ▶ Department of Archaeology and Historic Preservation (DAHP) at <http://www.dahp.wa.gov/>
 - ▶ Local historic societies
- When you are walking and reviewing your forest practice activity area, be aware of the potential for finding cultural resources in your project area.
- Meet with DNR, DAHP, and local Tribal governments if you know of or find any cultural resources in the forest practices project area or adjacent to the forest practices activity.

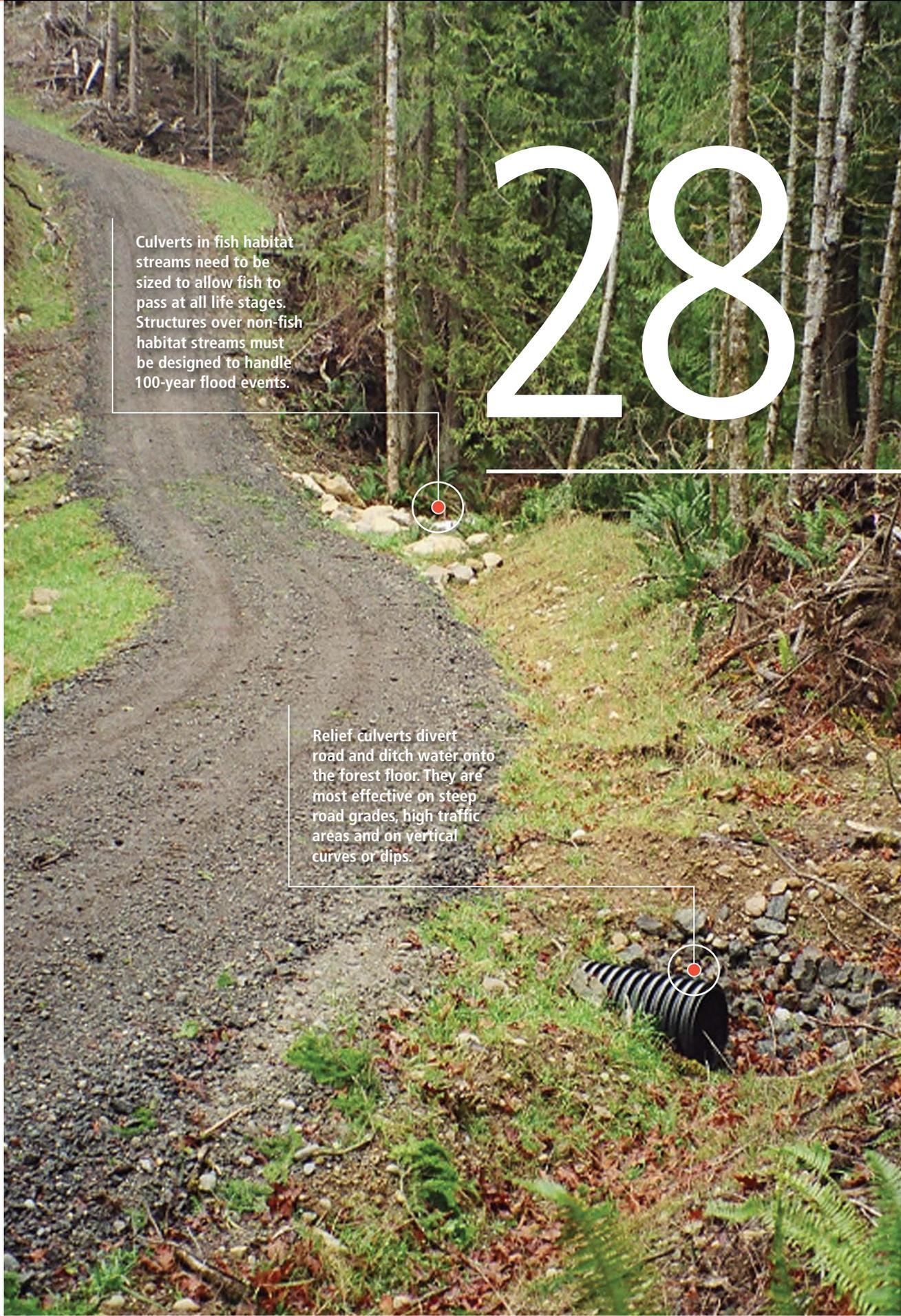
- If Affected Tribes request a plan, develop the plan specifications with the local Tribal representative to protect the cultural value.
- Prior to any harvest or road building activity, review the cultural resources protection plan with the timber purchaser and operator to ensure the plan is understood and operationally followed on the ground.
- Follow up to ensure harvest occurred according to your plan.



28

Culverts in fish habitat streams need to be sized to allow fish to pass at all life stages. Structures over non-fish habitat streams must be designed to handle 100-year flood events.

Relief culverts divert road and ditch water onto the forest floor. They are most effective on steep road grades, high traffic areas and on vertical curves or dips.





Forest Roads

Roads are an essential part of a well-managed forest. But if not properly constructed and maintained, they can be a source of sediment to streams and can pose other risks to public resources and public safety. Proper planning, construction, and maintenance of forest roads helps minimize soil erosion and protects forest productivity, water quality, and fish/wildlife habitat. Planning also minimizes the miles of roads built and maintained, which saves money and increases efficiency.

- 30** INTRODUCTION
- 31** ROAD MAINTENANCE AND ABANDONMENT PLANS
- 32** LOCATING A NEW FOREST ROAD
- 33** EXISTING ROADS | END HAULING
- 34** LANDINGS
- 36** DRAINAGE
- 40** STREAM CROSSING STRUCTURES
- 42** MAINTAINING FOREST ROADS DURING HARVEST USE
- 46** ON-GOING MAINTENANCE



APPLICABLE WASHINGTON

ADMINISTRATIVE CODES (WACS)

222-24-020 | 222-24-025 | 222-24-030 | 222-24-035
222-24-040 | 222-24-050 | 222-24-060

Understanding Forest Roads

Washington has rules affecting road construction and maintenance. The Forest Practices Act and Rules apply to all private and state forest roads.

Forest Practices Rules require that forest landowners construct and maintain roads to minimize damage to public resources, such as water quality and fish habitat. This chapter discusses various resource protection measures, also known as best management practices (BMPs), that will help you achieve this goal. Best management practices include:

- ▶ Minimizing new road construction
- ▶ Providing fish passage
- ▶ Minimizing road runoff
- ▶ Preventing erosion
- ▶ Protecting stream bank stability
- ▶ Maintaining wetland functions

Before You Begin a Road Maintenance or Construction Activity

Prior approval from either DNR or Washington Department of Fish and Wildlife (WDFW) may be required in the following instances:

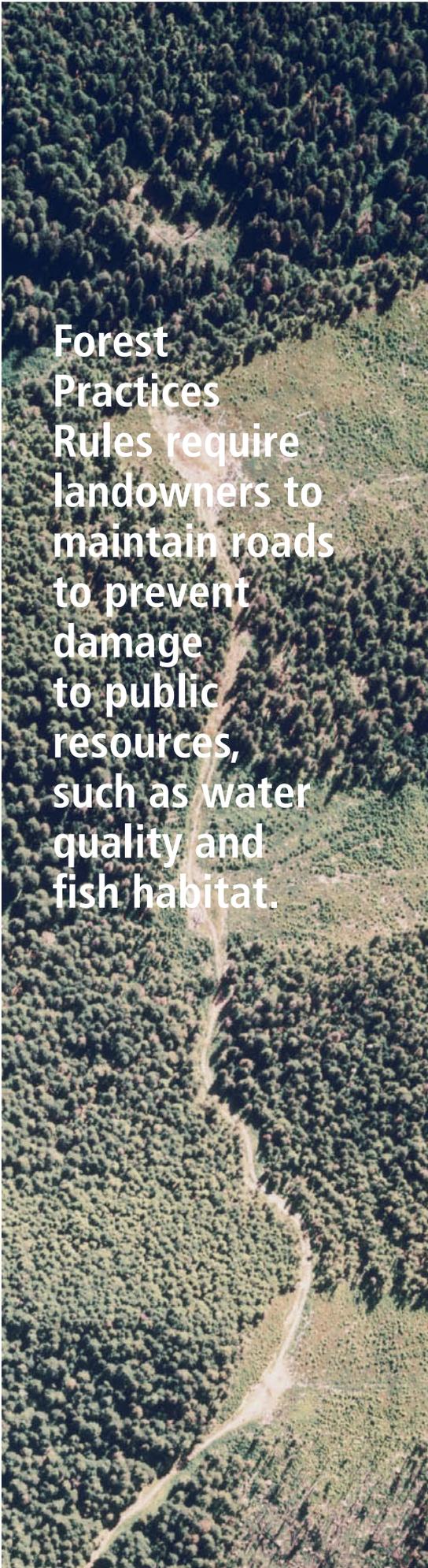
- 1 Constructing or maintaining a road where there is risk of sediment entering water or wetlands
- 2 Operating equipment near streams, unstable slopes or other sensitive sites
- 3 Installing or replacing stream crossings

Permits You'll Likely Need to Conduct Road Maintenance or Construction

Work on forest roads may require one or both of the following permits:

- 1 Forest Practices Application/ Notification
- 2 Hydraulic Project Approval

Contact the DNR region office nearest your property for more information on which permit you will need



Forest Practices Rules require landowners to maintain roads to prevent damage to public resources, such as water quality and fish habitat.



Road Maintenance and Abandonment Plans

A Road Maintenance and Abandonment Plan (RMAP) is a forest road inventory and schedule for any needed road work. It is prepared by the landowner and approved by the Washington Department of Natural Resources (DNR).

All large forest landowners are required to submit a RMAP. Some small forest landowners are required to submit a “checklist RMAP” which is a form landowners fill out to indicate they have assessed their roads and identified any potential road maintenance problems. If a problem is identified, DNR can provide advice on how to correct it.

LARGE FOREST LANDOWNERS

Annually harvest more than 2 million board feet of timber from their own land.

SMALL FOREST LANDOWNERS

Annually harvest 2 million board feet or less of timber from their own land.

IS A CHECKLIST RMAP REQUIRED?

If you are a small forest landowner, answer the following questions to see if a RMAP is required:

A Is this Forest Practices Application/Notification (FPA/N) for timber harvest or salvage?

No. A checklist RMAP is not required.

Yes. A checklist RMAP may be required. Go to B

B Are you hauling timber on existing forest roads on your property?

No. A checklist RMAP is not required.

Yes. A checklist RMAP may be required. Go to C

C Do you own more than 80 acres of forest land in Washington State?

Yes. A checklist RMAP is required with this Forest Practices Application/Notification .

No. A checklist RMAP may be required. Go to D

D Is this Forest Practices Application/Notification on a block of forest land that contains more than 20 contiguous acres?

Yes. A checklist RMAP is required with this Forest Practices Application/Notification.

No. A checklist RMAP is not required. Ask DNR for an informational brochure on forest road maintenance.



A Road Maintenance brochure and Checklist RMAP

form are available at the Forest Practices website at <http://www.dnr.wa.gov/BusinessPermits/ForestPractices/>



Even if you do not have a RMAP requirement, your forest roads must still meet the road maintenance requirements in WAC 222-24-052.

Locating a New Forest Road

New forest roads should fit the natural topography so that minimum changes to the natural features will occur. Special attention should be given to the location of roads near streams or wetlands to minimize delivery of sediment or changes to the natural direction of the stream.

When locating a road, consider the following guidelines:

- ▶ Locate roads where the risk of dirt and mud entering water is minimized and where there will be the least disturbance to stream channels, lakes, wetlands, and floodplains.
- ▶ Minimize the number of stream crossings.
- ▶ Reduce duplication of roads. Investigate using existing roads across another ownership before constructing new roads.

In general, reduce the amount of road in the following locations:

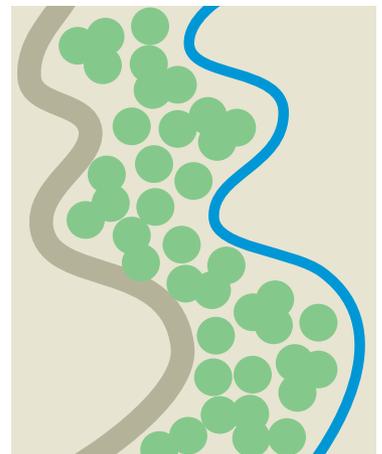
- ▶ Parallel or next to a stream of any size
- ▶ Across or immediately adjacent to wetlands
- ▶ On landslide prone locations or across the head or toe of old landslide deposits
- ▶ On steep slopes



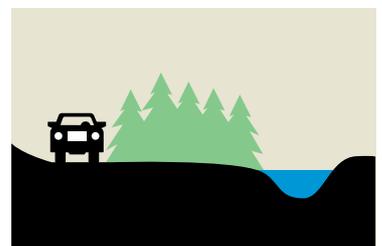
AVOID THIS OPTION



ACCEPTABLE OPTION



BEST OPTION



WETLAND DELINEATION AND MAPPING



To properly locate new roads in or near wetlands, the wetland boundaries may need to be identified and mapped (page 85). For more information, please see **Board Manual Section 8: Guidelines for Wetland Delineation.**



The location of forest roads must be shown on the activity map submitted with a FPA/N. Any trees removed for road construction outside the timber harvest unit must be indicated on the FPA/N.



Existing Roads

Using existing roads instead of building new roads can sometimes be more cost-effective and can have fewer environmental impacts.

Evaluate existing roads for maintenance needs, future uses, and necessary upgrades to meet Forest Practices Rules.

Consider using existing roads and landings if:

- ▶ They are in appropriate locations and fit your needs
- ▶ New construction will have more impacts on resources than using old roads

Sometimes existing roads are in unsuitable places. For instance, you wouldn't want to use an old road or skid road that parallels a stream, has little or no vegetation between it and a stream, or one that goes straight up a natural drainage channel.

Consider consulting with professionals to help identify erodible soils and slide prone areas, which may be characterized by:

- ▶ Steep slopes
- ▶ Clay soils
- ▶ Uneven topography
- ▶ Pistol-butted (curved) trees
- ▶ Slumps, dips, and cracks
- ▶ Evidence of previous slides

End Hauling

Good road location and design eliminates or minimizes end hauling, which is the removal of excavated materials from the site. However, end hauling will be necessary if there is potential for displaced materials to enter:

- ▶ Type A or B wetlands (see page 85)
- ▶ The 100-year flood level of any streams.
- ▶ Wetland management zones

Waste material must be end-hauled to an approved waste site when constructing roads adjacent to or on side slopes greater than 60 percent.



A Trees with pistol-butts (curved) can indicate the soil may be unstable and therefore unsuitable for road building.

B This road would need to be evaluated for future use. Was the road failure caused by improper culvert sizing or was it caused by something else?



FOREST PRACTICES APPLICATION HINT

Locations where end hauling will take place, as well as spoils disposal areas, must be indicated on the activity map submitted with a FPA/N.



For more information on end hauling, please see

Board Manual Section 3: Guidelines for Forest Roads and Board Manual Section 16: Unstable Slopes.

Landings

Landings are areas where logs are brought during a harvest before they are loaded on a truck. Due to the high use landings receive, they have the potential to impact soils and deliver sediment to nearby waterways.

- ▶ Review the road design plan with the logging operator to minimize the number of landings and ensure that they are not larger than necessary for safe operation.
- ▶ Locate landings on well-drained areas. Slope the surface of the landing to drain water onto the forest floor.

Avoid:

- ▶ Excessive cuts and fills
- ▶ Constructing landings on soils with potential for erosion
- ▶ Constructing landings adjacent to streams or wetlands

Landings cannot be located in the following areas:

- ▶ Natural drainage channels
- ▶ Channel migration zones
- ▶ Core and inner zones of riparian management zones
- ▶ Type Np (non-fish perennial) Riparian Management Zones
- ▶ Sensitive sites
- ▶ Within 30 feet of any Type Np or Ns (non-fish seasonal) stream
- ▶ Type A & B wetlands or their Wetland Management Zones

When constructing landings, fill materials should be free of loose stumps and other woody debris. These materials can cause the landing to fail and potentially deliver sediment to streams.

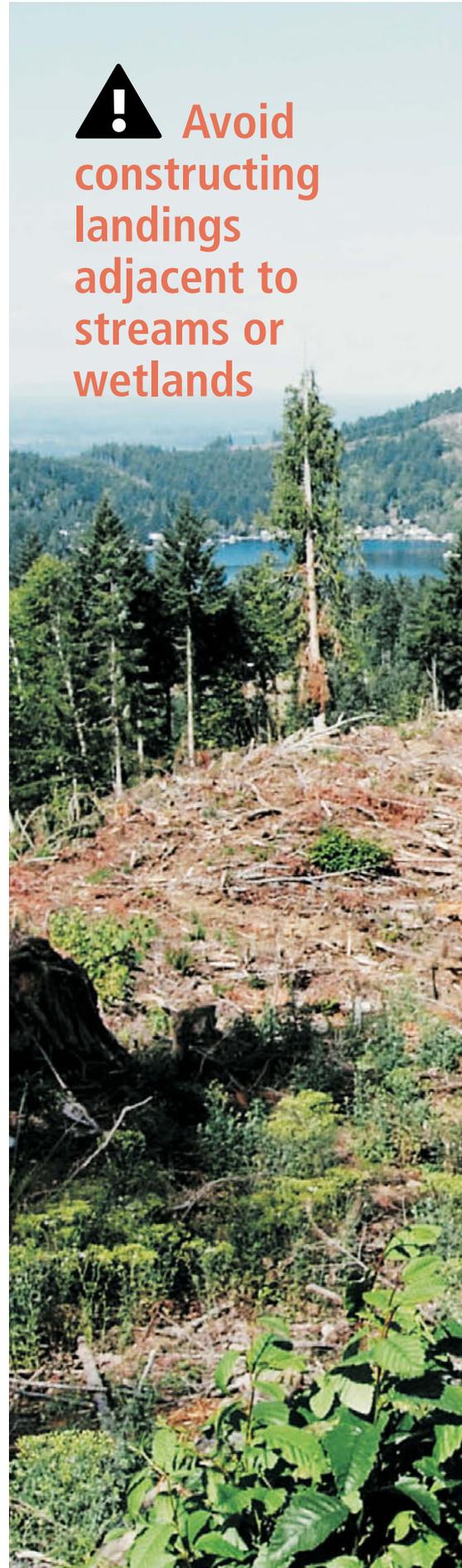
If the landing will be used in wet weather, make sure sufficient rock has been added to the surface to prevent rutting and that adequate drainage devices have been installed.



← The location of landings

must be shown on the activity map submitted with a FPA/N.

! Avoid constructing landings adjacent to streams or wetlands





Use ditches and other drainage devices to divert water away from the landing and onto the forest floor.

Water diverted to the forest floor reduces the potential for sediment delivery to the stream.

If the landing will be used in wet weather, make sure sufficient rock has been added to the surface to prevent rutting.

INSLOPE ROAD

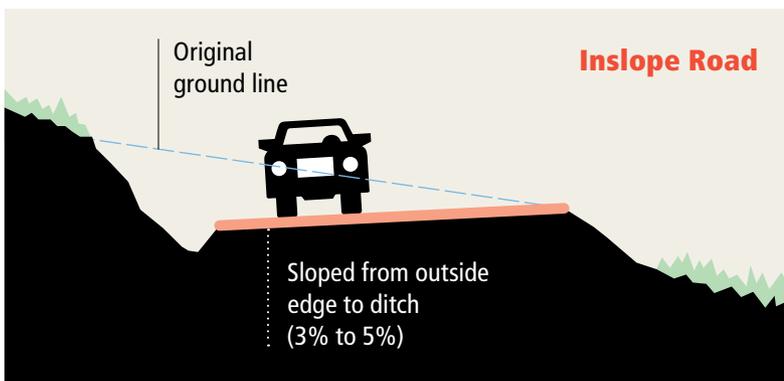
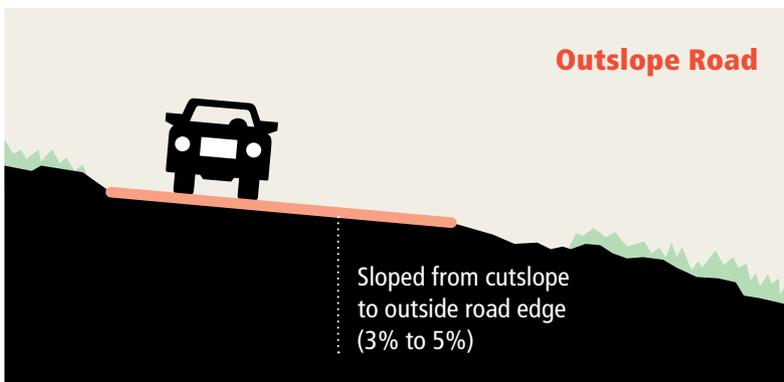
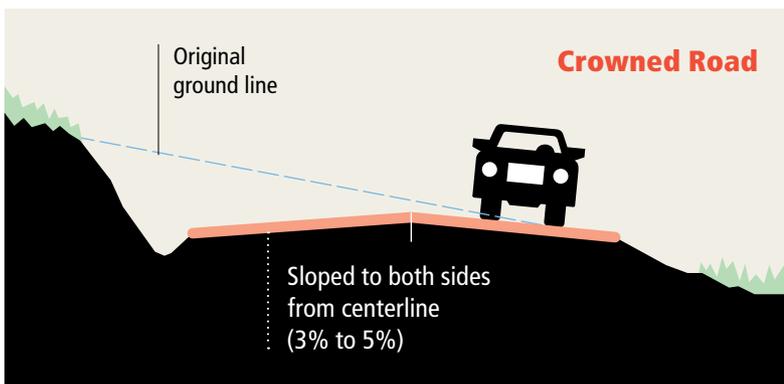
Locate landings on well-drained areas. Slope the surface of the landing to drain water onto the forest floor.



Drainage

Controlling water on and adjacent to roads is essential to protecting both the structure of a road and the surrounding environment. Water runoff, if not managed properly, can lead to rutting, slumping of road fill, erosion of roadbed material, and ultimately sediment entering the stream.

Various strategies can be used to control water and effectively move it away from a road and onto the forest floor where it will not damage either a landowner's investment or water quality. The following illustrations show strategies for shaping the surface of the road to control water runoff:



For more information on grading and when to use

crowned, out-sloped, or in-sloped roads, please see

Board Manual Section 3:
Guidelines for Forest Roads.

WHEN TO USE

- ▶ On high use roads.
- ▶ When the road, ditches and other drainage structures can be routinely maintained.
- ▶ On double-lane main hauling roads.
- ▶ During periods of slippery or icy road conditions.
- ▶ Effective on any road grade.

WHEN TO USE

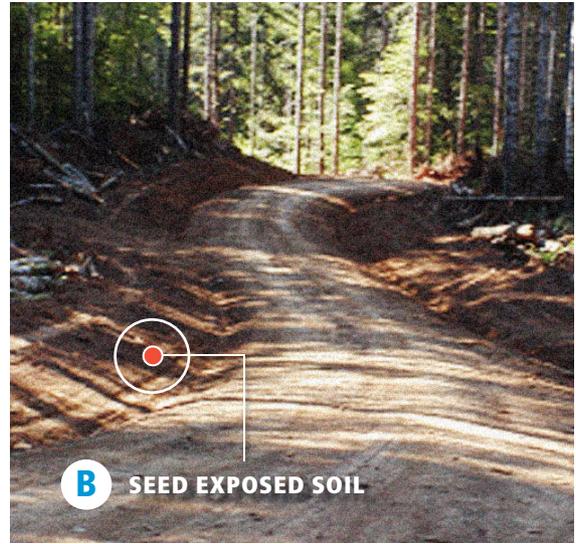
- ▶ On gentle grades (< 8%).
- ▶ Where constructing and maintaining ditches is not possible.
- ▶ On low use or unused roads.
- ▶ In areas where the outslope can be maintained to prevent rutting.

WHEN TO USE

- ▶ Surface drainage needs to be carried to a ditch.
- ▶ If outsloping would cause fill erosion.
- ▶ To avoid runoff from directly entering a stream.
- ▶ Slippery road conditions.
- ▶ On steeper road grades.



A SEDIMENT TRAP



B SEED EXPOSED SOIL

Ditches

Well-constructed ditches are essential to maintain proper drainage.

Ditch water should not flow directly into streams and wetlands. Water collected in ditches should be directed to the forest floor or other vegetated areas at regular intervals through ditch-outs or relief culverts.

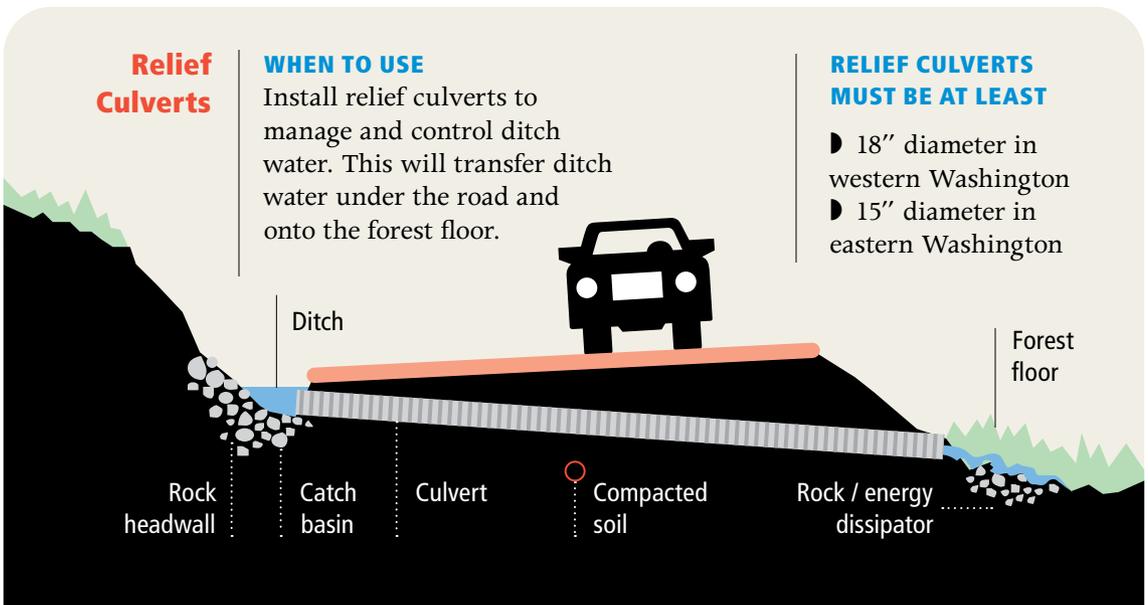
Seeding ground cover or installing sediment filters, such as straw bales or rock weirs, in ditches helps:

- ▶ Catch and filter sediment
- ▶ Reduce velocity of water
- ▶ Reduce maintenance

Clean ditches only as needed to maintain water flow. Some vegetation in the ditch may help reduce erosion. Clean catch basins as needed to keep them functional.

A When needed, use sediment traps, especially when ditch water cannot be re-routed to the forest floor before entering streams or wetlands.

B Exposed soils on edges of roads can be seeded with native grasses or clover to minimize surface runoff.



Drainage Structures

Drainage structures are used to deliver road runoff collected from ditches onto the forest floor or vegetated areas. They include relief culverts, water bars, rolling dips, and ditch-outs. Drainage structures minimize erosion of ditches and should be placed frequently enough to reduce sediment from entering water.

Use culverts, energy dissipaters, or a DNR-approved alternative when necessary to:

- ▶ Protect road surfacing
- ▶ Protect fill slopes
- ▶ Return water to its natural course
- ▶ Reduce the water velocity
- ▶ Protect the discharge point from erosion

Relief Culverts

Relief culverts or cross drains are very effective for removing ditch and road water.

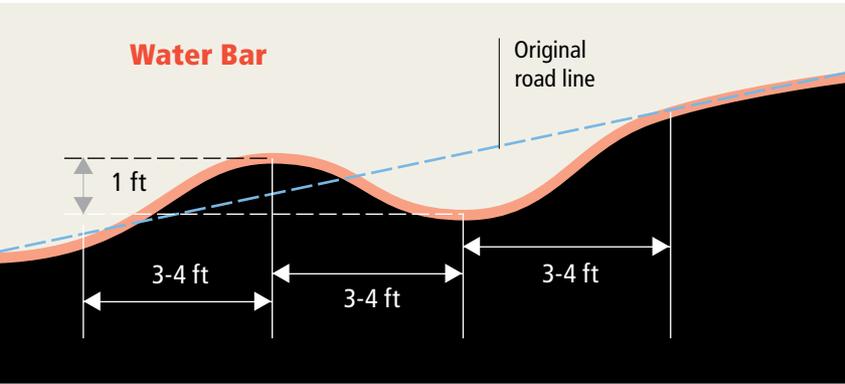
FOREST
PRACTICES
MANUAL

For relief culverts spacing guidelines, see **Board Manual Section 3: Guidelines for Forest Roads.**

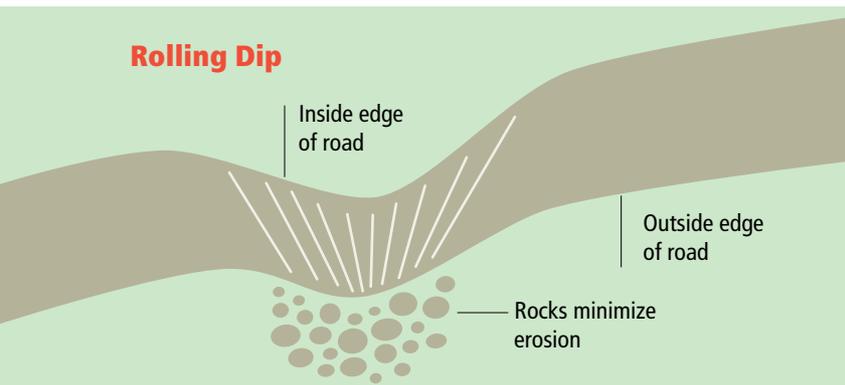


Use an armored head-wall to direct water into the relief culvert



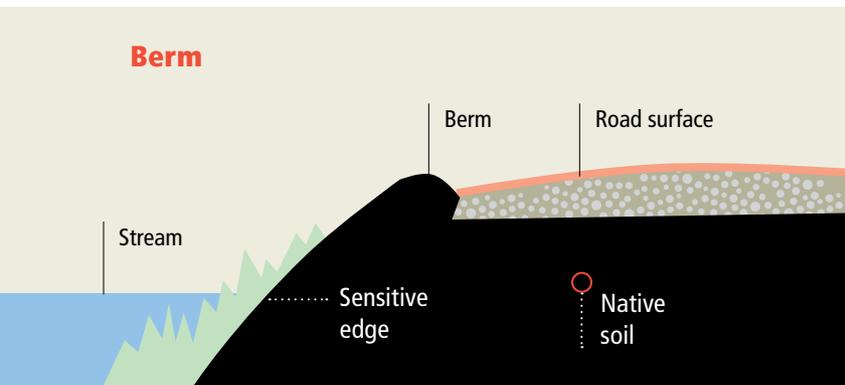


Water bars and rolling dips serve the same purpose – both divert water from ditches and the road surface. A water bar is a small hump built into the road surface that runs the width of the road at an angle sufficient to drain water to either a ditch, the forest floor, or a vegetated surface. Water bars are most effective on low-use roads because they require frequent maintenance.

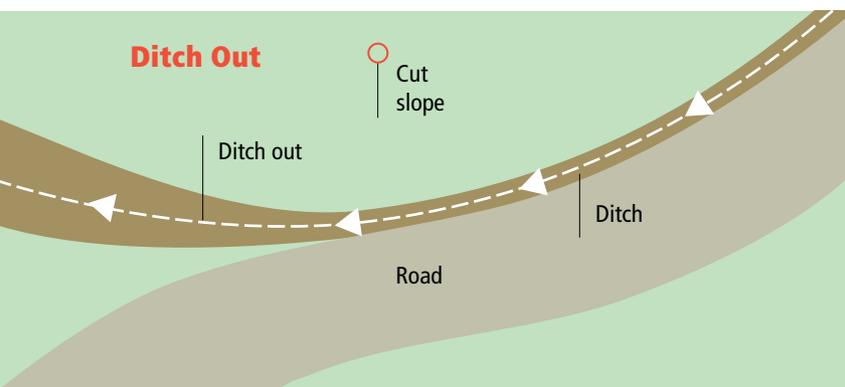


A **rolling dip** is a gentle roll in the road surface, sloped to carry water to the outside edge of the road. Use energy dissipaters, such as rocks, at the outlet of both water bars and rolling dips to minimize erosion.

Rolling dips should be constructed to accommodate truck haul if that is the intended use of the road.



Berms are constructed by using a grader to create short earthen barriers along the edge of a road. Berms are good to use where a road parallels a stream or wetland. Berms should be kept to a minimum length. Any water that flows along the berm edge needs to be routed to the forest floor in an area that will not affect a stream or wetland. In most cases, an insloped road surface is a better option.



Another type of ditch relief structure that can be used in some instances to route ditch flow to the forest floor is a **ditch out**. Use ditch outs when the terrain allows ditch water to be drained away from the road on the same side the ditch is on. These structures are most common on ridge tops and switchbacks. Ditch outs should not be used where water will drain toward an unstable slope or directly into a stream or wetland.

Stream Crossing Structures

Washington State has very specific requirements for sizing and locating stream crossing structures (such as bridges, culverts, or fords). Structures over fish habitat streams must be designed to allow fish passage for all life stages. Structures over non-fish habitat streams must be designed to handle flood events.

If you plan to install a stream crossing structure you will need to submit a FPA/N. Your FPA/N serves as your request to the Washington State Department of Fish and Wildlife (WDFW) for their Hydraulics Project Approval (HPA) permit.

After you submit the FPA/N, a field biologist from WDFW may contact you requesting additional information to issue a HPA, which may be required when work is done in or near fish habitat streams or wetlands.

Specific protection measures for streams will be identified in your HPA. In general, it will tell you:

- ▶ When the structure can be installed
- ▶ Minimum sizes of structures relative to the size of the stream
- ▶ Design requirements
- ▶ When to remove structures, if necessary
- ▶ When and where to plant or seed disturbed soils
- ▶ Other special requirements

Culverts in Fish Habitat Streams

Each permit will have size and installation requirements for culverts. *See photo above.*

Culverts in Non-Fish Habitat Streams

Each permit will have size and installation requirements for culverts. Both FPA/N and HPA rules require:

NP STREAMS

Must pass 100-year flood with consideration for passage of woody debris

Must be at least 24" diameter in Western and Eastern Washington

NS STREAMS

Must be at least:

18" diameter in Western Washington

15" diameter in Eastern Washington



For guidance on sizing culverts, see **Board Manual**

Section 3: Guidelines for Forest Roads.

Culverts in Fish Habitat Streams

Culverts in fish habitat streams are sized to allow all fish species to pass during all life stages (fry to adult). Washington State Department of Fish and Wildlife regulates the installation of culverts on fish habitat streams and can provide assistance with culvert sizing.





Structures over fish habitat streams must be designed to allow fish passage for all life stages.

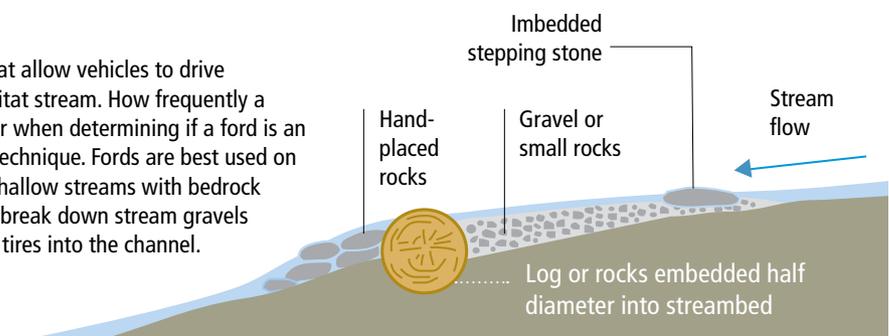
Bridges

Bridges are used to cross large streams or streams that transport large amounts of woody debris. For wide stream channels, bridges are often preferable to large culverts as they can be less expensive and less complicated to install. Earth embankments near bridges should be protected to prevent erosion during times of high water. Road runoff should be diverted before it reaches the bridge to prevent sediment from entering the stream.

A well-constructed bridge allows the stream to function more naturally.

Fords

Fords are stream crossings that allow vehicles to drive directly across a non-fish habitat stream. How frequently a road is used is the main factor when determining if a ford is an appropriate stream crossing technique. Fords are best used on rarely used roads that cross shallow streams with bedrock bottoms. Frequent traffic will break down stream gravels and deliver mud from vehicle tires into the channel.



Temporary Crossings

Temporary stream crossing structures typically are short, pre-manufactured bridges that are laid across a stream during a harvest and then removed when the harvest is complete. If a stream crossing is needed to access small areas of timber or is needed for harvest, a temporary crossing is a practical option. They also are useful on complex crossings where fish passage is difficult or on roads where washouts are likely. Often, the long-term maintenance cost of a permanent crossing will exceed the cost of installation, making temporary crossings more economical. The crossing can usually be restored to the original condition. In more complicated instances, temporary crossings may be the only option due to the risk of damage to natural resources.



Permanent and temporary stream crossing structures must

be indicated on the activity map submitted with a FPA/N. Temporary structures can only be used for one season and must be abandoned when indicated on the FPA/N.

Maintaining Roads During Harvest Use

Forest road surfaces can soften due to rain or periods of thawing. Using roads in the wet season can cause fine sediment to enter streams through muddy runoff water. The mixture of fine sediment and water is also known as “turbidity.” Turbidity refers to the very small, dissolved materials that remain suspended in water and prevent light from penetrating. Consistently high turbidity levels can cause stress to fish, affect fish feeding rates, impair their homing instincts, and reduce growth rates. Sediment also can smother fish eggs and affect aquatic insect life.



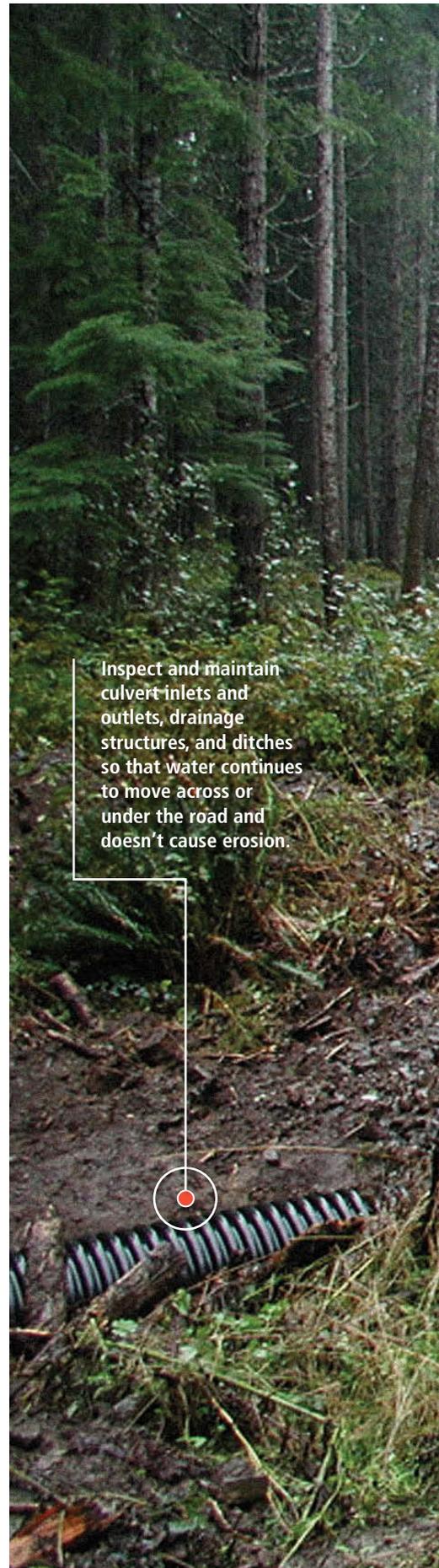
Cold Weather

When plowing snow for winter timber harvest, it's best to leave two to four inches of snow on the surface. It is also advisable to provide breaks in the snow berm to allow road drainage; however, avoid locating breaks where road runoff will drain to streams or wetlands. Remember, wheel tracks in the snow will channel meltwater down the road instead of to the forest floor.



Post-Harvest Maintenance

After harvest, make sure drainage structures are functional. Inspect and maintain culvert inlets and outlets, drainage structures, and ditches so that water continues to move across or under the road and doesn't cause erosion. Provide effective road surface drainage, such as water bars, crowned and/or out sloped surfaces, and sediment traps.



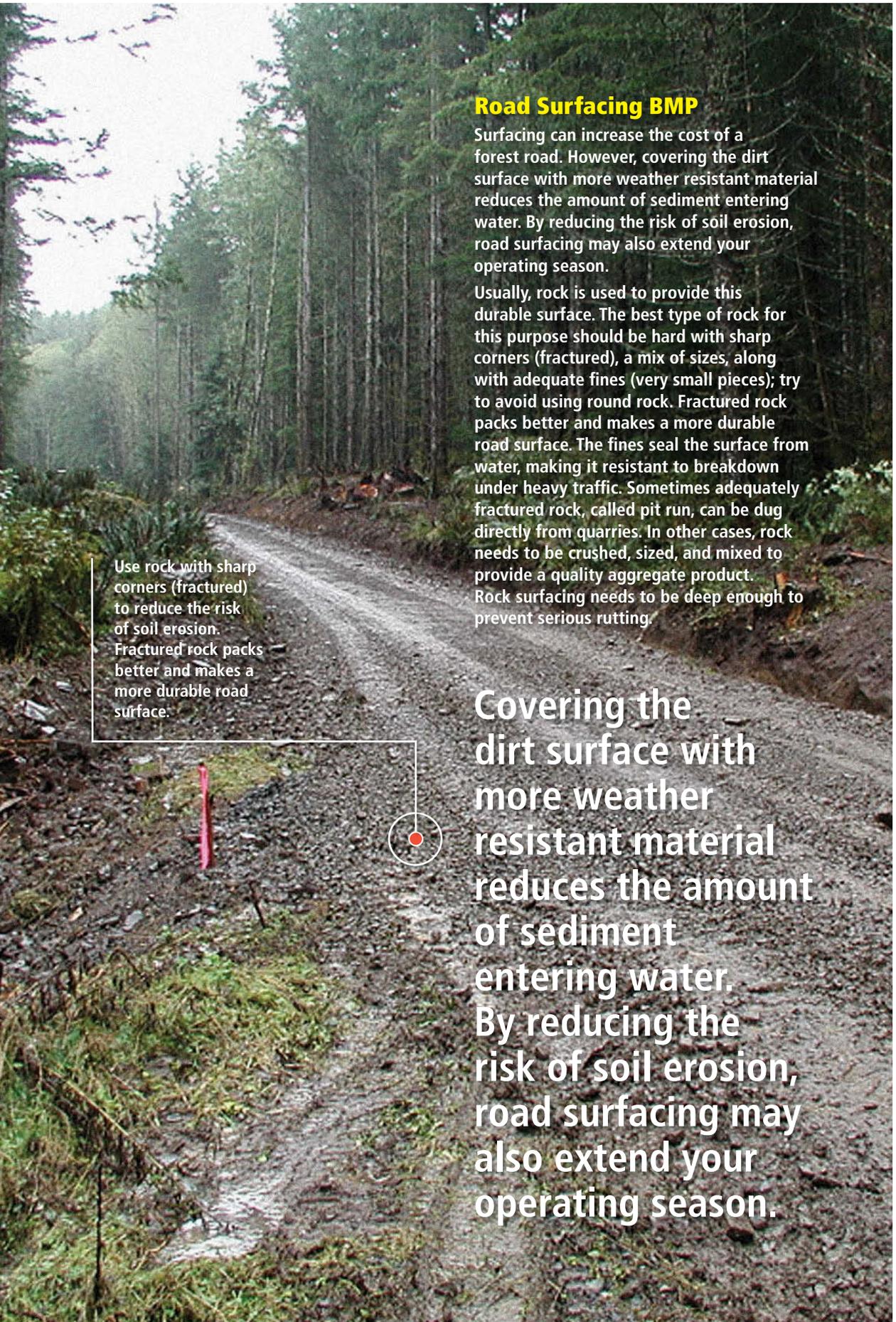
Road Surfacing BMP

Surfacing can increase the cost of a forest road. However, covering the dirt surface with more weather resistant material reduces the amount of sediment entering water. By reducing the risk of soil erosion, road surfacing may also extend your operating season.

Usually, rock is used to provide this durable surface. The best type of rock for this purpose should be hard with sharp corners (fractured), a mix of sizes, along with adequate fines (very small pieces); try to avoid using round rock. Fractured rock packs better and makes a more durable road surface. The fines seal the surface from water, making it resistant to breakdown under heavy traffic. Sometimes adequately fractured rock, called pit run, can be dug directly from quarries. In other cases, rock needs to be crushed, sized, and mixed to provide a quality aggregate product. Rock surfacing needs to be deep enough to prevent serious rutting.

Use rock with sharp corners (fractured) to reduce the risk of soil erosion. Fractured rock packs better and makes a more durable road surface.

Covering the dirt surface with more weather resistant material reduces the amount of sediment entering water. By reducing the risk of soil erosion, road surfacing may also extend your operating season.





UNDERSIZED
CULVERT

This culvert outlet has a drop and is undersized for the stream; it presents a barrier to fish.

OUTFALL
DROP

Check for ditches, culverts, water-crossing structures, water bars, flumes, and energy dissipaters that may be blocked, eroded or not functioning.

Suggestions for Success

The following list has suggestions to help you achieve management objectives while protecting long-term investments and public resources. These suggestions may exceed Forest Practices Rules.

Regularly inspect roads for maintenance needs before, during, and/or after:

- ▶ Stormy weather
- ▶ Freeze-thaw conditions
- ▶ The spring thaw or winter wet season
- ▶ Log hauling or heavy traffic
- ▶ The end of dry season prior to the start of the wet season

When inspecting roads:

- Check for ditches, culverts, water-crossing structures, water bars, flumes, and energy dissipaters that may be blocked, eroded or not functioning.
- Check for evidence of cracking, rutting and poor drainage in the road surface.
- Schedule repairs for identified problems.

When plowing snow from roads in:



WESTERN WASHINGTON

- ▶ Try to avoid snow plowing roads; if you must, don't disturb the road surface.



EASTERN WASHINGTON

- ▶ Plow roads, leaving 2-4 inches of snow on the surface.



General Maintenance Strategies

Grading at appropriate times helps extend the life of your road by maintaining proper drainage and preventing pooling of excess water, which can damage the sub-grade.

- Avoid grading roads unnecessarily or when soils are saturated or excessively dry.
- Install and/or replace culverts during the dry season.
- Check road surface material prior to harvest or heavy use, and especially during the rainy season; additional surfacing material may be needed.
- Mark culverts on the ground before grading.
- Do not use roads during excessively wet or freeze/thaw conditions.
- Reduce any sediment that has the potential to enter streams or wetlands; measures include using fabric or spreading straw to stabilize surfaces prone to erosion and not using the road.
- Control roadside vegetation, but if using chemicals, keep them away from streams and wetlands.
- Exposed soil can be seeded with native grass or clover along roadsides to help control erosion, provide forage, and minimize vegetation maintenance costs.
- Limit unwanted use/access.

Maintenance of orphaned roads is not required, but if the road poses a risk to public resources or safety, the location must be noted on your RMAP.



On-Going Maintenance

Road maintenance is the ongoing responsibility of the landowner, even after the forest practices operation is completed. Roads must be maintained to prevent damage to public resources.

Be aware of early signs of road damage, such as ruts. They indicate that the road is deteriorating. Serious damage to road surfaces starts with excess and standing water. Both are a sign of road drainage problems. Avoid damage by properly sloping the road surface so water runs off onto the forest floor.

Road surfaces should maintain a stable running surface and provide functional surface drainage. Avoid grading sections of road that do not need it. Grading creates a source of sediment by loosening the compacted surface. Raise the blade where grading is not needed. Grading active haul roads during rainy weather may cause sediment to enter streams and can damage the road surface.

Significant amounts of road surfacing can be lost as dust. Applying water can decrease dust. Occasionally, other dust abatement materials are used, such as oil and other chemicals. However, these can be pollutants, and caution should be used near streams and wetlands. (Please see the Chemical Use chapter on page 120.)

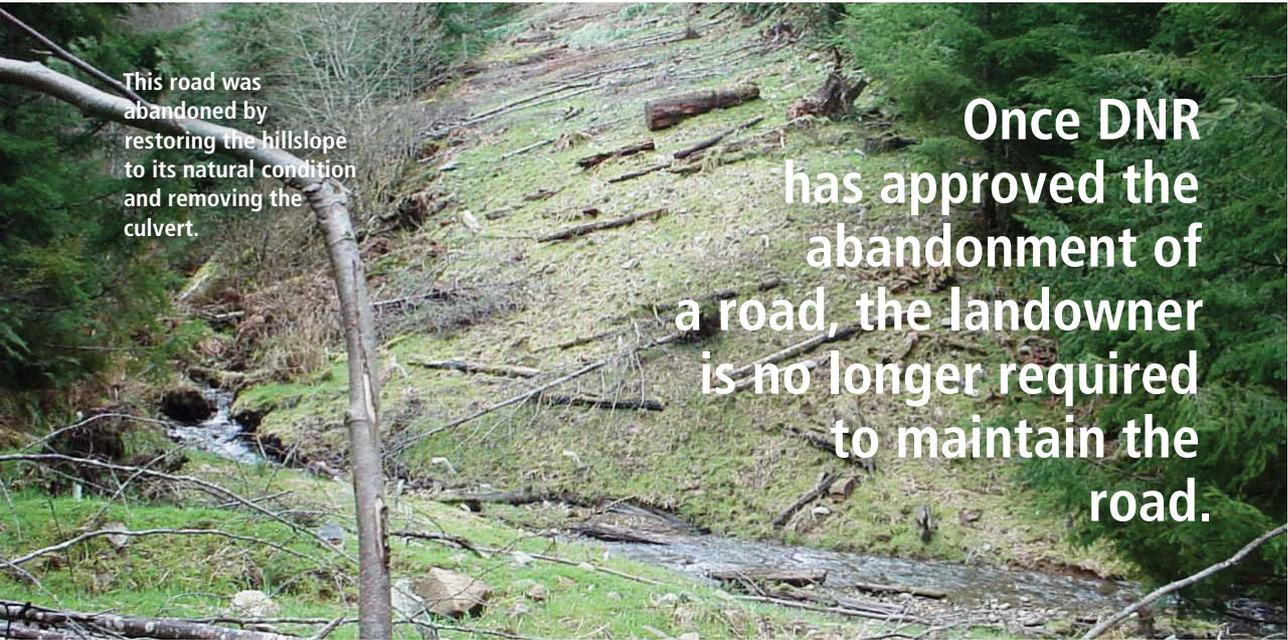
▲ Orphaned Roads

An orphaned road is a road or railroad grade that the forest landowner has not used for forest practices activities since 1974. If orphaned roads pose a risk to public resources or public safety, their location must be included on the map submitted with a landowner's Checklist RMAP.

Control Roadside Vegetation

CONTROL ROADSIDE VEGETATION TO:

- ▶ Increase visibility for drivers
- ▶ Allow sunlight to dry out the road surface
- ▶ Minimize organic debris falling on the road and blocking drainage



This road was abandoned by restoring the hillslope to its natural condition and removing the culvert.

Once DNR has approved the abandonment of a road, the landowner is no longer required to maintain the road.



Access to this road has been blocked.



Roads that will be abandoned must be

shown on the activity map submitted with a FPA/N and can only be used for one season. They must be abandoned before the FPA/N expires.

Abandonment

Forest roads that no longer need to be used can be abandoned. To abandon a road, many factors must be considered, the most important of which are the road's location and potential impacts to public resources.

Abandonment strategies may involve the removal of stream crossing structures and unstable road fill, installing water bars, revegetating exposed soils, and other similar techniques. In many cases, it may be cheaper to abandon a road than to maintain it, especially if the road is not likely to be used for many years. DNR must approve the roadwork before the road can be considered abandoned. After DNR has approved the completed work associated with the abandonment plan, the landowner is no longer required to maintain the road.

ANY FOREST ROAD MAY BE ABANDONED BY FOLLOWING PROPER PROCEDURES, WHICH MAY INCLUDE:

- ▶ Minimizing erosion
- ▶ Ensuring roads do not inhibit water movement through wetlands
- ▶ Leaving ditches in a condition that reduces erosion
- ▶ Removing bridges, culverts, or fords
- ▶ Stabilizing cuts and removing fill
- ▶ Blocking vehicle access
- ▶ Installing erosion control measures, such as water bars
- ▶ Seeding exposed soils to control erosion



Suggestions for Success

The following list has suggestions to help you achieve management objectives while protecting long-term investments and public resources. These suggestions may exceed Forest Practices Rules.

I have read the Forest Roads chapter

Assemble property information

- ▶ Forest practices activity map
- ▶ Forest practices resource map
- ▶ Aerial photos
- ▶ Property deeds, surveys, or real estate contracts
- ▶ Check with DNR for information on sensitive wildlife species and cultural resources
- ▶ Check for legal access and obtain if necessary

Determine purpose of road network

- ▶ Length of time needed (long-term for future activities such as thinning, tree planting, future harvest, permanent culvert/road vs. temporary culvert/road)
- ▶ Year-round or seasonal use
- ▶ Method of harvest



Locate all

- ▶ Streams and wetlands within 200 feet of the road and verify water typing
- ▶ Bogs or low nutrient fens; roads should not be constructed in these areas
- ▶ Potentially unstable slopes or landforms (See **Board Manual Section 16: Guidelines for Evaluating Potentially Unstable Slopes and Landforms**)
- ▶ Property lines and harvest area boundaries
- ▶ Existing roads and landings
- ▶ Rock sources, if needed



Properly design and locate roads to:

- ▶ Follow contours of the terrain to take advantage of natural drainage
- ▶ Minimize potential for erosion
- ▶ Accommodate harvest and transportation needs
- ▶ Minimize number of landings
- ▶ Minimize cuts, fills, and stream crossings
- ▶ Meet safety considerations



If building roads in difficult terrain and/or unstable areas, a qualified expert's report may be necessary

To minimize impacts to public resources, avoid:

- ▶ Excessively steep terrain
- ▶ Potentially unstable slopes and landforms
- ▶ Multiple crossings over the same stream
- ▶ Filling, draining, and crossing wetlands
- ▶ Roads that parallel wetlands and streams
- ▶ Narrow canyons
- ▶ Excessive number of roads
- ▶ Large cuts and fills
- ▶ Road gradients greater than 12 percent
- ▶ Areas of historical, cultural, and archaeological importance (see page 20 for more information)

Plan for the proper number, size and location of

- ▶ Culverts
- ▶ Turn-outs
- ▶ Wide curves
- ▶ End-haul and spoil disposal areas

If placing culverts, bridges, or fords in fish habitat streams:

- ▶ Contact the Washington State Department of Fish and Wildlife for information and requirements at (360) 902-2200

To assist the road construction operator and in preparation for filling out the Forest Practices Application/Notification activity map make a simple map showing:

- ▶ Property and harvest unit boundaries
- ▶ Physical features, e.g., streams, wetlands, steep slopes, etc.
- ▶ Road locations

Obtain all required permits from city, county, state, and federal agencies

Communicate your plans with neighbors, adjacent landowners, and Washington Tribal governments

Plan for long-term road maintenance



Ground-based harvest systems are designed for areas with slopes less than 35 percent.



Timber Harvest

Harvesting timber is more complex than the act of cutting trees. Good planning will address many of the issues that need to be considered in your harvest plan, including: management objectives, site conditions, resource protection, harvest type, and economic factors. This section discusses the options available to you when planning your harvest.

52	RIPARIAN AND WETLAND PROTECTION
58	RIPARIAN MANAGEMENT ZONES
84	WETLAND MANAGEMENT ZONES
92	PLANNING AND DESIGNING HARVEST UNITS, ROADS AND SKID TRAILS
96	TREES AND DOWN LOGS FOR WILDLIFE HABITAT
100	THREATENED & ENDANGERED SPECIES
102	HARVESTING SYSTEMS
110	REFORESTATION
120	PLANTATION MAINTENANCE
122	CHEMICAL MAINTENANCE
128	HOW TO REPORT A SPILL



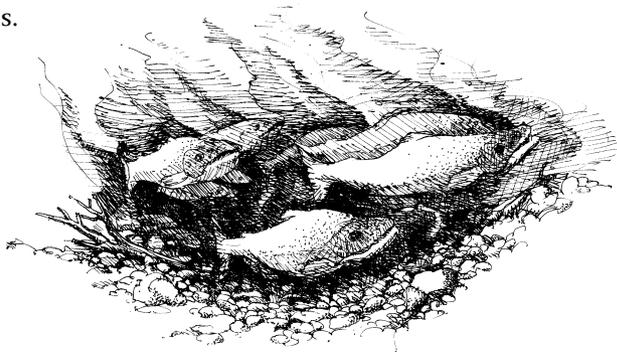
APPLICABLE FOREST PRACTICES RULES
WAC 222-30 Timber Harvesting
WAC 222-20-050 Classes of Forest Practices

Riparian and Wetland Protection

Riparian and wetland areas are important parts of the forest ecosystem that provide fish, amphibian, and wildlife habitat; preserve water quality; and help protect areas during flood and drought conditions. These unique and valuable areas are important for landowners to identify and protect.

Wet soils, high water tables, and the presence of water-tolerant plants commonly characterize wetland and riparian areas. Soils in these areas soak up water in the wet season and then slowly release it during drier periods. This helps regulate the water level during times of high water and seasonal low-flows. Trees, vegetation, and their root systems stabilize stream banks and capture sediment and other debris to prevent it from entering stream channels.

Sediment entering streams can kill aquatic plants and insects that provide habitat and nutrients for fish. Sediment can also fill resting pools and gravel spawning beds that fish need for reproduction. During and after timber harvest, it is important that trees and vegetation remain to function as a buffer for streams and wetlands.



What Do Stream and Wetland Buffers Do?

- ▶ Filter runoff to minimize sediment entering water
- ▶ Provide logs and organic material crucial for fish and amphibian habitat
- ▶ Maintain shade and regulate stream temperatures
- ▶ Provide wildlife habitat



COHO SALMON ILLUSTRATION BY JANE CHAVEY / DNR



Spirea (hardhack)



Pinegrass



Skunk cabbage



Labrador tea

Trees and Plants Associated with Riparian and Wetland Areas

The following plants typically are found in riparian areas and wetlands; however, their presence does not always indicate the existence of a riparian area, Channel Migration Zone (CMZ) or a wetland. Contact the Washington State Department of Ecology for professional help with identifying wetlands.

TREE SPECIES

Eastern Washington

- Engelmann spruce
- Quaking aspen
- Sitka alder
- Black cottonwood

Western Washington

- Sitka alder
- Sitka spruce
- Western red cedar
- Oregon ash
- Red alder

PLANT SPECIES

Eastern and Western Washington

- Labrador tea
- Red osier dogwood
- Reed canary grass
- Rushes & sedges
- Willow
- Spirea (hardhack)
- Bog laurel
- Skunk cabbage
- Cattails

Riparian and wetland areas are important parts of the forest ecosystem that provide fish, amphibian, and wildlife habitat, preserve water quality, and help protect areas during flood and drought conditions.



Turbidity Level

Turbidity is the level of sediment in water. As turbidity increases, the amount of oxygen decreases, affecting fish and plant life.



Sediment entering streams can harm aquatic plants and insects that provide habitat and nutrients for fish. Sediment can also fill resting pools and gravel spawning beds that fish need for reproduction.

Buffers filter sediment; provide shade, bank stability, and cool, clean water for fish to use as habitat.



NON-FISH
HABITAT
STREAM
TYPE 'Np'

FISH
HABITAT
STREAM
TYPE 'F'





Channel Migration Zone (CMZ)

In some cases, part of the Riparian Management Zone (RMZ) could be a Channel Migration Zone (CMZ). The CMZ is an area of the stream where the channel is prone to move. Over time, when a stream channel moves, the buffers needed to protect the stream will move with it.

For more information and guidance on determining the presence of a CMZ, please see **Board Manual Section 2.**



During and after timber harvest, it's important that trees and vegetation remain to function as a buffer for streams and wetlands.

Riparian and wetland buffers are grouped into two categories:

- ▶ Riparian Management Zones (RMZs) and
- ▶ Wetland Management Zones (WMZs)

A Closer Look at Riparian Management Zones

Unstable Slope

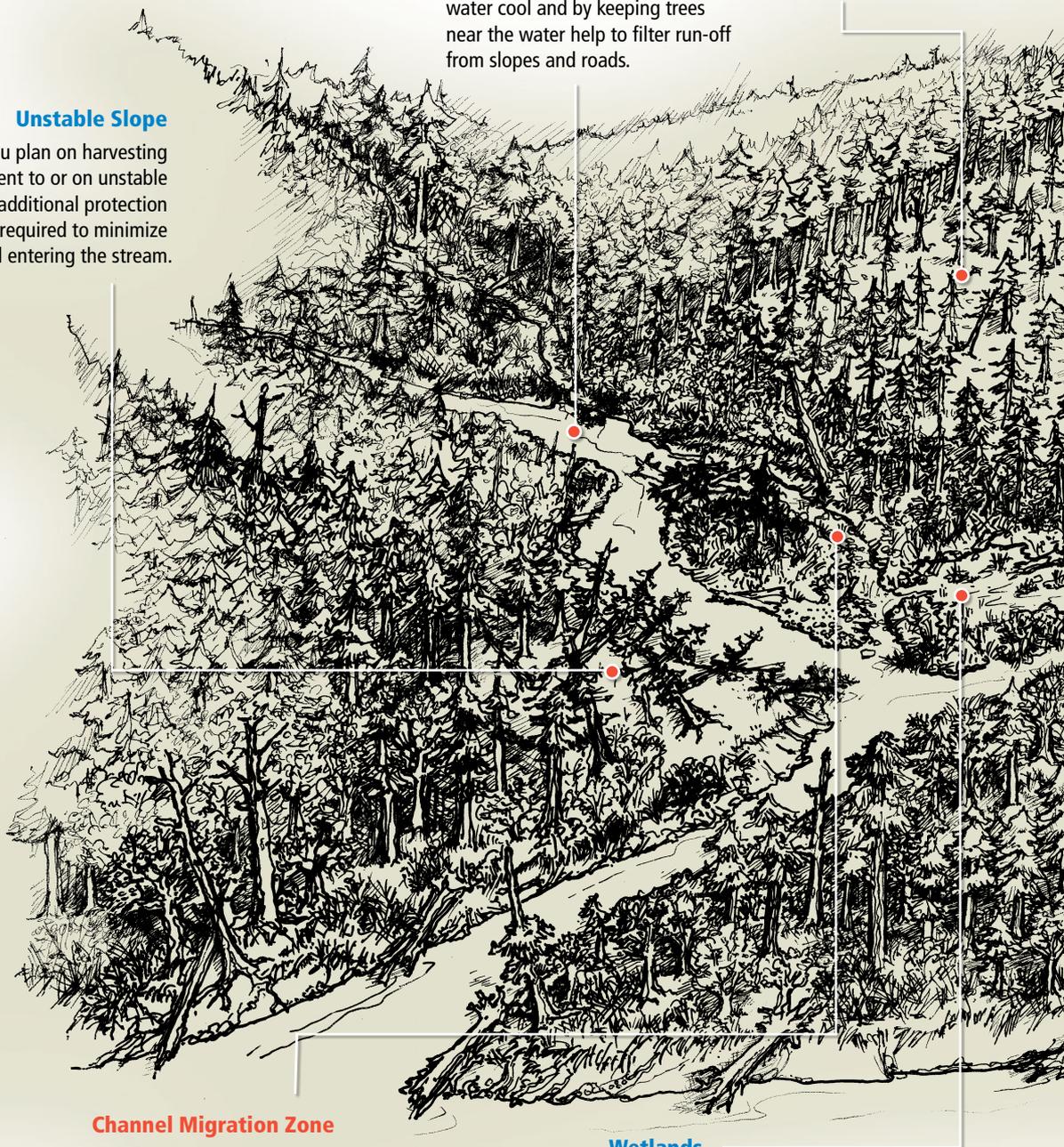
If you plan on harvesting adjacent to or on unstable slopes, additional protection may be required to minimize soil entering the stream.

Type 'F' Stream

These include streams, lakes, and ponds that are used by fish, amphibians, wildlife and for drinking water. RMZs on these waters protect fish habitat by retaining shade trees to keep the water cool and by keeping trees near the water help to filter run-off from slopes and roads.

Thinning

A landowner may want to thin if their management goal is to create larger trees to be harvested at a later time.



Channel Migration Zone

The log jam blocking the entrance of this channel will rot or be displaced by the adjacent stream channel. This area will need to be protected as part of the Riparian Management Zone.

Wetlands

An area of 1/4 acre or more covered by open water seven consecutive days between April 1 and October 1.



Type 'F' Stream

A culvert that restricted fish passage was removed.

Type 'Np' Stream

These flow year round either on the surface of the stream bed or sometimes below the surface for some distance. Buffers on these waters provide habitat for amphibians, protect downstream fish habitat and water quality.

Type 'Ns' Stream

These do not flow year round, but they connect to a Type S, F, or Np stream. Buffers are not required on these streams.

However, since they connect to fish habitat or drinking water, use of heavy equipment is limited to 30 feet on each side of these streams.

Leave Trees

This is a clump of green recruitment trees surrounding a wildlife reserve tree (snag).

Water Bar

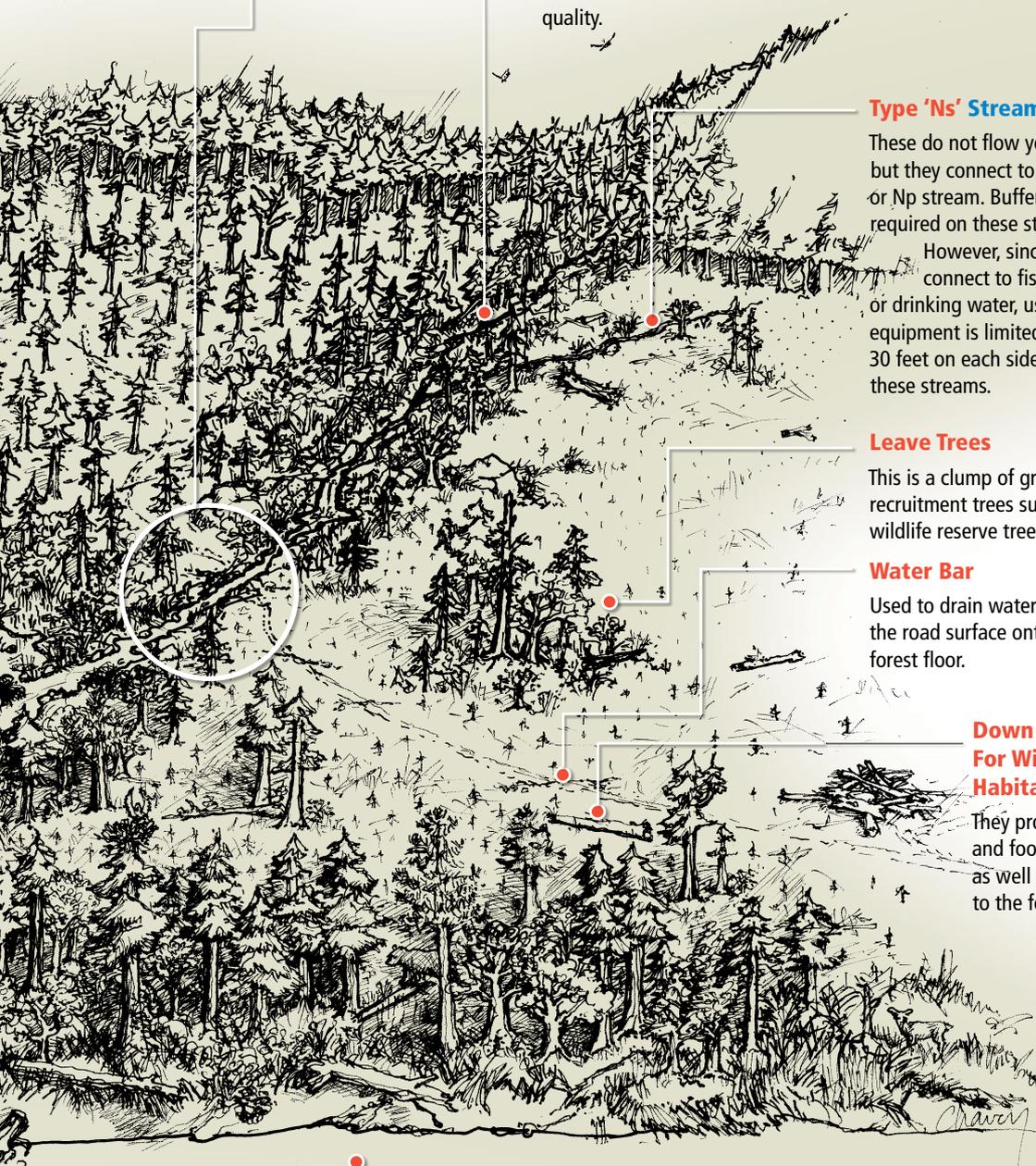
Used to drain water from the road surface onto the forest floor.

Down Logs For Wildlife Habitat

They provide shelter and food to wildlife as well as nutrients to the forest soil.

Type 'S' Stream

These are Shorelines of the State and are usually large, named rivers or creeks. If your forest practice activity is within 200 feet of Type S stream, please contact your county planning department. Some counties require permits for forest practices activities adjacent to Shorelines of the State.







Riparian Management Zones*

A Riparian Management Zone is the area that is located on each side of a Type S, F or Np stream where trees are left to provide protection from disturbance when forest practices activities are conducted. It is important to protect this area because it provides a mix of food and cover for aquatic species and protects water quality. The trees that are left provide shade and nutrients for the stream, as well as habitat for many wildlife species.

If you have a stream on your property, the following steps will help guide you in determining your Riparian Management Zone.

FOLLOW THESE STEPS

- 1 DETERMINE THE TYPE OF STREAM(S) YOU HAVE ON YOUR PROPERTY
- 2 DETERMINE THE WIDTH OF THE STREAM
- 3 DETERMINE THE SITE CLASS OF YOUR RIPARIAN MANAGEMENT ZONE (RMZ)
- 4 DETERMINE THE HARVEST OPTION
- 5 MEASURE AND MARK YOUR RIPARIAN MANAGEMENT ZONE (RMZ)

* The landowner is responsible for verifying stream locations, determining the type of stream you have, and providing that information on the Forest Practices Activity map. If you disagree with the stream types on your Forest Practices activity map or have questions, contact your local DNR region office for assistance. Any work in or over streams may require a Hydraulic Project Approval (HPA) permit from the Washington Department of Fish and Wildlife (WDFW).

1

DETERMINE THE STREAM TYPES YOU HAVE ON YOUR PROPERTY

Obtain a copy of an activity map for your area that identifies the locations and types of streams. All maps and forms are available at your local DNR region office or online at <http://www.dnr.wa.gov/BusinessPermits/ForestPractices/>. The following information will help guide you in determining what stream type(s) you have on your property.

**STREAM TYPE FISH**

These are Shorelines of the State and are usually large, named rivers or creeks. If your forest practices activity is within 200 feet of a Type S stream, please contact your county planning department. Some counties require permits for forest practices activities adjacent to Shorelines of the State.

**STREAM TYPE FISH**

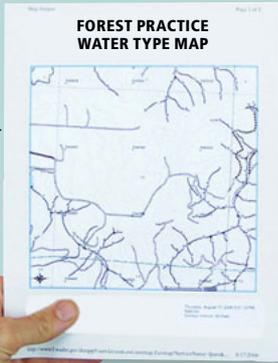
These include streams, lakes, and ponds that are used by fish, amphibians, wildlife, and for drinking water. Buffers on these waters protect fish habitat by retaining shade trees to keep the water cool and help to filter run-off from slopes and roads.

**STREAM TYPE Nperennial**

These flow year round either on the surface of the streambed or sometimes below the surface for some distance. Buffers on these waters provide habitat for amphibians, protect downstream fish habitat and water quality.

**STREAM TYPE Nseasonal**

These do not flow year round, but they connect to a Type S, F, or Np stream. There are no buffers required on these streams. However, because they connect to fish habitat or drinking water, use of heavy equipment is limited to 30 feet on each side of these waters.



STREAM TYPE U

These are streams that have not been verified in the field.

GET THE WATER TYPE MAP ONLINE



You can get maps from the Forest Practices web site: <http://www.dnr.wa.gov/forestpractices>. Maps also are available at your local DNR region office. You will need to know the section, township, and range of your activity to download or request a map. Please contact the county assessor for this information.

If you have questions about the map standards or the activity map, please contact the Forest Practices Help Desk at (360) 902-1420. The e-mail address is FPA/N@dnr.wa.gov. You may also contact the DNR region office for help.

All maps and forms that help you determine the stream types on your property are available online or at your local DNR region office.



The landowner is responsible for verifying stream locations, determining the stream type, and providing that information on the Forest Practices Activity map. Forest Practices foresters will confirm your stream type.

If you disagree with the stream types on your Forest Practices activity map or have questions, contact your local DNR region office for assistance.

Any work in or over streams may require a Hydraulic Project Approval (HPA) permit from the Washington Department of Fish and Wildlife (WDFW).

If you have streams on your property, a HPA permit is applied for automatically with the submittal and processing of your FPA/N. You can also apply for only the HPA permit by visiting the WDFW website at wdfw.wa.gov/hab/hpapage.htm.

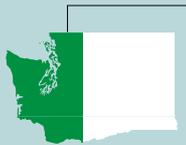
Western Washington and Eastern Washington Water Type Classification Worksheets are available on-line and will assist you with typing your streams. <http://www.dnr.wa.gov/BusinessPermits/ForestPractices/>.

These are general descriptions of water types. For complete definitions, refer to WAC 222-16-031.

2

DETERMINE THE WIDTH OF THE STREAM(S) ON YOUR PROPERTY

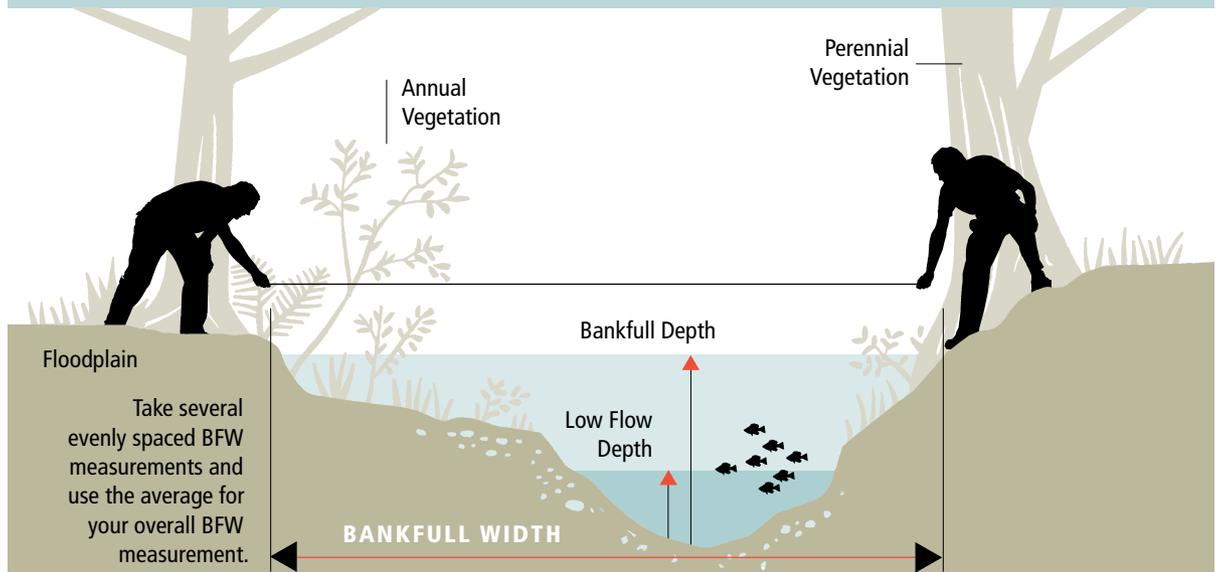
To determine the Riparian Management Zone for Type S and F streams in both Eastern and Western Washington, you will need to determine the bankfull width (BFW) distance for each stream or stream segment.

**WESTERN WASHINGTON**

Determine if your stream or stream segment is 10 feet or less bankfull width, or more than 10 feet bankfull width.

**EASTERN WASHINGTON**

Determine if your stream or stream segment is 15 feet or less bankfull width, or more than 15 feet bankfull width.

**HOW TO MEASURE THE BANKFULL WIDTH (BFW)**

To get an accurate measurement of your stream you will need to know about bankfull width (BFW). Bankfull width is often found where you see a break in the slope or the erosion line in a steep stream bank caused by the stream. Where BFW is not easily found it is best described as the point on the bank where plants change from water tolerant species to upland species. This point can be significantly wider than the actual width of the flowing stream, especially after periods of no rain. The BFW measurement is different for streams, lakes, ponds, impoundments, and tidal water.

To measure the width of your stream, take several evenly spaced BFW measurements and use the average of those measurements for your overall BFW measurement.

If side channels are present, you will need to add those BFWs to determine your total stream BFW for an accurate measurement of the width of your stream.

FOREST
PRACTICES
MANUAL

See the **Board Manual Section 2** for details on measuring bankfull width (BFW).

3

DETERMINE THE SITE CLASS OF YOUR RIPARIAN MANAGEMENT ZONE (RMZ)

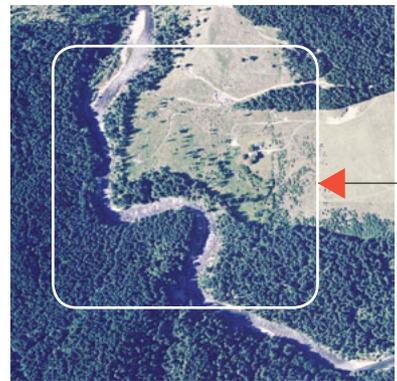
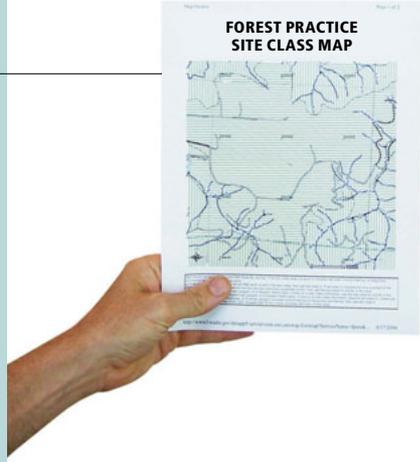
The site class is a growth potential rating for trees within a given area based upon soil surveys.

The designated site class along type S or F streams or stream segments will determine the width of the riparian management zone.



Site class maps are available at your local DNR region office or online at: <http://www.dnr.wa.gov/BusinessPermits/ForestPractices/>

To get an accurate measurement of your stream you will need to know about bankfull width (BFW). Bankfull width is often found where you see a break in slope or where the stream has created an erosion line in the stream bank.



WHAT IF MY PARCEL IS 20 ACRES OR LESS?

If your harvest is on a parcel that totals 20 contiguous acres or less, and you own less than a total of 80 acres of forest land in Washington State, you have different riparian protection requirements.

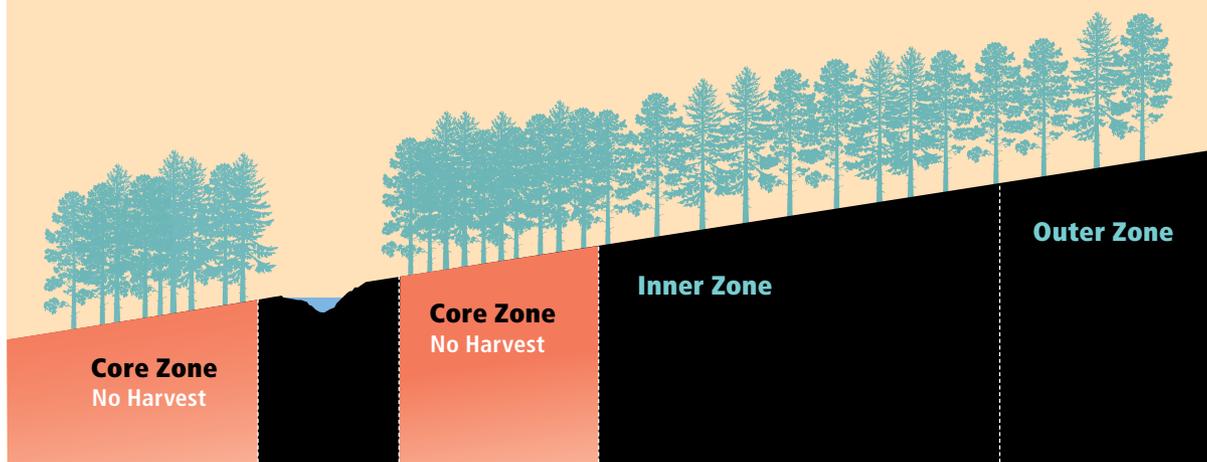
Your actual Riparian Management Zone may have varying widths with minimum and maximum distances. Within these distances, your tree count, shade requirements, and physical features of the landscape will determine your RMZ boundary and allow you to design your harvest unit.

Landowners with exempt 20-acre parcels should review the Forest Practices Rules for specifications on what you will need to do for your 20-acre parcel. Also see WAC 222-30-023

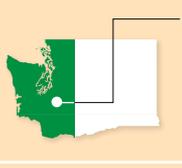


Step 4a is the option to not harvest within the inner zone.

Using the charts on the next page, apply the following widths to your Riparian Management Zone (RMZ) and then go to step 5 on page 82.



4a No Inner Zone Harvest



WESTERN WASHINGTON

S | F

TYPE 'S' OR 'F'
WESTERN WASHINGTON
RMZ REQUIREMENTS



TYPES 'S' AND 'F' ARE FISH HABITAT STREAMS

Site Class	Total RMZ Width	Core Zone Width ¹	Inner Zone Width ²		Outer Zone Width ³	
			Stream ≤ 10'	Stream > 10'	Stream ≤ 10'	Stream > 10'
I	200'	50'	83'	100'	67'	50'
II	170'	50'	63'	78'	57'	42'
III	140'	50'	43'	55'	47'	35'
IV	110'	50'	23'	33'	37'	27'
V	90'	50'	10'	18'	30'	22'

No Harvest



EASTERN WASHINGTON

S | F

TYPE 'S' OR 'F'
EASTERN WASHINGTON
RMZ REQUIREMENTS



TYPES 'S' AND 'F' ARE FISH HABITAT STREAMS

Bankfull width less than or equal to 15 feet

Site Class	Total RMZ Width	Core Zone Width ¹	Inner Zone Width ²	Outer Zone Width ³
I	130'	30'	45'	55'
II	110'	30'	45'	35'
III	90'	30'	45'	15'
IV	75'	30'	45'	0'
V	75'	30'	45'	0'

No Harvest

¹ Measured from outer edge of bankfull width (BFW) or outer edge of Channel Migration Zone (CMZ), whichever is greater.

² Measured from outer edge of Core Zone.

³ Measured from outer edge of Inner Zone.

Bankfull width greater than 15 feet

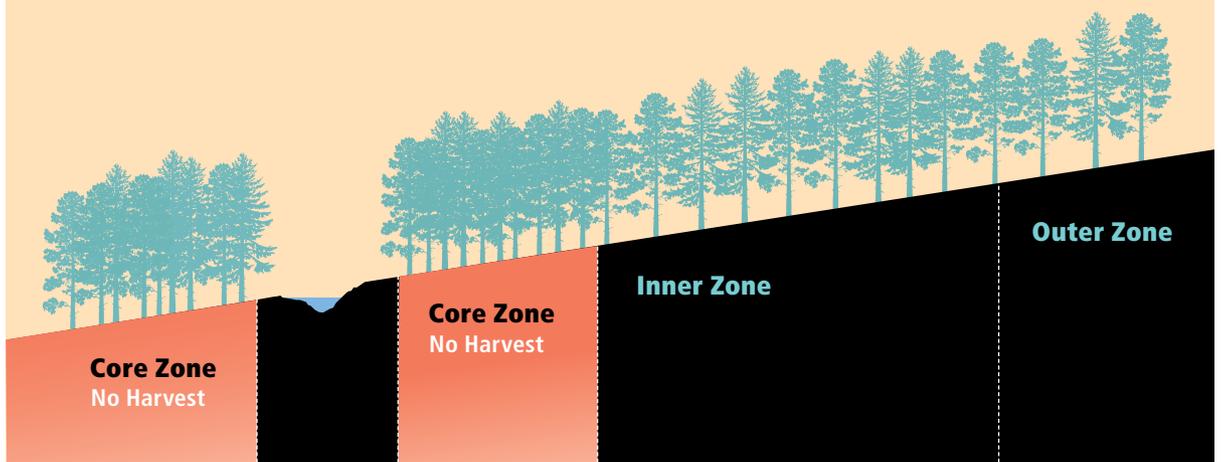
Site Class	Total RMZ Width	Core Zone Width ¹	Inner Zone Width ²	Outer Zone Width ³
I	130'	30'	70'	30'
II	110'	30'	70'	10'
III	100'	30'	70'	0'
IV	100'	30'	70'	0'
V	100'	30'	70'	0'

No Harvest

1 DETERMINE THE TYPE OF STREAM 2 DETERMINE THE WIDTH OF STREAM 3 DETERMINE THE SITE CLASS 4 DETERMINE THE HARVEST OPTION 5 MARK YOUR RMZ

Step 4b is the option to harvest in the Inner Zone. This option differs between Western and Eastern Washington.

In the next pages you will find the harvest options that help protect fish and wildlife, while allowing you to harvest in your Riparian Management Zone.



4b

DETERMINE THE HARVEST OPTION | WESTERN WASHINGTON



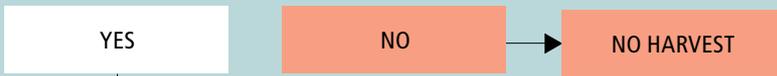
How you harvest adjacent to a Type S, F or Np stream in Western Washington is based upon stream width, site class, and shade requirements needed to protect your stream(s).

A. HOW WIDE IS YOUR RIPARIAN MANAGEMENT ZONE (RMZ)?

Once you have determined the site class and know the width of your stream, you need to determine the maximum width of your RMZ. Using the charts on the next pages, add the core, inner, and outer zone widths. This total width is the maximum width of your RMZ.

B. DO YOU HAVE ADEQUATE SHADE?

You can harvest inside the inner zone only if there is adequate shade present. See WAC 222-30-040



C. DO YOU MEET THE DESIRED FUTURE CONDITION (DFC) REQUIRED?

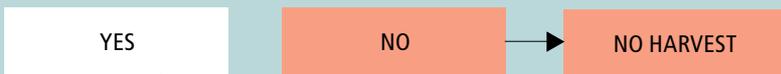
**Desired Future Condition
Target Basal Area at 140 years**

Site Class I	325 sq. feet per acre
Site Class II	325 sq. feet per acre
Site Class III	325 sq. feet per acre
Site Class IV	325 sq. feet per acre
Site Class V	325 sq. feet per acre

Knowing the age of your trees and its basal area, you can calculate the Desired Future Condition. A computer program will help you determine this. See page 74 to learn how to calculate the basal area.



See the **Board Manual Section 7.**



**Inner Zone | Option 1
Thinning from Below Canopy**

This option is explained in the following two pages.

**Inner Zone | Option 2
Leave Trees Closest to Water**

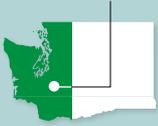
This option is explained in pages 70 and 71.

Outer Zone

You must leave 20 riparian leave trees per acre after harvest. Leave trees in the outer zone may be dispersed or clumped. See WAC 222-30-021 for species and size.

LEAVE TREE REQUIREMENTS

Option 1 | Thinning from Below Canopy

WESTERN
WASHINGTON

S | F

TYPE 'S' OR 'F'
WESTERN
WASHINGTONTYPES 'S' AND 'F'
ARE FISH HABITAT
STREAMS

Bankfull width less than or equal to 10 feet

	River/Stream	Channel Migration Zone	Core Zone Width	Inner Zone Width		Outer Zone Width
SITE CLASS I 200' WIDE RMZ	Bankfull Width/Channel Migration Zone		50'	83'		67'
SITE CLASS II 170' WIDE RMZ			50'	63'	57'	
SITE CLASS III 140' WIDE RMZ			50'	43'	47'	
SITE CLASS IV 110' WIDE RMZ			50'	23'	37'	
SITE CLASS V 90' WIDE RMZ			50'	30'		
			No Harvest	10'		

The width of the inner zone depends on the width of your river/stream(s).

Bankfull width greater than 10 feet

	River/Stream	Channel Migration Zone	Core Zone Width	Inner Zone Width		Outer Zone Width
SITE CLASS I 200' WIDE RMZ	Bankfull Width/Channel Migration Zone		50'	100'		50'
SITE CLASS II 170' WIDE RMZ			50'	78'	45'	
SITE CLASS III 140' WIDE RMZ			50'	55'	35'	
SITE CLASS IV 110' WIDE RMZ			50'	33'	27'	
SITE CLASS V 90' WIDE RMZ			50'	18'	20'	

The width of the inner zone depends on the width of your river/stream(s).

The option to thin from below in Western Washington is determined by many factors. The most significant of these factors is the amount of basal area that can be harvested.

LEAVE TREE REQUIREMENTS

Option 1 | Thinning from Below Canopy



SF

TYPE 'S' OR 'F'
WESTERN
WASHINGTON

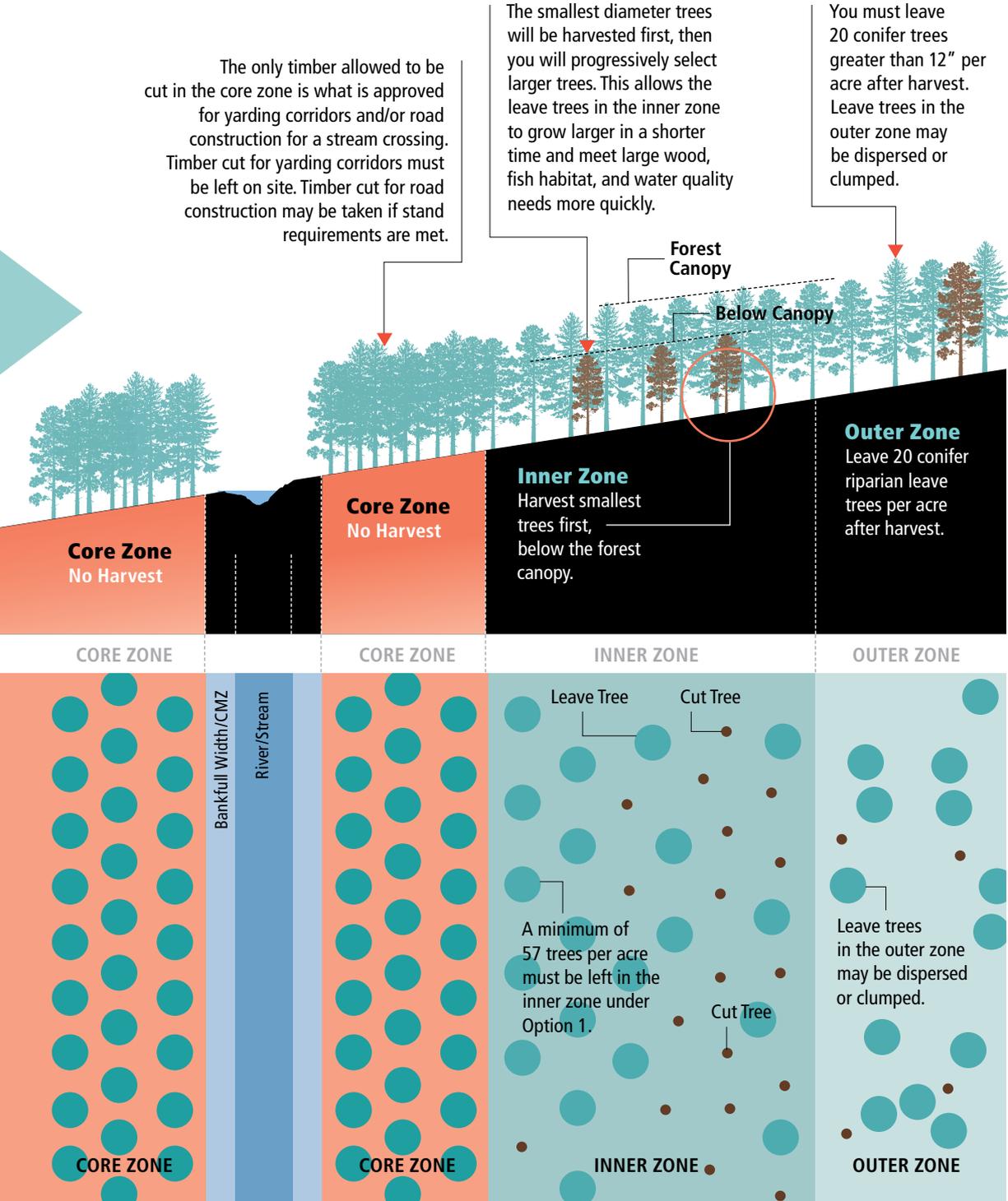


TYPES 'S' AND 'F'
ARE FISH HABITAT
STREAMS

The only timber allowed to be cut in the core zone is what is approved for yarding corridors and/or road construction for a stream crossing. Timber cut for yarding corridors must be left on site. Timber cut for road construction may be taken if stand requirements are met.

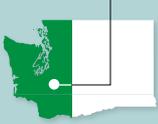
The smallest diameter trees will be harvested first, then you will progressively select larger trees. This allows the leave trees in the inner zone to grow larger in a shorter time and meet large wood, fish habitat, and water quality needs more quickly.

You must leave 20 conifer trees greater than 12" per acre after harvest. Leave trees in the outer zone may be dispersed or clumped.



1 DETERMINE THE TYPE OF STREAM 2 DETERMINE THE WIDTH OF STREAM 3 DETERMINE THE SITE CLASS 4 DETERMINE THE HARVEST OPTION 5 MARK YOUR RMZ

LEAVE TREE REQUIREMENTS

WESTERN
WASHINGTON

Option 2 | Leaving Trees Closest to Water

S F

TYPE 'S' OR 'F'
WESTERN
WASHINGTONTYPES 'S' AND 'F'
ARE FISH HABITAT
STREAMS

Bankfull width less than or equal to 10 feet

	River/Stream	Bankfull Width/CMZ	Core Zone Width	Inner Zone Width	Outer Zone Width
SITE CLASS I 200' WIDE RMZ	River/Stream	Bankfull Width/CMZ	50'	84'	66'
SITE CLASS II 170' WIDE RMZ	River/Stream	Bankfull Width/CMZ	50'	64'	56'
SITE CLASS III 140' WIDE RMZ	River/Stream	Bankfull Width/CMZ	50'	44'	46'

The width of the inner zone depends on the width of your river/stream(s).

No Harvest

30' No Harvest Extension

Bankfull width greater than 10 feet

	River/Stream	Bankfull Width/CMZ	Core Zone Width	Inner Zone Width	Outer Zone Width
SITE CLASS I 200' WIDE RMZ	River/Stream	Bankfull Width/CMZ	50'	84'	66'
SITE CLASS II 170' WIDE RMZ	River/Stream	Bankfull Width/CMZ	50'	70'	50'

The width of the inner zone depends on the width of your river/stream(s).

No Harvest

50' No Harvest Extension

The option to leave trees closest to the stream in Western Washington is determined by multiple factors including site class and basal area.

LEAVE TREE REQUIREMENTS

Option 2 | Leaving Trees Closest to Water



SF

TYPE 'S' OR 'F'
WESTERN
WASHINGTON



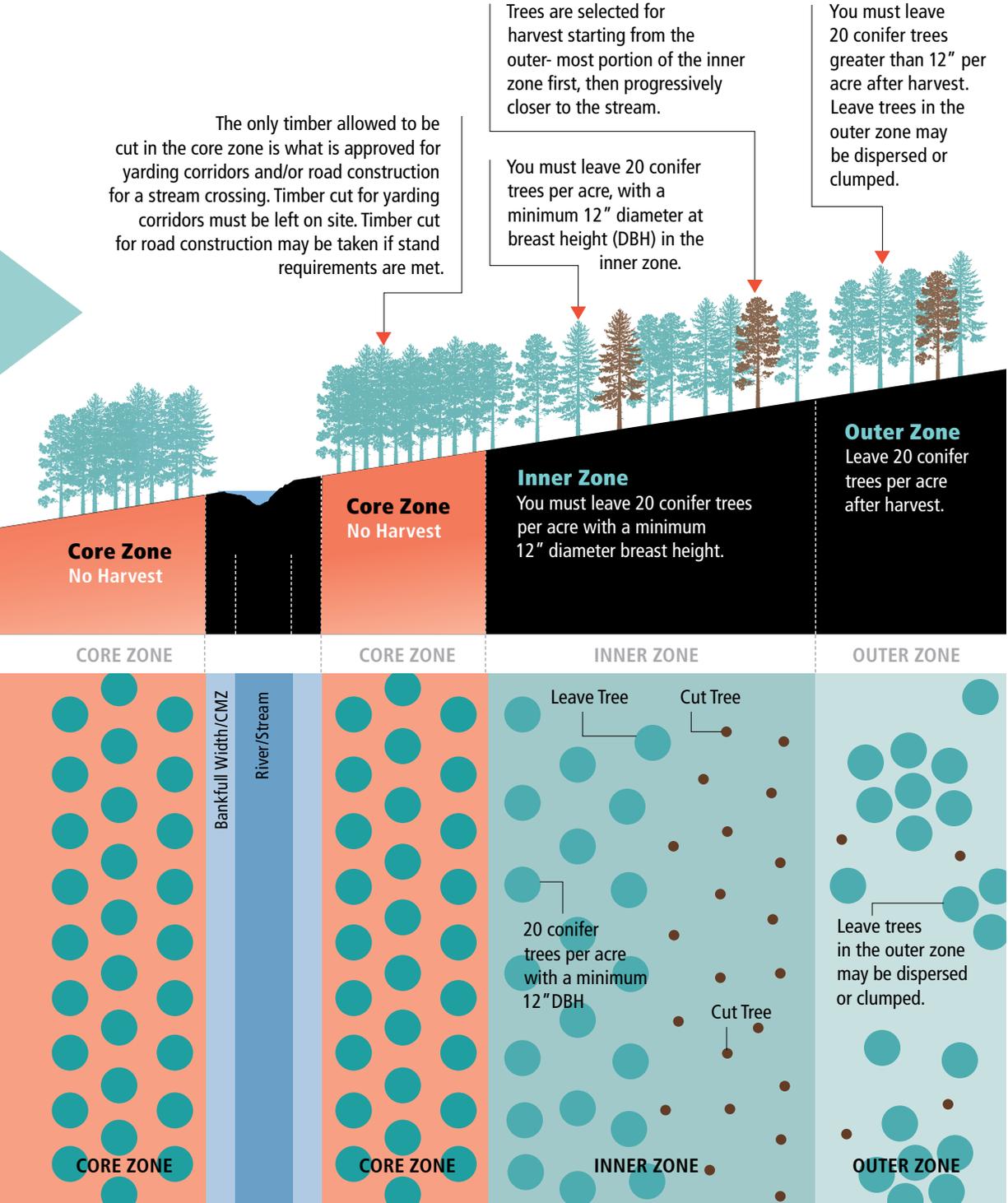
TYPES 'S' AND 'F'
ARE FISH HABITAT
STREAMS

The only timber allowed to be cut in the core zone is what is approved for yarding corridors and/or road construction for a stream crossing. Timber cut for yarding corridors must be left on site. Timber cut for road construction may be taken if stand requirements are met.

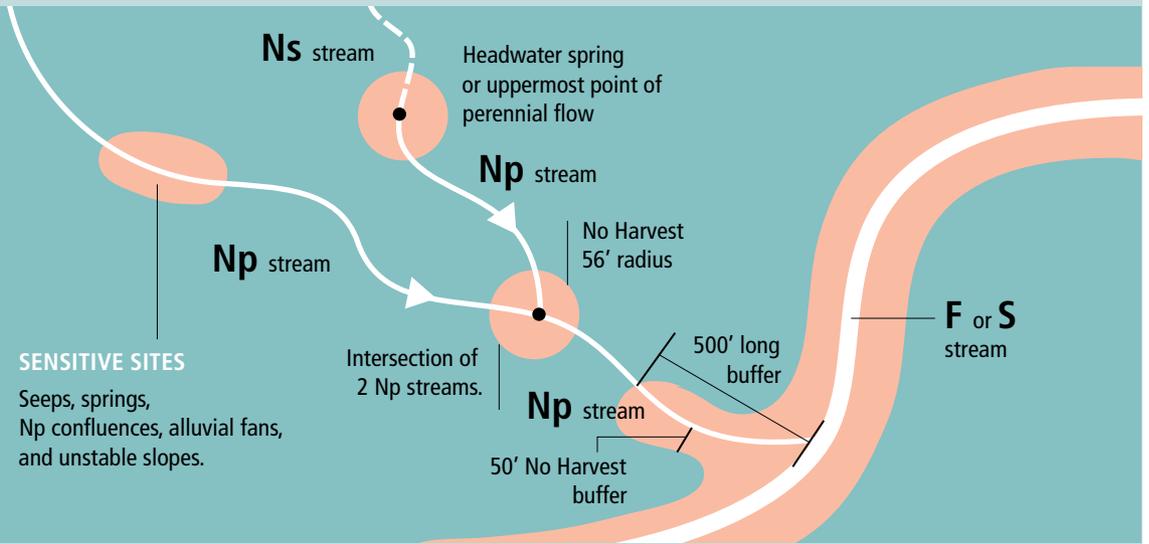
Trees are selected for harvest starting from the outer- most portion of the inner zone first, then progressively closer to the stream.

You must leave 20 conifer trees per acre, with a minimum 12" diameter at breast height (DBH) in the inner zone.

You must leave 20 conifer trees greater than 12" per acre after harvest. Leave trees in the outer zone may be dispersed or clumped.



1 DETERMINE THE TYPE OF STREAM 2 DETERMINE THE WIDTH OF STREAM 3 DETERMINE THE SITE CLASS 4 DETERMINE THE HARVEST OPTION 5 MARK YOUR RMZ



Np

TYPE 'Np' STREAMS RMZ REQUIREMENTS WESTERN WASHINGTON



Protection of Type Np streams and sensitive sites is very important as they contribute to the

quality of water and fish habitat in downstream Type S and/or F streams. They also provide habitat to a variety of wildlife. Type Np streams have a 30 foot equipment limitation zone (ELZ).

If your Np stream is longer than 1,000' and is more than 500' upstream from a Type S or F stream, refer to the Western Washington Type Np RMZ Worksheet. Determine the distance of buffer protection required. The worksheet can be found in the Forest Practices Application instructions.

Sensitive sites associated with Np streams must also be protected. See the chart to the right.



See the **Board Manual Section 7** and Forest Practices Application Worksheet.

Np RIPARIAN MANAGEMENT ZONE

Length of Type Np stream from S or F stream

Length of 50' no touch RMZ required on Type Np stream starting at S or F stream

Greater than 1,000'

500'

Greater than 300' but less than 1,000'

50% of entire length or 300', whichever is greater

Less than or equal to 300'

The entire length of Type Np stream

WHAT ARE SENSITIVE SITES AND WHAT PROTECTION DO THEY NEED?

Headwater spring or in absence of headwater spring, the upper most point of perennial flow.

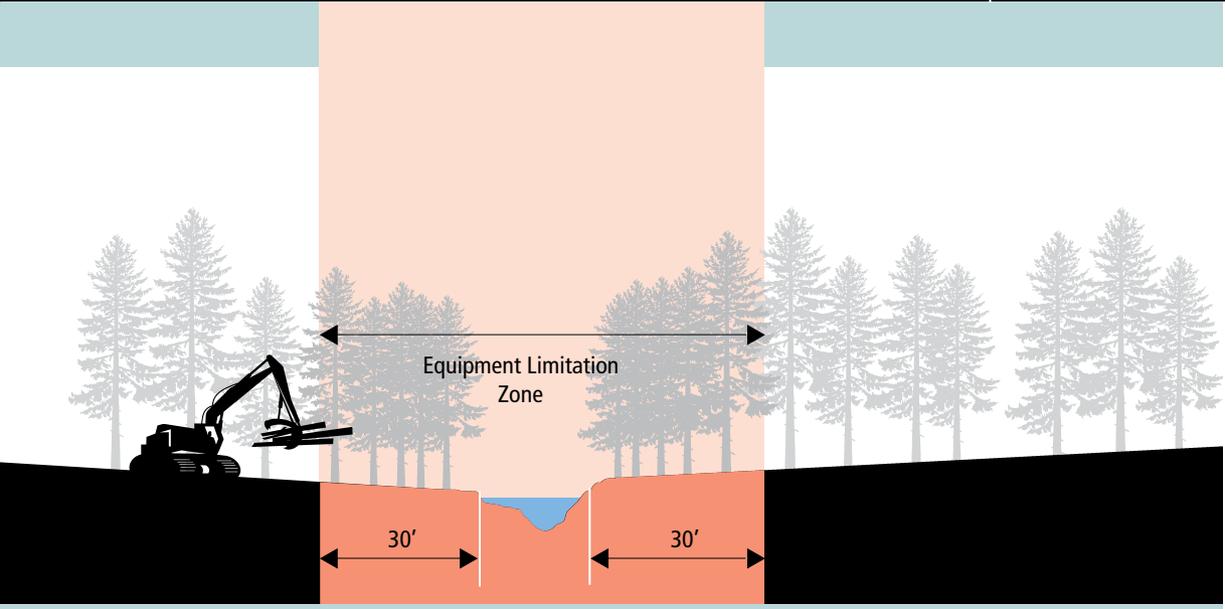
56-foot radius buffer centered on the sensitive site.

Intersection on two or more Type Np waters
56-foot radius buffer centered on the intersection.

Perennially saturated side-slope seep
50' buffer from outer edge of saturated area.

Perennially saturated headwall seep
50' buffer from outer edge of saturated area.

Alluvial fan
No harvest within this area.



Ns

TYPE 'Ns' STREAMS RMZ REQUIREMENTS WESTERN WASHINGTON



Buffers are not required for type Ns streams. There is a 30-foot equipment limitation zone.

30-foot Equipment Limitation Zone (ELZ)

This is a 30-foot wide zone that limits surface disturbances caused by equipment. It is measured from the outer edge of bankfull width. It applies to all type Ns and Np streams. Mitigation is required if harvest activities expose the soil on more than 10 percent of the ELZ length.

Shade

Shade trees greatly influence stream temperature and help provide cool water for fish and other aquatic species. Consider purposefully placing your required leave trees to provide additional stream protection.

Shade trees greatly influence stream temperature and help provide cool water for fish and other aquatic species.



TYPES 'Np' AND 'Ns' ARE NON-FISH HABITAT STREAMS

SANDHILL CRANE ILLUSTRATION BY JANE CHAVEY / DNR

1 DETERMINE THE TYPE OF STREAM 2 DETERMINE THE WIDTH OF STREAM 3 DETERMINE THE SITE CLASS 4 DETERMINE THE HARVEST OPTION 5 MARK YOUR RMZ

WESTERN WASHINGTON

How to Calculate the Basal Area of a Forest

Basal area is an important measurement. If you know basal area you can calculate the number of trees per acre.



See the Board Manual Section 7 to help you determine whether you

can harvest in the inner and outer zones of your Riparian Management Zone.

Add the individual basal area of every tree on an acre and you have the basal area per acre. Basal area is expressed as square feet per acre.

Diameter of tree at Breast Height (DBH)

DBH	BA
6"	.20 sq ft
8	.35
10	.55
12	.79
14	1.1
16	1.4
18	1.8
20	2.2
22	2.6
24	3.1
26	3.7
28	4.3
30	4.9
32	5.6
34	6.3
36	7.1
38	7.9
40	8.7
42	9.6
44	10.6
46	11.5
48	12.6
50	13.6
52	14.8
54	15.9
56	17.1
58	18.3
60	19.6

What is Basal Area?

Basal area (BA) is a calculation to determine the amount of area a tree takes up in the forest.

Basal area is usually calculated on a per-acre basis in order to know how much surface area (square feet) the trees are occupying on each acre.

The basal area of a tree is calculated by measuring its diameter.

Measure the tree at 4.5 feet above the ground on the uphill side which is referred to as DBH (diameter at breast height).

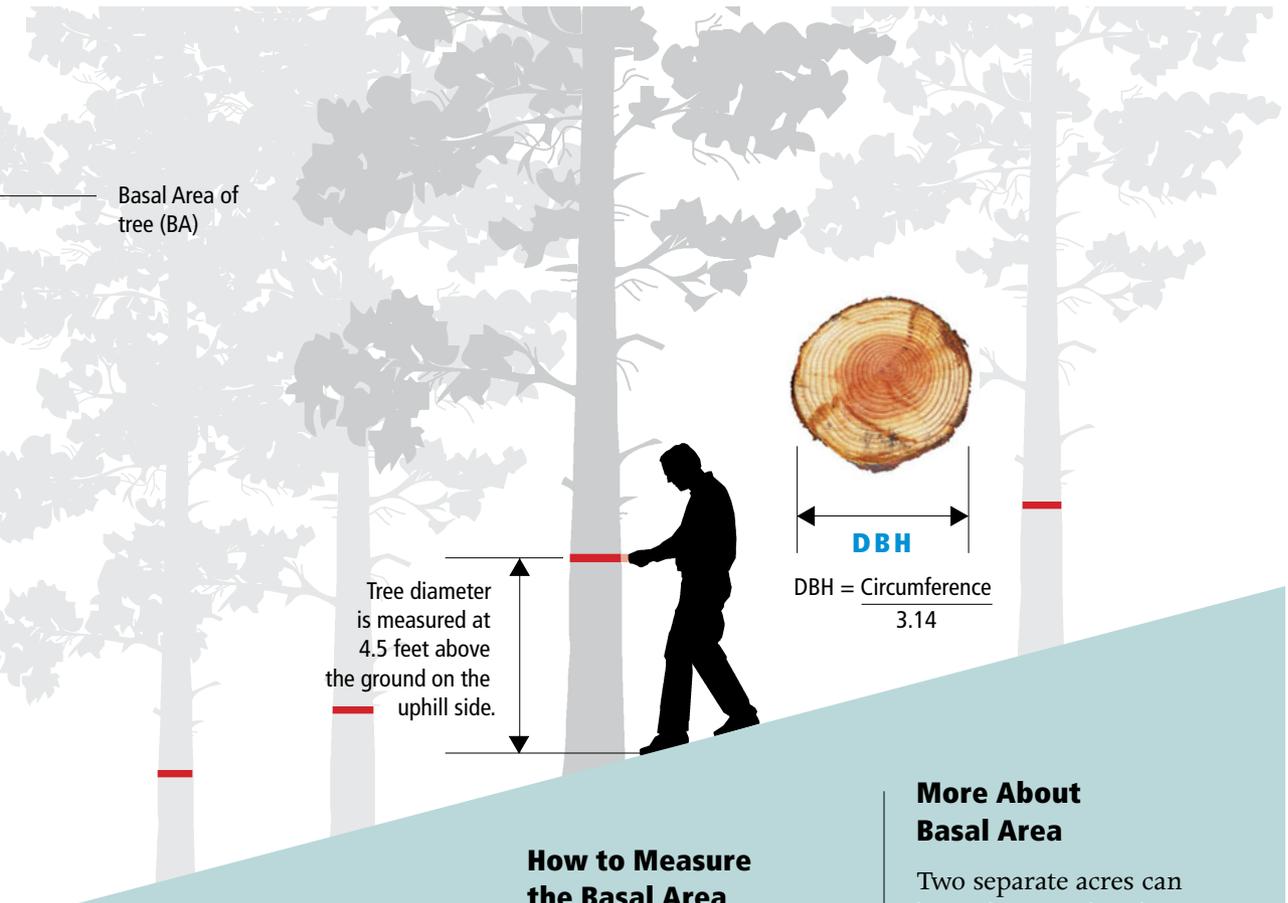
If you know basal area you can calculate the number of trees per acre.

When you add the individual basal area of every tree on an acre you can then determine how many trees you can remove.



A diameter tape measures a tree's circumference and converts it to diameter in inches.

This table shows the Diameter at Breast Height (DBH) in inches, and its corresponding Basal Area (BA) in square feet.



Basal Area of tree (BA)

Tree diameter is measured at 4.5 feet above the ground on the uphill side.



DBH
 $DBH = \frac{Circumference}{3.14}$

In Western Washington, inner zone harvest is based on the Desired Future Condition (DFC) model. This model will provide all the information necessary to lay out an inner zone harvest.

How to Measure the Basal Area

There are two common ways to measure DBH. Use the chart to determine BA:

- 1 A diameter tape measures a tree's circumference and converts it automatically to diameter in inches.
- 2 A household tape measure can be used to measure the circumference of a tree. Convert the circumference to diameter by using the following formula:

$$DBH = \frac{Circumference}{3.14}$$

Example

250 trees on an acre which all have diameters of 12 inches DBH (0.8 square feet) would total 196 square feet of basal area.

$$0.8 \times 250 = 196.3 \text{ square feet of basal area}$$

More About Basal Area

Two separate acres can have the same basal area but a different number of trees. The tree diameter is an important factor.



This acre has a basal area of 78.5 with **24-inch** diameter trees



This acre has a basal area of 78.5 with **6-inch** diameter trees

4b

DETERMINE THE HARVEST OPTION | EASTERN WASHINGTON



How you harvest adjacent to a Type S, F or Np stream (see page 60) in Eastern Washington is based upon the site class, timber habitat type, and shade requirements needed to protect your stream(s).

A. HOW WIDE IS YOUR RIPARIAN MANAGEMENT ZONE (RMZ)?

Once you have determined the site class and know the width of your stream, using the charts below, add the core, inner, and outer zone widths to determine the maximum width of your RMZ.

S | F

TYPE 'S' OR 'F'
EASTERN WASHINGTON
RMZ REQUIREMENTSBankfull width less than
or equal to 15 feet

	River/Stream	Bankfull Width/Channel Migration Zone	Core Zone Width	Inner Zone Width	Outer Zone Width
SITE CLASS I 130' WIDE RMZ	River/Stream	Channel Migration Zone	30'	45'	55'
SITE CLASS II 110' WIDE RMZ		Bankfull Width/Channel Migration Zone	30'	45'	35'
SITE CLASS III 90' WIDE RMZ		Bankfull Width/Channel Migration Zone	30'	45'	15'
SITE CLASS IV 75' WIDE RMZ		Bankfull Width/Channel Migration Zone	30'	45'	
SITE CLASS V 75' WIDE RMZ		Bankfull Width/Channel Migration Zone	30'	45'	

Not all streams in Eastern Washington will have an outer zone.

The width of the inner zone depends on the width of your river/stream(s).

No Harvest

TYPES
'S' AND 'F' ARE
FISH HABITAT
STREAMS



The only timber allowed to be cut in the core zone is what is approved for yarding corridors and/or road construction for a stream crossing. Timber cut for yarding corridors must be left on site.

S | F

TYPE 'S' OR 'F'
EASTERN WASHINGTON
RMZ REQUIREMENTSBankfull width greater
than 15 feet

	River/Stream	Bankfull Width/Channel Migration Zone	Core Zone Width	Inner Zone Width	Outer Zone Width
SITE CLASS I 130' WIDE RMZ	River/Stream	Channel Migration Zone	30'	70'	30'
SITE CLASS II 110' WIDE RMZ		Bankfull Width/Channel Migration Zone	30'	70'	10'
SITE CLASS III 100' WIDE RMZ		Bankfull Width/Channel Migration Zone	30'	70'	
SITE CLASS IV 100' WIDE RMZ		Bankfull Width/Channel Migration Zone	30'	70'	
SITE CLASS V 100' WIDE RMZ		Bankfull Width/Channel Migration Zone	30'	70'	

Not all streams in Eastern Washington will have an outer zone.

No Harvest



B. IS YOUR HARVEST IN THE BULL TROUT OVERLAY?

Harvest units within the bull trout overlay must leave all available shade within 75 feet of the bankfull width or CMZ, whichever is greater.

YES

NO



See the Board Manual Section 1 for Bull trout habitat overlay map.

C. DO YOU HAVE ADEQUATE SHADE?

You can harvest inside the inner zone only if there is adequate shade present. The amount of shade required depends on whether the harvest unit is within the bull trout habitat overlay.

YES

NO

NO HARVEST



See the Board Manual Section 1 for guidance on determining shade.

D. DO YOU MEET THE BASAL AREA REQUIREMENTS?

YES

NO

NO HARVEST

YOU ARE ALLOWED TO HARVEST | With the Following Requirements

Inner Zone

Leave tree requirements are based upon habitat type and elevation:

Ponderosa Pine

Elevations at or below 2500 feet.

Mixed Conifer

Elevations from 2501 feet to 5000 feet.

High Elevation

Elevations above 5000 feet.

The stand must meet certain basal area requirements. You must leave a certain number, size, and type of leave trees.

The stand must meet certain basal area requirements.

Outer Zone

Leave tree requirements are based upon habitat type and elevation:

Ponderosa Pine

Leave 10 dominant or co-dominant trees per acre.

Mixed Conifer

Leave 15 dominant or co-dominant trees per acre.

High Elevation

Leave 20 dominant or co-dominant trees per acre.

See Leave Tree Requirements graphics on next pages



LEAVE TREE REQUIREMENTS

Stands with High Basal Area

EASTERN WASHINGTON



SF

TYPE 'S' OR 'F'
EASTERN WASHINGTON



TYPES 'S' AND 'F'
ARE FISH HABITAT
STREAMS

1 DETERMINE THE TYPE OF STREAM 2 DETERMINE THE WIDTH OF STREAM 3 DETERMINE THE SITE CLASS 4 DETERMINE THE HARVEST OPTION 5 MARK YOUR RMZ

Ponderosa Pine

At or below 2,500 feet

Mixed Conifer

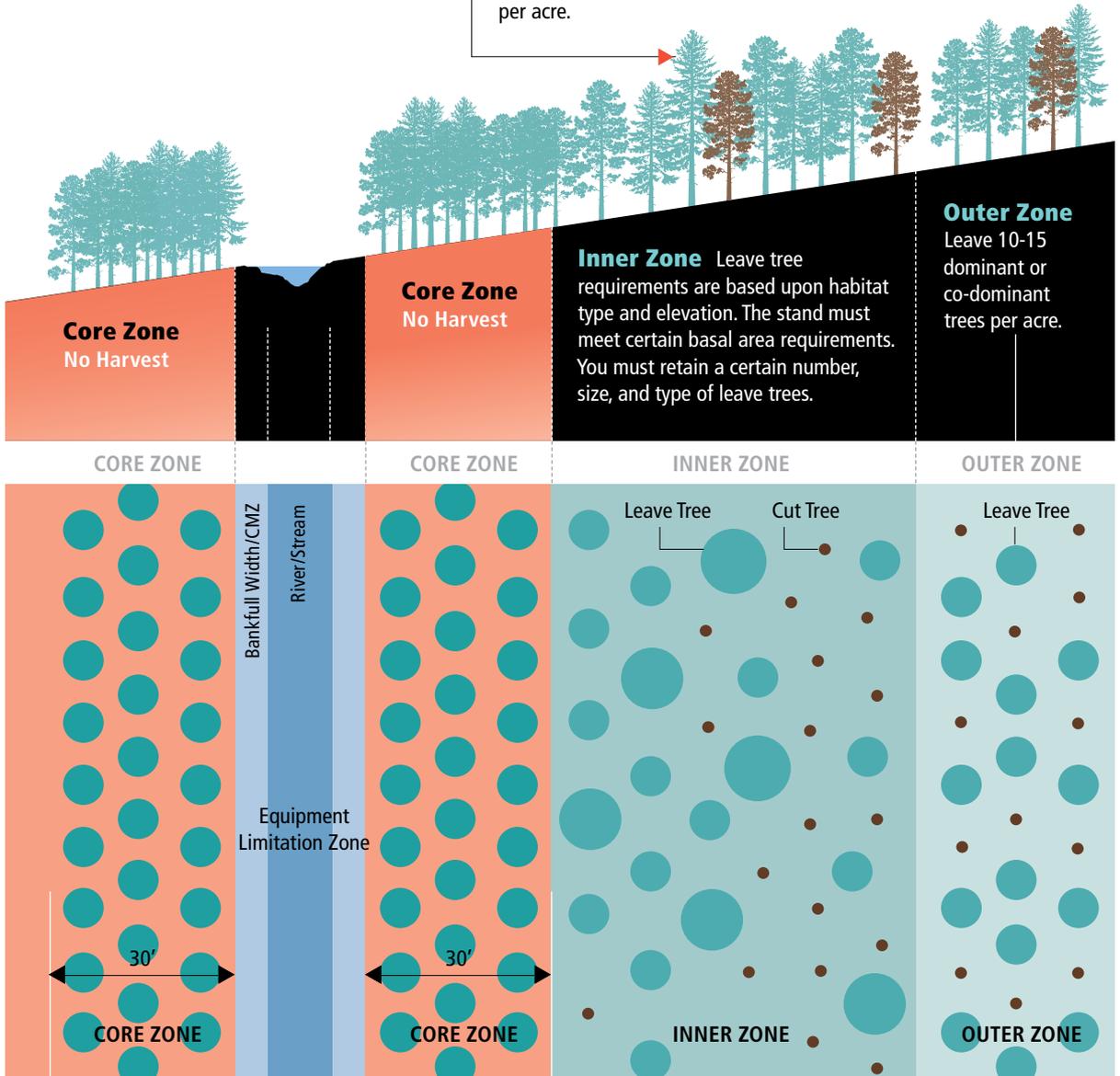
from 2,500 to 5,000 feet

Generally, you will have to leave 21 trees per acre with the largest diameters. If you don't meet basal area requirements, leave 29 trees per acre of the next available largest diameter trees.

If you still don't meet the basal area requirements you will need to leave all trees that are 6 inches in diameter and larger per acre.



Please refer to the Forest Practices Rules for your specific site: 222-30-022



LEAVE TREE REQUIREMENTS

High Elevation Stands



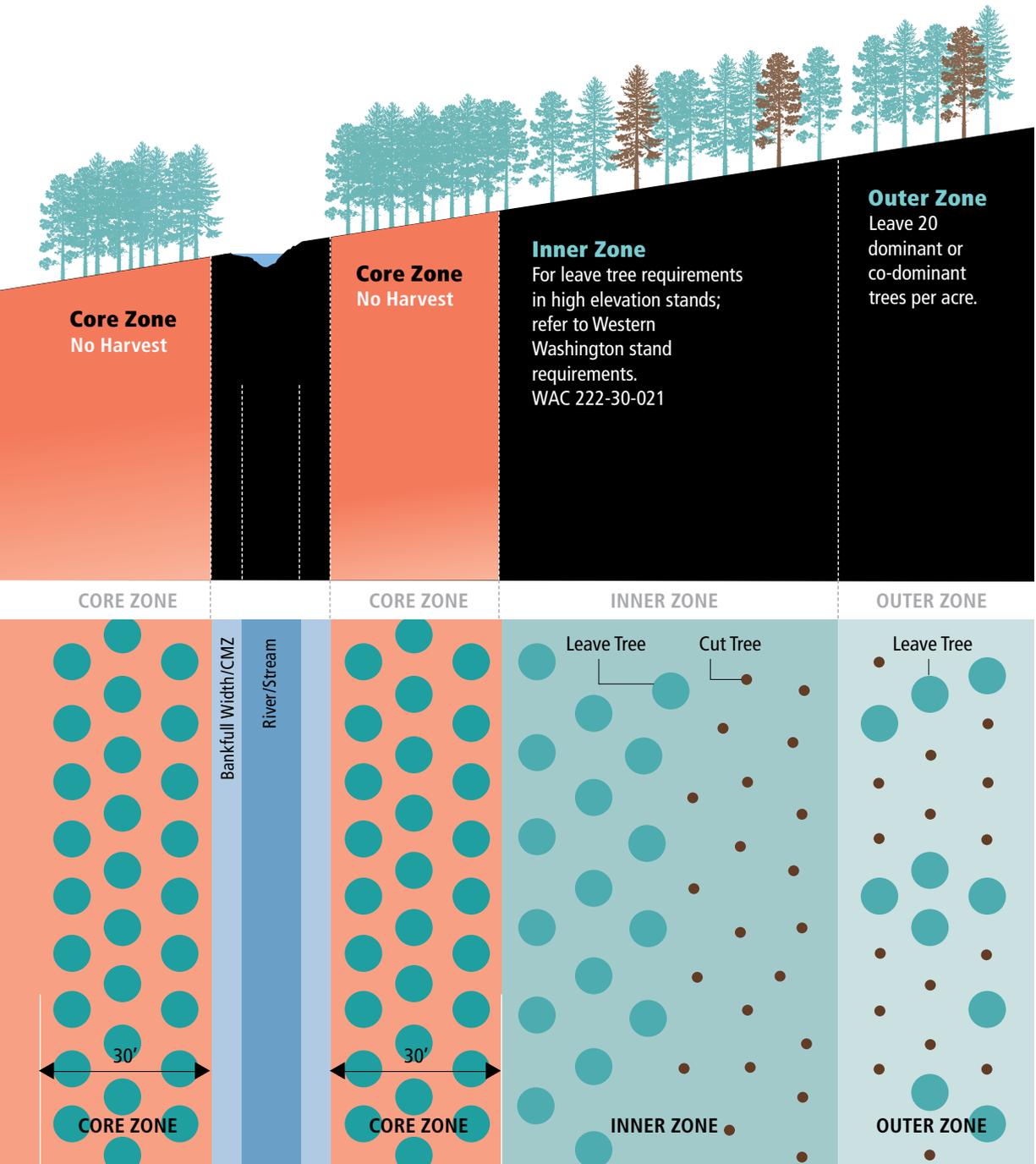
SF

TYPE 'S' OR 'F'
EASTERN
WASHINGTON



TYPES 'S' AND 'F'
ARE FISH HABITAT
STREAMS

High Elevation
Above 5,000 feet



1 DETERMINE THE TYPE OF STREAM 2 DETERMINE THE WIDTH OF STREAM 3 DETERMINE THE SITE CLASS 4 DETERMINE THE HARVEST OPTION 5 MARK YOUR RMZ

Np

TYPE 'Np' STREAMS RMZ REQUIREMENTS EASTERN WASHINGTON

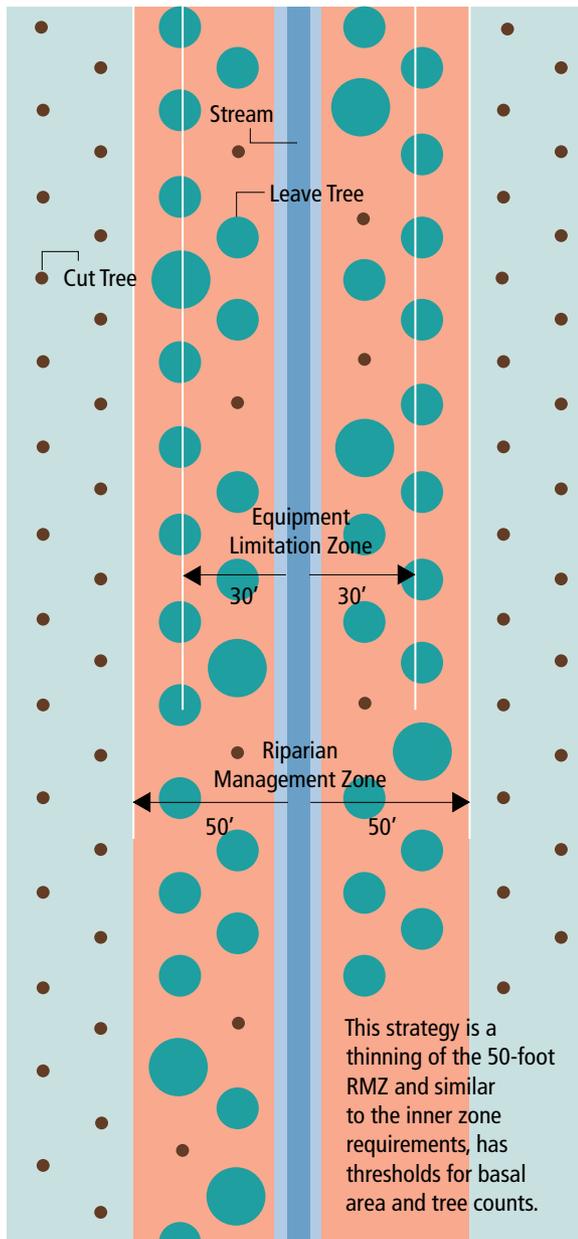


Type Np streams require a 50-foot Riparian Management Zone and a 30-foot equipment limitation zone. You may be able to harvest within this 50' buffer if you meet certain basal area requirements and tree counts (this is similar to the Inner Zone requirements for Type S or F streams).

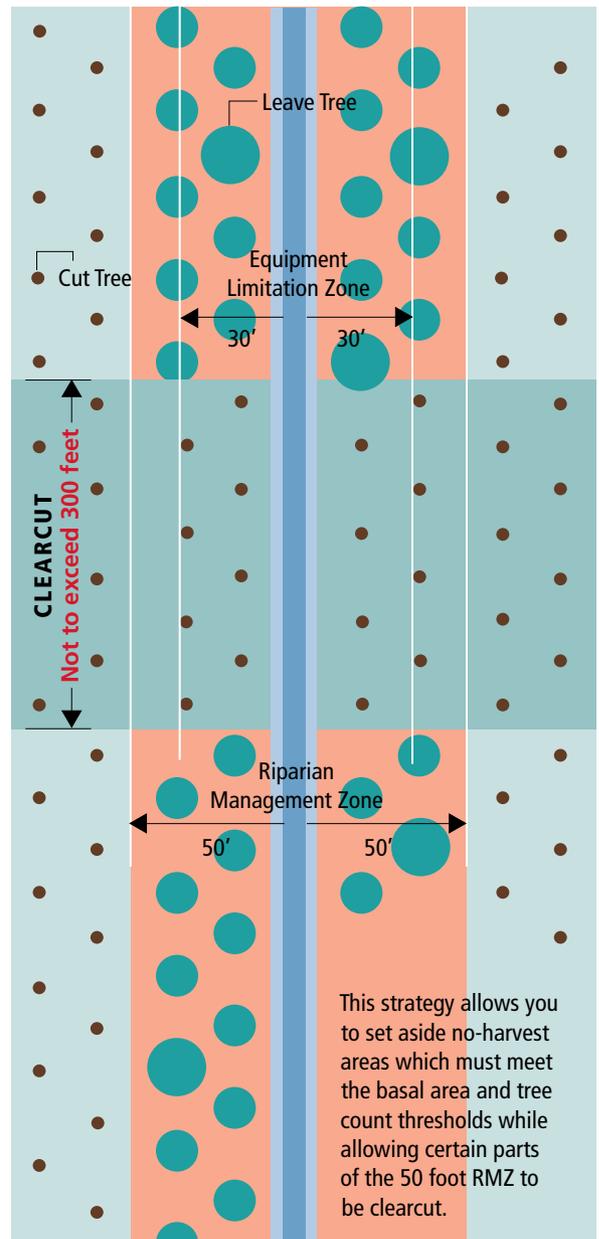
What options do you have?

For Type Np streams, you can select one of two harvest strategies:

Partial Cut Strategy



Clearcut Strategy



Protection of Type Np, Ns streams and sensitive sites is very important as they contribute to the quality of water and fish habitat in downstream Type S and/or F streams.

Ns

TYPE 'Ns' STREAMS RMZ REQUIREMENTS EASTERN WASHINGTON



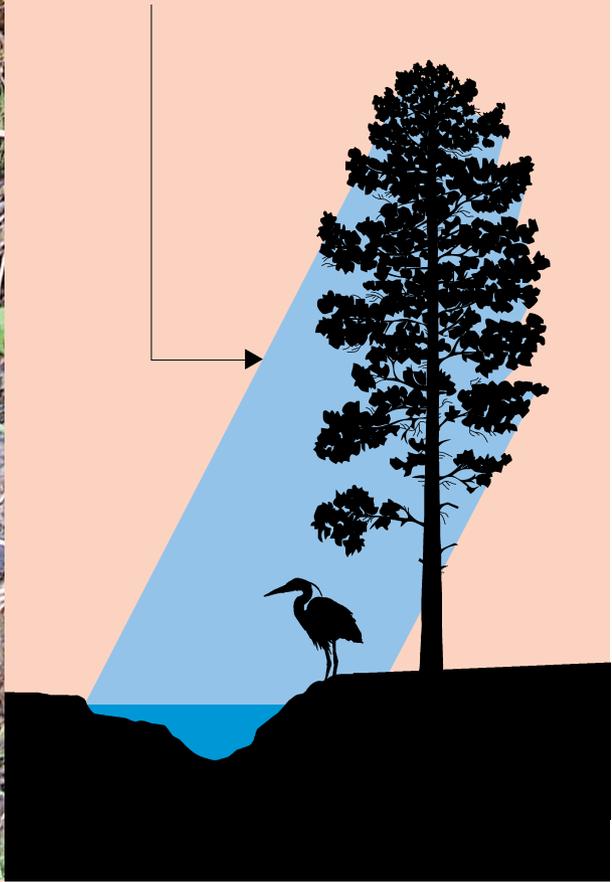
Buffers are not required for type Ns streams. There is a 30-foot equipment limitation zone.

30-foot Equipment Limitation Zone (ELZ)

This is a 30-foot wide zone that limits equipment use and disturbances. It is measured from the outer edge of bankfull width. It applies to all type Ns and Np streams. Mitigation is required if harvest activities expose the soil on more than 10 percent of the ELZ associated with each harvest activity.

Shade

Shade trees greatly influence stream temperature and help provide cool water for fish and other aquatic species. Consider placing your required leave trees to provide additional stream protection.



1 DETERMINE THE TYPE OF STREAM 2 DETERMINE THE WIDTH OF STREAM 3 DETERMINE THE SITE CLASS 4 DETERMINE THE HARVEST OPTION 5 MARK YOUR RMZ



5

MEASURE AND MARK YOUR RIPARIAN MANAGEMENT ZONE (RMZ)

▶ All measurements are taken horizontally, while keeping the measuring tape level at all times.

▶ Tree diameter measurements are taken at “diameter at breast height” or DBH. This measurement is taken with a diameter tape at a height of 4.5 feet from the ground.



▶ Bright tree-marking ribbon or paint is recommended. Using a different color for road location from the color used on the RMZ or harvest boundary helps eliminate confusion.

▶ Marking the proposal on the ground is very important. Clear marking helps to eliminate resource and property damage and delays in application processing.



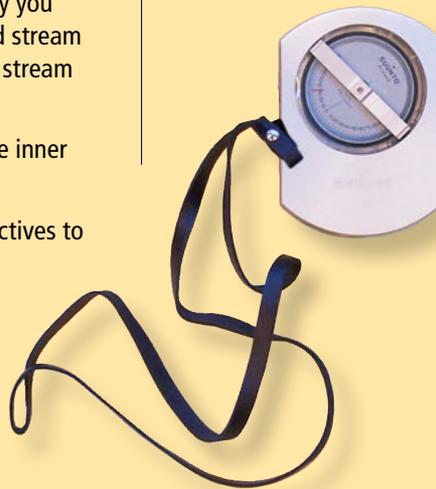
See the **Board Manual Section 7** and Forest Practices Application Worksheet.

Identifying the proposal on the ground is very important. Clear marking helps to eliminate resource and property damage and delays in application processing.

Suggestions for Success

The following list has suggestions to help you achieve management objectives while protecting long-term investments and public resources. These suggestions may exceed Forest Practices Rules.

- I have read the “Riparian Management Zones” section.
 - Verify all stream types within 200 feet of your harvest, including those on your neighbor’s property (with the neighbor’s permission).
 - Verify all stream types within 200 feet of any road construction, including those on your neighbor’s property (with the neighbor’s permission).
 - Determine whether you will harvest within your Riparian Management Zone (RMZ).
 - Identify and mark boundaries of the Channel Migration Zone (CMZ), if present.
 - Identify and mark boundaries of RMZs.
 - Retain trees necessary to meet shade requirements along streams.
 - Determine which harvest strategy you will use based upon habitat type and stream width (Eastern WA) or site class and stream width (Western WA).
 - Mark trees for removal within the inner and outer zones of your RMZ.
 - Communicate management objectives to logging operator.
- Avoid disturbing stumps, root systems, or any logs within the stream channel or embedded in stream banks.
 - Avoid damage to stream banks and riparian and wetland vegetation.
 - ▶ Fall trees away from water and management zones.
 - ▶ Use tree-length yarding where possible.
 - ▶ Lift the leading end of the logs during skidding and/or yarding.
 - Contact a consulting forester for assistance with your RMZ layout.
 - Obtain all required permits from city, county, state, and federal agencies.







Wetland Management Zones*

A Wetland Management Zone (WMZ) is the area located around the perimeter of a wetland where trees are left to provide protection from disturbance. It is important to protect this area because it provides a mix of food and cover for aquatic species and protects water quality. The trees that are left provide shade and nutrients for the wetland, as well as habitat for many wildlife species.

If you have a wetland on your property, the following steps will help guide you in determining your Wetland Management Zone.

FOLLOW THESE STEPS

- 1 DETERMINE WETLAND TYPES
- 2 DETERMINE WETLAND MANAGEMENT ZONES
- 3 CONDUCT A TREE INVENTORY WITHIN THE WETLAND MANAGEMENT ZONE
- 4 MEASURE AND MARK YOUR WETLAND MANAGEMENT ZONE

* The landowner is responsible for verifying stream locations, determining the type of wetland you have, and providing that information on the Forest Practices Activity map. If you disagree with the wetland types on your Forest Practices activity map or have questions, contact your local DNR region office for assistance.

1

DETERMINE THE WETLAND TYPES YOU HAVE

Determine if you have wetland types that require protection. If so, identify which type. Wetland Management Zone (WMZ) buffers or other protection measures are required if you have any of the following:

See the Forest Practices Rules WAC 222-30-020 WAC 222-16-035 and Board Manual Section 8.

**TYPE 'A' WETLAND**

An area of 1/2 acre or more covered by open water seven consecutive days between April 1 and October 1. This includes forested and non-forested bogs that are greater than 1/4 acre.

**TYPE 'B' WETLAND**

An open area of 1/4 acre or more that is vegetated with water-tolerant plants and/or shrubs.

**FORESTED WETLAND**

A wetland with a tree crown closure of 30 percent or more, if trees are mature.



2

DETERMINE THE WETLAND MANAGEMENT ZONES (WMZ)

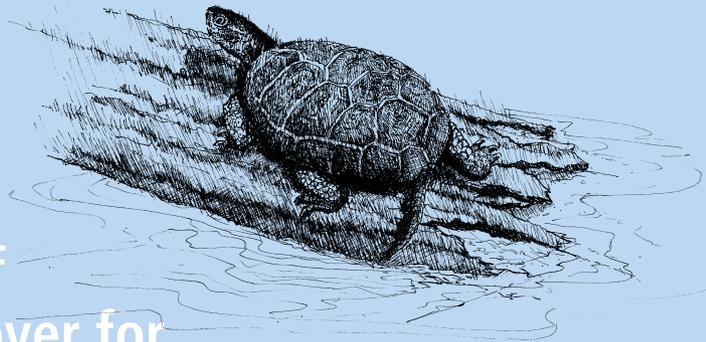
Wetland Management Zones in Eastern and Western Washington have variable widths, based on the size and type of the wetland.

Wetland Type	Acres of Non-Forested Wetland*	Maximum WMZ Width (feet)	Average WMZ Width (feet)	Minimum WMZ Width (feet)
A (including bogs*)	Greater than 5	200'	100'	50'
A (including bogs*)	0.5 to 5	100'	50'	25'
A (bogs only*)	0.25 – 0.5	100'	50'	25'
B	Greater than 5	100'	50'	25'
B	0.5 to 5	No WMZ Required	No WMZ Required	25'
B	0.25 to 0.5	No WMZ Required	No WMZ Required	No WMZ Required
Forested	No WMZ required. Low impact harvesting allowed. Additional restrictions apply. * For bogs, both forested and non-forested areas are included.			



See **Board Manual Section 8** for more information. Boundaries are measured from the edge of the wetland. Decide if you will be harvesting within a WMZ. If not, skip step 3 and read the Resource Protection section on page 90.

It is important to protect wetlands because they provide a mix of nutrients and cover for aquatic species and protect stream quality.



3

CONDUCT A TREE INVENTORY WITHIN THE WETLAND MANAGEMENT ZONE (WMZ)

Conduct a tree inventory to determine which trees can be harvested within the WMZ. The Forest Practices Rules establish leave tree requirements per acre.

You must leave 75 trees per acre, all of which must be greater than 6" DBH in Western Washington and 4" DBH in Eastern Washington. In addition, 25 of the 75 trees must be greater than 12" DBH and five must be greater than 20" DBH. To make determining your leave trees easier, use the following formulas for determining trees per 1,000 linear feet of WMZ.

The resulting numbers will be equivalent to the number and size of trees required per acre.


**TREES PER 1,000 LINEAR FEET
OF WETLAND BOUNDARY
WESTERN WASHINGTON**

	100' Width WMZ: 172 Total Trees	50' Width WMZ: 86 Total Trees	25' Width WMZ: 43 Total Trees
6" DBH	115	57	29
12" DBH	46	23	11
20" DBH	11	6	3


**TREES PER 1,000 LINEAR FEET
OF WETLAND BOUNDARY
EASTERN WASHINGTON**

	100' Width WMZ: 172 Total Trees	50' Width WMZ: 86 Total Trees	25' Width WMZ: 43 Total Trees
4" DBH	115	57	29
12" DBH	46	23	11
20" DBH	11	6	3



Openings must be less than 100' wide, measured parallel to the wetland edge. Openings in the WMZ need to be more than 200' apart.

Limited partial cuts or removal of small groups of trees within the WMZ may be allowed.



All measurements are taken horizontally, while keeping the measuring tape level at all times.



4

MEASURE AND MARK YOUR WETLAND MANAGEMENT ZONE (WMZ)

- ▶ All measurements are taken horizontally, while keeping the measuring tape level at all times.
- ▶ Tree diameter measurements are taken at “diameter at breast height” or DBH. This measurement is taken with a diameter tape at a height of 4.5 feet from the ground.
- ▶ Bright tree-marking ribbon or paint is recommended. Using a different color for road location from the color used on the WMZ or harvest boundary helps eliminate confusion.
- ▶ Marking the proposal on the ground is very important. Clear marking helps to eliminate resource and property damage and delays in application processing.



See the Board Manual Section 8.

Resource Protection in the Wetland Management Zone (WMZ)

For best resource protection, retain your leave trees in the Wetland Management Zone.

And remember, ground-based equipment cannot be used within the minimum Wetland Management Zone without written permission from DNR. The minimum Wetland Management Zone width is dependent upon the type and size of the wetland.

When WMZ and RMZ protections overlap, use the one that provides the most protection for the water resource.

FOREST PRACTICES RULES

See Forest Practices Rules WAC 222-30 for more information on resource protection in wetlands.

Stream Type 'F'
Riparian
Management
Zone Buffer
Boundary

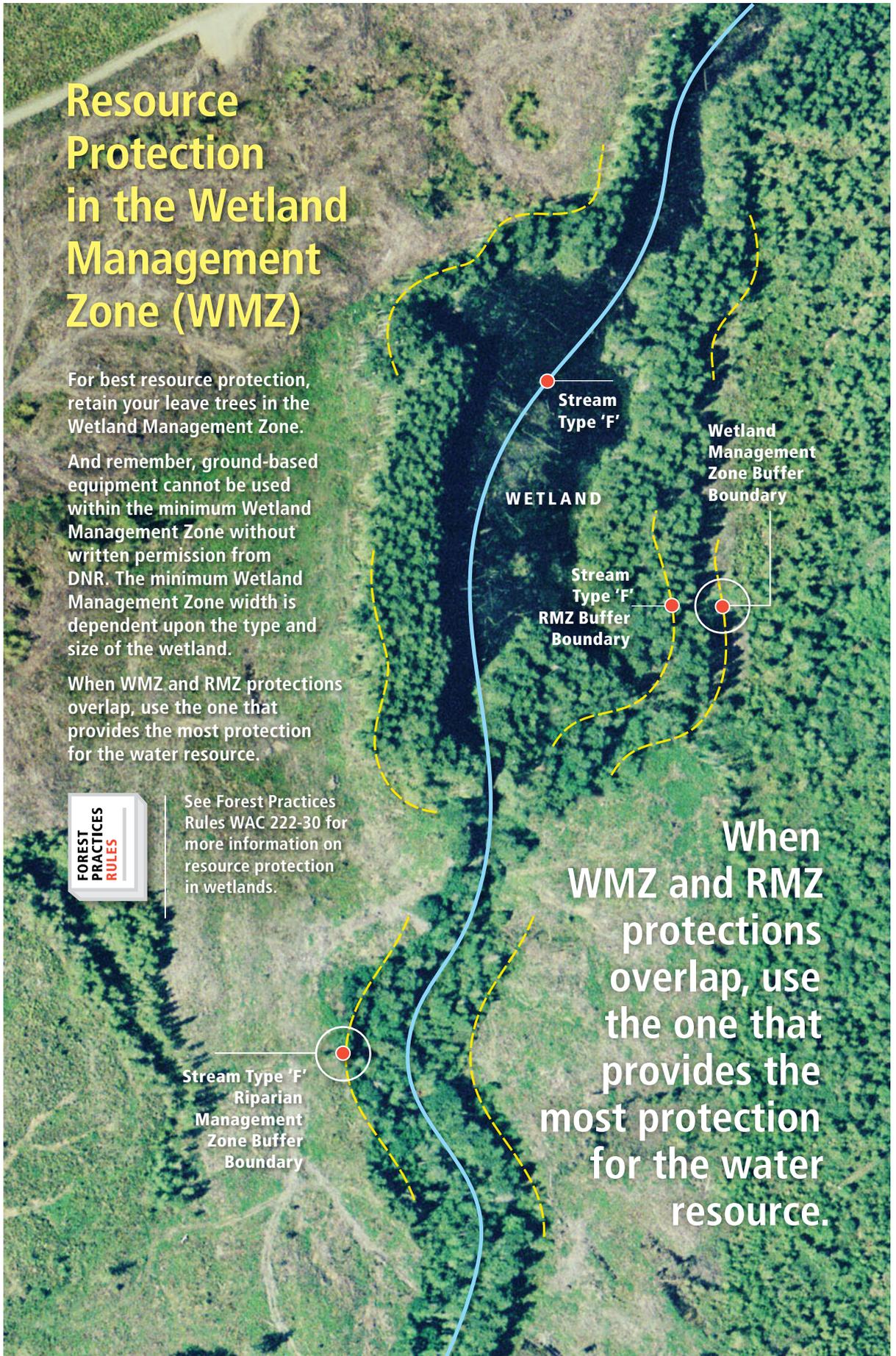
WETLAND

Stream
Type 'F'

Wetland
Management
Zone Buffer
Boundary

Stream
Type 'F'
RMZ Buffer
Boundary

When
WMZ and RMZ
protections
overlap, use
the one that
provides the
most protection
for the water
resource.





Suggestions for Success

The following list has suggestions to help you achieve management objectives while protecting long-term investments and public resources. These suggestions may exceed Forest Practices Rules.

- I have read the "Wetland Management Zones" section.
- Verify all wetland types within 200 feet of your harvest, including those on your neighbor's property (with the neighbor's permission).
- Determine if you will harvest within the WMZ:
 - ▶ If the WMZ overlaps with an RMZ, you must leave whichever buffer provides the most protection for the water resource.
- Identify and mark WMZ boundaries.
- Mark trees for removal within the WMZ.
- Avoid damage to wetland vegetation:
 - ▶ Fall trees away from water and the WMZs.
 - ▶ Use tree-length yarding where possible.
 - ▶ Lift the leading end of the logs during skidding and/or yarding.
- If you have a forested wetland, make sure those more than 3 acres in size have the boundaries marked on the ground and are shown on the activity map.
- If you have a Type A or B wetland, determine the acreage of the wetland and the WMZ width needed to protect the wetland.

- If in the process of building a road or landing, you fill or drain 1/2 acre or more of an individual wetland (forested, type A or type B) you must replace the wetland or designate other land as a substitution for that filled/draind wetland. Seeking assistance from a professional consulting forester for this activity is strongly encouraged.
- Communicate management objectives to your logging operator.
- Contact a consulting forester for assistance with WMZ layout.
- Obtain all required permits from city, county, state, and federal agencies.



See the **Board Manual Section 8**

Planning and Designing Harvest Units, Roads, and Skid Trails

Proper road placement and maintenance are important parts of harvest planning. Building and maintaining the right road in the right place at the right time protects soil, water, fish, amphibians, wildlife, and long-term productivity of the site. It also maximizes your investments in harvest operations. (For more information, see Roads chapter, page 29)

Design and locate skid trails and skidding operations to minimize soil disturbance. Disturbing the soil can result in erosion and soil compaction, which can affect the soil's ability to grow trees. Skidding equipment should be limited to designated skid trails. Skid trails should also be designed to avoid areas where soil can enter the stream. Planning and marking the harvest site in advance minimizes the area covered by skid trails and landings. Building more skid trails and landings than you need takes land out of production and may contribute to increased soil erosion.



Your forest roads, harvest unit, stream(s), wetland(s), and reserve trees need to be shown on your activity map.



Soil compaction and runoff can be reduced by properly placing skid trails and by harvesting during drier times of the year.



Place roads and skid trails away from your wildlife reserve trees for your safety. These high traffic areas can damage roots and bark.



Damage to trees can be avoided through proper planning and hiring experienced contractors.

Building and maintaining the right road in the right place at the right time protects soil, water, fish, amphibians, wildlife, and long-term productivity of the site.

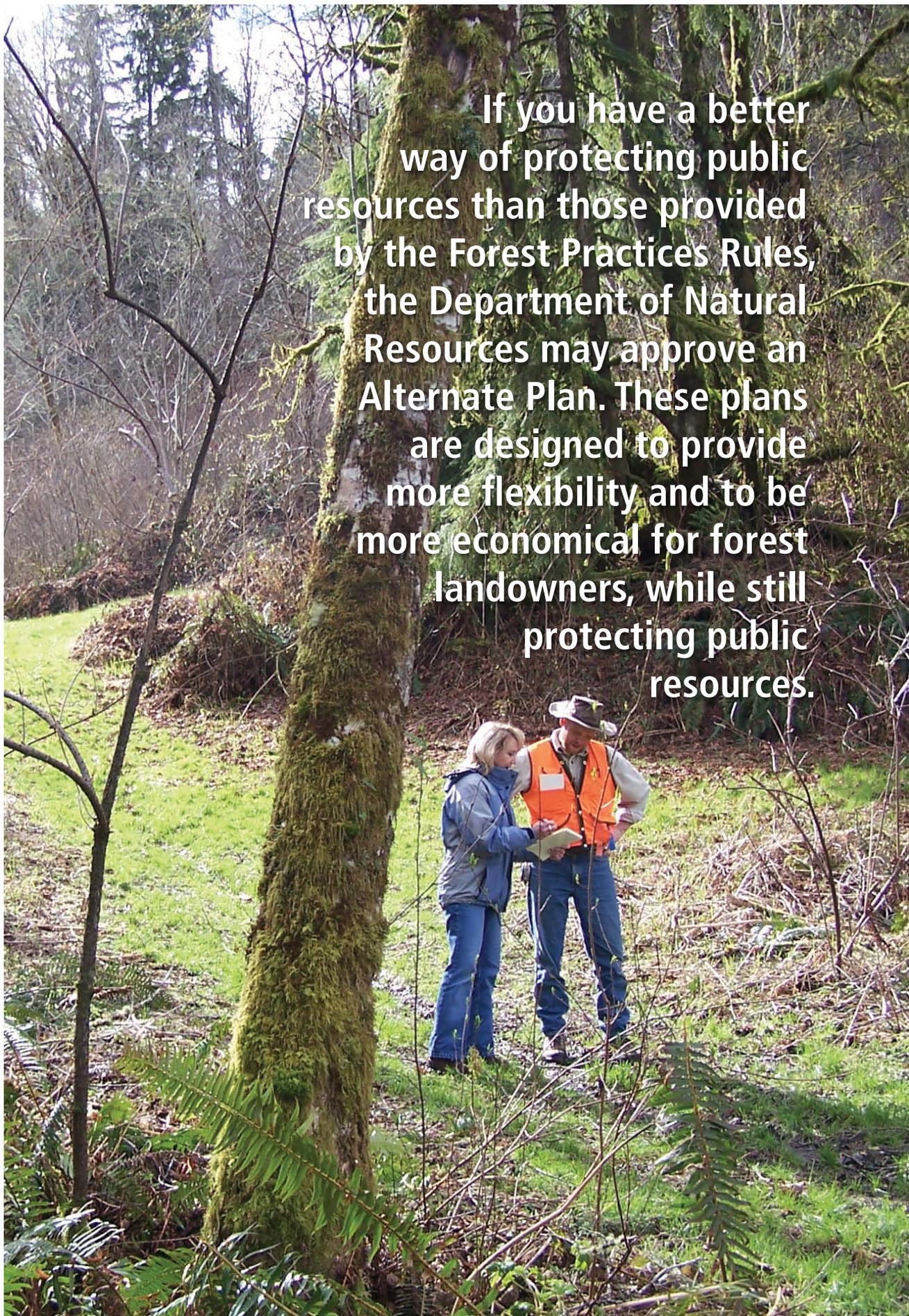


LANDING

Consider what type of surface you may need. Dirt for dry weather; rock for wet weather.

Place landings in locations that will easily drain water onto the forest floor.

If you have a better way of protecting public resources than those provided by the Forest Practices Rules, the Department of Natural Resources may approve an Alternate Plan. These plans are designed to provide more flexibility and to be more economical for forest landowners, while still protecting public resources.





Planning Considerations

Consulting foresters can help you develop management plans, design timber harvest units and roads, contact loggers, and market your timber. A directory of consulting foresters is available from DNR and WSU Cooperative Extension offices. See the Resources section on page 130.

Site Conditions

- ▶ Topography
- ▶ Soil
- ▶ Water
- ▶ Wetlands
- ▶ Existing roads and future maintenance
- ▶ Forest health
- ▶ Forest stand type

Economic Factors

- ▶ Short-term and long-term income needs
- ▶ Tax considerations (Contact Washington Department of Revenue for information: dor.wa.gov/content/taxes/timber/default.aspx)
- ▶ Logging methods and costs
- ▶ Markets

Management Objectives

- ▶ Income from timber
- ▶ Fish and wildlife habitat
- ▶ Aesthetics
- ▶ Recreation
- ▶ Fire Protection
- ▶ Forest Health

Resource Protection

- ▶ Public improvements, e.g., county roads, state highways, hatcheries, campgrounds
- ▶ Fish and wildlife habitat
- ▶ Threatened and endangered species' critical habitat
- ▶ Cultural, archaeological, and historical sites

- ▶ Municipal water sources
- ▶ Riparian Management Zones and Wetland Management Zones
- ▶ Wildlife Reserve Trees
- ▶ Green Recruitment Trees and down logs

Timing of Operations

Harvest operations at the wrong time of year for the site can create problems, including:

- ▶ Soil compaction and erosion
- ▶ Excessive bark damage in the spring
- ▶ Disturbing fish and wildlife during crucial times in their life cycles
- ▶ Damaging roads and public resources
- ▶ Accumulation of pine slash in Eastern Washington from January to June creates prime habitat for bark beetles

Do You Have a Better Idea?



Submit an Alternate Plan as part of a FPA/N for timber harvest to your local DNR region office. The plan must describe how the proposed alternative prescriptions depart from the Forest Practices Rules and how the proposal will provide sufficient resource protection. An application with an Alternate Plan may be submitted for either a two-year or a multi-year (five-year limit) period of time.

Types of Wildlife Reserve Trees (WRTs) and Green Recruitment Trees (GRTs)



TYPE 1 TREES

are live trees that are defective or deformed with sound tops, trunks, and roots



TYPE 2 TREES

are dead trees with sound tops, trunks, and roots



TYPE 3 TREES

are live or dead trees with unstable tops or upper portions



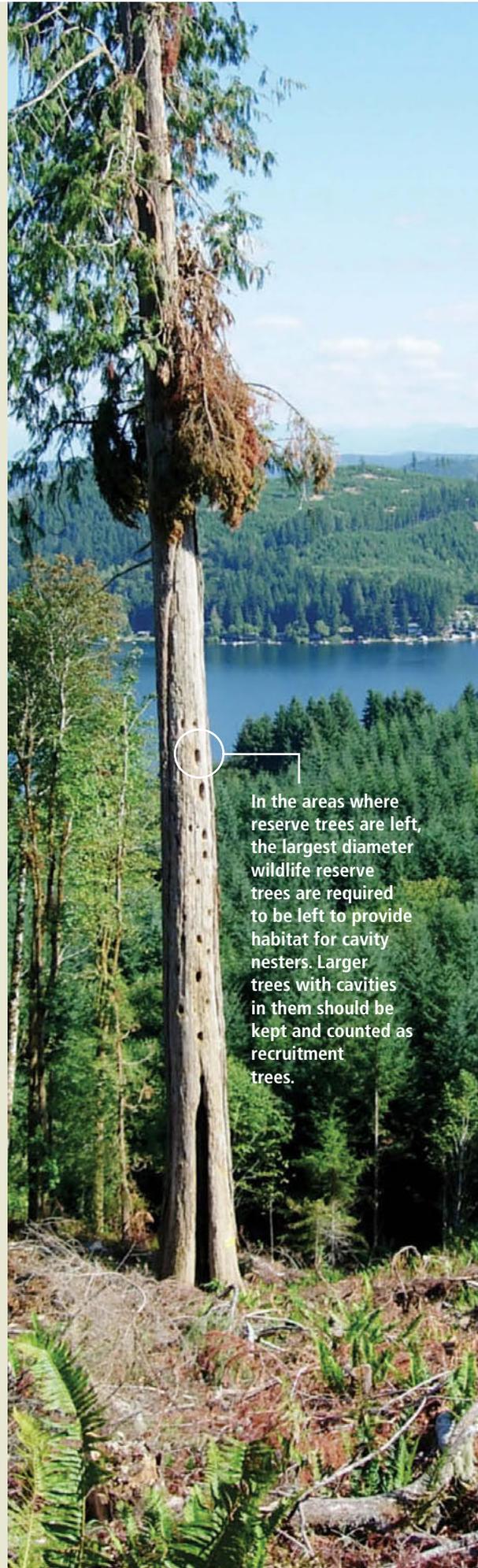
TYPE 4 TREES

are live or dead with unstable trunks or roots; with or without bark

Type 3 and Type 4 Wildlife Reserve Trees (WRTs) present significant safety considerations



It is best to leave these trees in Riparian Management Zones (RMZs) and Wetland Management Zones (WMZs) where minimum activity will take place near them. If you think a Wildlife Reserve Tree is a safety hazard, contact your local DNR region office and Department of Labor and Industries before you cut it down.



In the areas where reserve trees are left, the largest diameter wildlife reserve trees are required to be left to provide habitat for cavity nesters. Larger trees with cavities in them should be kept and counted as recruitment trees.



Trees and Down Logs for Wildlife Habitat

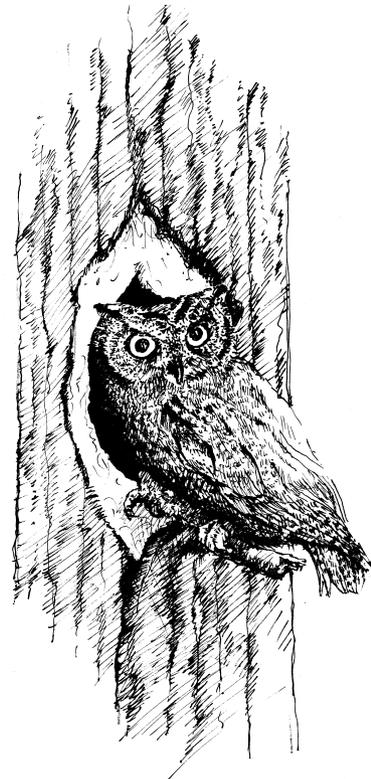
Dead, dying, live but deformed, and live trees are an important part of a healthy forest. They provide habitat for birds, mammals, amphibians, reptiles, insects, and a variety of plants.

More than 100 species of amphibians, mammals, and birds depend on down logs to meet at least some of their habitat needs. Some of those needs include nesting, overwintering sites, dens, roosting, foraging, and food storage. Some birds, such as sapsuckers and woodpeckers, excavate their own nests in snags (primary cavity nesters). Other birds occupy abandoned nests or natural cavities (secondary cavity nesters). Most cavity-nesting birds eat large quantities of insects each year. There is evidence that these birds eat so many insects that they keep populations of tree killing insects, such as bark beetles, below epidemic levels.

Squirrels and other small mammals use dying and dead trees as foraging sites, storing winter food supplies, and for roosting and denning. Bats use loose bark and hollow tree trunks for roosting. Numerous insects use dead trees as over-wintering sites; some eat portions of dead trees, contributing to the decomposition process.

The death and eventual falling of trees provide forest openings that encourage growth of vegetation and younger trees. This leads to improved habitat for species such as elk, deer, raptors, and small mammals.

Landowners are required to leave a minimum number and size of trees and down logs to provide current and future wildlife habitat.



Minimum Requirements for Retaining Leave Trees and Down Logs

WESTERN WASHINGTON



WILDLIFE TREE	# PER ACRE	MIN. HEIGHT	MIN. DIAMETER
Wildlife Reserve Tree	3	10 feet	12" DBH (diameter at breast height)
Down Log	2	20 feet	12" DBH at small end
Green Recruitment	2	30 feet with 1/3 live crown	10" DBH

EASTERN WASHINGTON



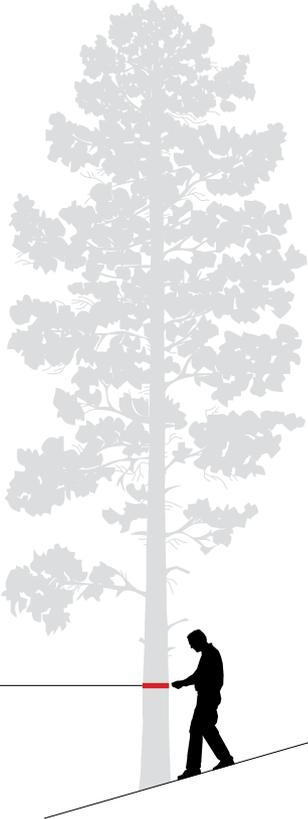
WILDLIFE TREE	# PER ACRE	MIN. HEIGHT	MIN. DIAMETER
Wildlife Reserve Tree	2	10 feet	10" DBH
Down Log	2	20 feet	12" DBH at small end
Green Recruitment	2	30 feet with 1/3 live crown	10" DBH



Distribution Options for Wildlife Reserve and Green Recruitment Trees

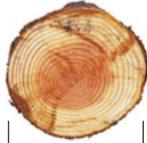
Clumped
Scattered





What is DBH?

DBH is the cross-sectional area of a tree stem at 4.5 feet above the ground. Tree diameter is measured at 4.5 feet above the ground on the uphill size and is referred to as DBH (diameter at breast height).



$$DBH = \frac{\text{Circumference}}{3.14}$$

Amphibians, mammals, and birds depend on down logs to meet at least some of their habitat needs.

Down Logs

The death and eventual falling of trees provides forest openings that encourage growth of vegetation and younger trees. This leads to improved habitat for species such as elk, deer, raptors, and small mammals.



Threatened and Endangered Wildlife Species

Some wildlife species are more sensitive to human activities than others. The federal government and Washington State have created measures to protect their habitat and hopefully increase their populations.

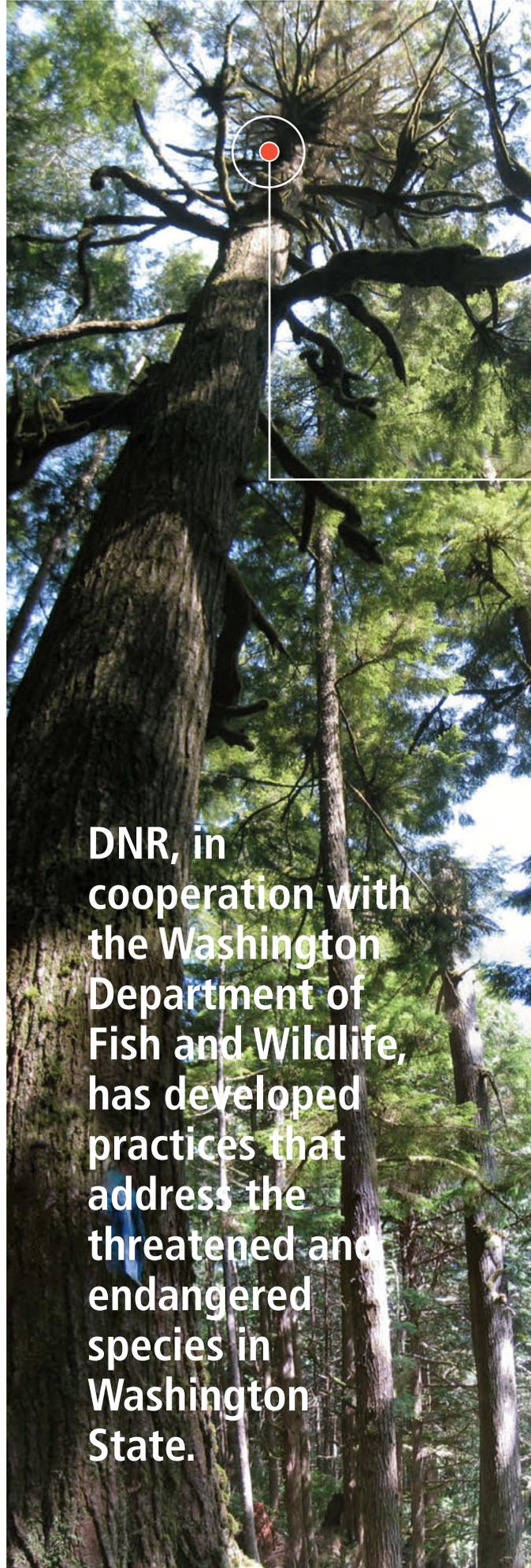
The Federal Endangered Species Act was passed in 1973. An endangered species is one in danger of extinction and a threatened species is one likely to become endangered in the future.

The Forest Practices Board has adopted additional protection measures for certain threatened and endangered species.

As population increases and the demand for urbanization places pressure on wildlife habitat, it becomes crucial to protect the most sensitive of these species. DNR, in cooperation with the Washington Department of Fish and Wildlife, has developed practices that address the threatened and endangered species in Washington State.



When you submit your FPA/N, DNR will screen your activities to see if they impact any species' critical habitat. If they do, DNR will contact you.



DNR, in cooperation with the Washington Department of Fish and Wildlife, has developed practices that address the threatened and endangered species in Washington State.



Western gray squirrel



Bald eagle



Lynx

Threatened Wildlife Species in Washington State*



Marbled murrelet
makes its nest on large limbs of mature conifers.

Aleutian Canada goose

Bald eagle

Ferruginous hawk

Marbled murrelet

Western gray squirrel

Mazama Pocket Gopher

Green sea turtle

Loggerhead sea turtle

Lynx

Note:

Species marked in red are the species covered by Forest Practices Rules.



Gray wolf



Northern Spotted owl



Oregon spotted frog

Endangered Wildlife Species in Washington State*

Northern leopard frog

Oregon spotted frog

American white pelican

Sandhill crane

Snowy plover

Upland sandpiper

Northern Spotted owl

Pygmy rabbit

Columbian white-tailed deer

Western pond turtle

Humpback whale

Woodland caribou

Gray wolf

Grizzly bear

Sea otter

Fin whale



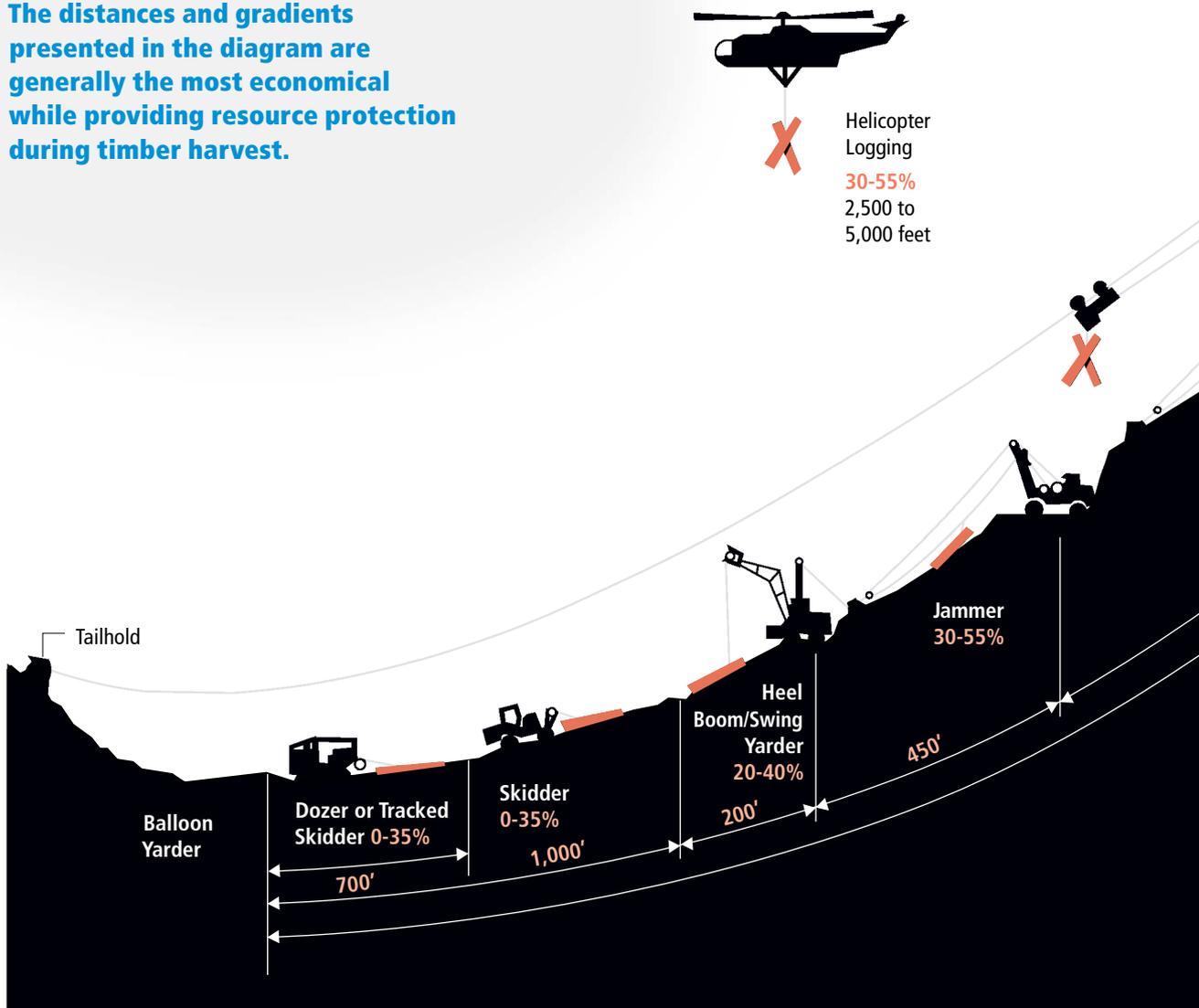
* Partial List

WOODLAND CARIBOU ILLUSTRATION BY JANE CHAVEY; WESTERN GRAY SQUIRREL PHOTO: MARY LINDERS; LYNX AND GRAY WOLF: GERALD AND BUFF CORSI © CALIFORNIA ACADEMY OF SCIENCES; MARBLED MURRELET: THOMAS HAMER; OREGON SPOTTED FROG: WILLIAM LEONARD

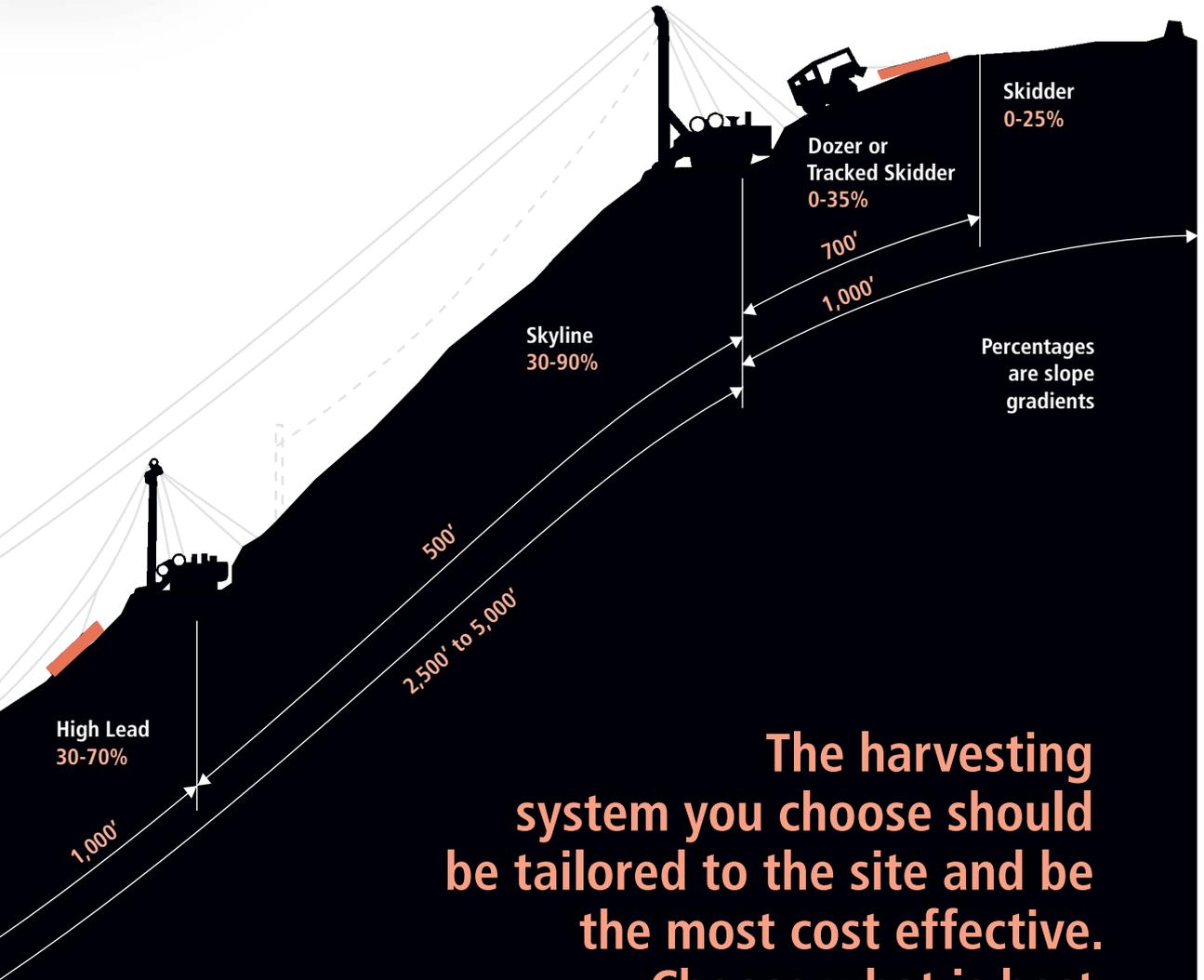
Harvesting Systems

The harvesting system you choose will depend largely upon your particular site conditions. As this diagram shows, each machine can be combined with others to create the most advantageous harvesting system. There are advantages and disadvantages to each piece of equipment. Consult with a forester when choosing your harvesting system.

The distances and gradients presented in the diagram are generally the most economical while providing resource protection during timber harvest.



Optimum Yarding Distances and Slope Percent of Logging Systems



The harvesting system you choose should be tailored to the site and be the most cost effective. Choose what is best for protecting soil, water, fish, amphibians, and wildlife.

Ground-Based Harvesting Systems

The following ground-based harvesting systems are typically used on gentle terrain, on soils not easily compacted, and in areas with good road access. Ground-based systems are generally used on slopes less than 35 percent in Western Washington and less than 50 percent in Eastern Washington. Skidding distances are less than 700 feet in Western Washington and 1,300 feet in Eastern Washington. The harvesting system you choose should be tailored to the site and be the most cost-effective. Choose what is best for protecting soil, water, fish, amphibians, and wildlife on your proposed harvest activities.

The harvesting system you choose should be tailored to the site. Choose what is best for protecting soil, water, fish, amphibians, and wildlife.



Horses

Good for smaller timber, partial harvesting on level ground in aesthetically or environmentally sensitive areas.

Shovel

May place less pressure on the ground than tracked and rubber tire skidders. Versatile equipment that operates well around Riparian Management Zones, leave trees, and across uneven surfaces (stumps, brush, etc.). Performs multiple tasks, such as site preparation, road construction, yarding, and culvert installation.





Tracked Skidder (Dozer)

Can operate on moderate slopes and perform multiple tasks. Tracked skidders are able to pull larger loads and work in softer soil with less compaction than rubber tired skidders.



Rubber Tire Skidder

Single task equipment (only pushes or pulls logs), is generally less expensive than tracked skidders, and is used for longer skidding distances. Rubber-tired skidders generally cause more soil disturbance and compaction than other types of skidding equipment.



Fully Mechanized Harvesting Systems

Performs entire process (cutting, forwarding, bucking, etc.) and requires fewer people to conduct a harvest operation. Typically compacts the ground less than skidders.



Water Tank

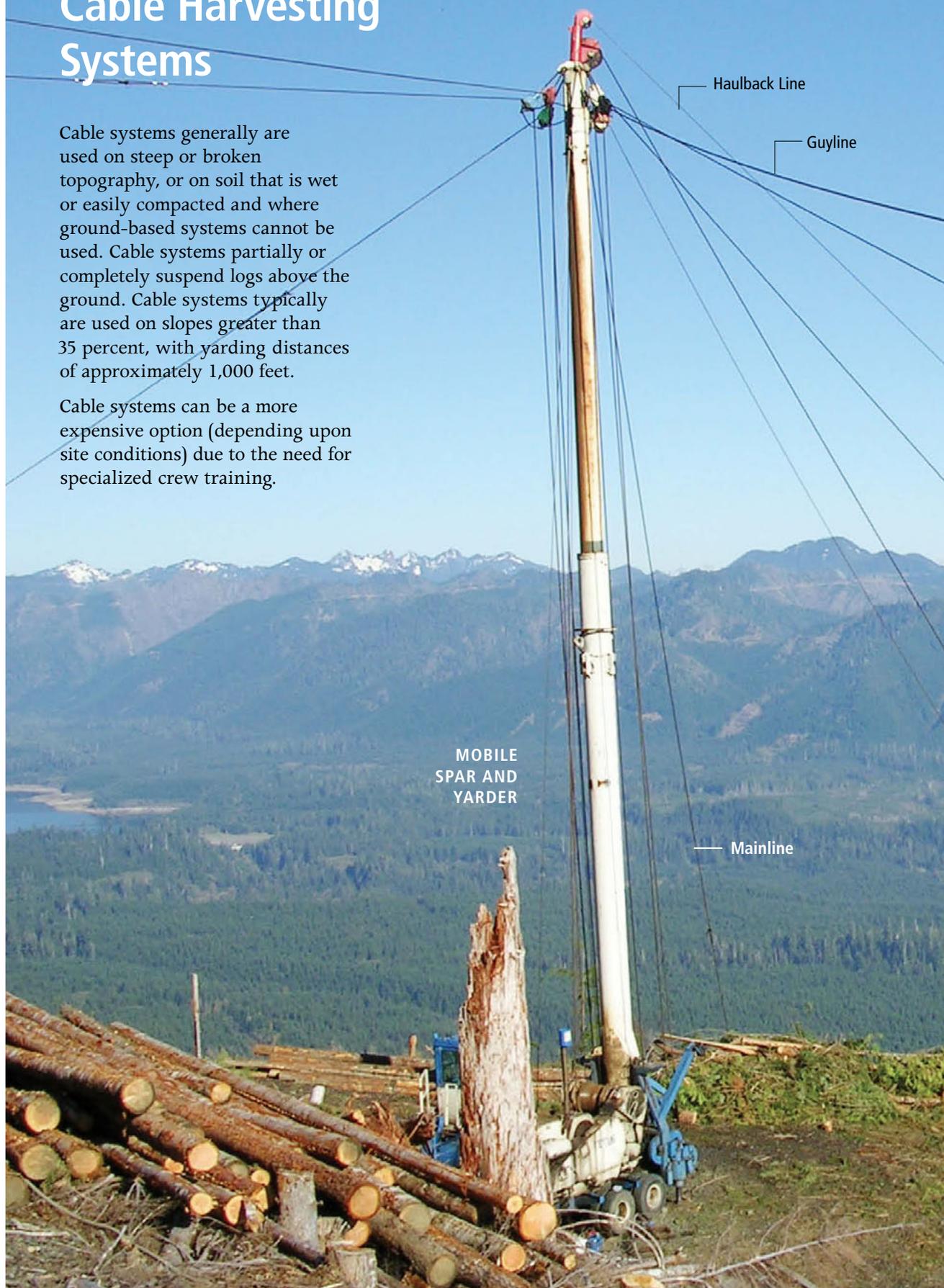
Maintain a water tank near logging operations between April 15-Oct 15. WAC 332-24-405



Cable Harvesting Systems

Cable systems generally are used on steep or broken topography, or on soil that is wet or easily compacted and where ground-based systems cannot be used. Cable systems partially or completely suspend logs above the ground. Cable systems typically are used on slopes greater than 35 percent, with yarding distances of approximately 1,000 feet.

Cable systems can be a more expensive option (depending upon site conditions) due to the need for specialized crew training.



Cable systems typically are used on slopes greater than 35 percent, with yarding distances of approximately 1,000 feet.



Helicopter Logging

Helicopter logging, while expensive, can be cost-effective in areas where the timber value is high and road construction is expensive or will have a negative environmental impact. Helicopter logging is typically used on slopes between 40-100 percent and have yarding distances up to 5,000 feet.

Helicopter logging is a good option for areas with sensitive features or in areas where roads are difficult to build.



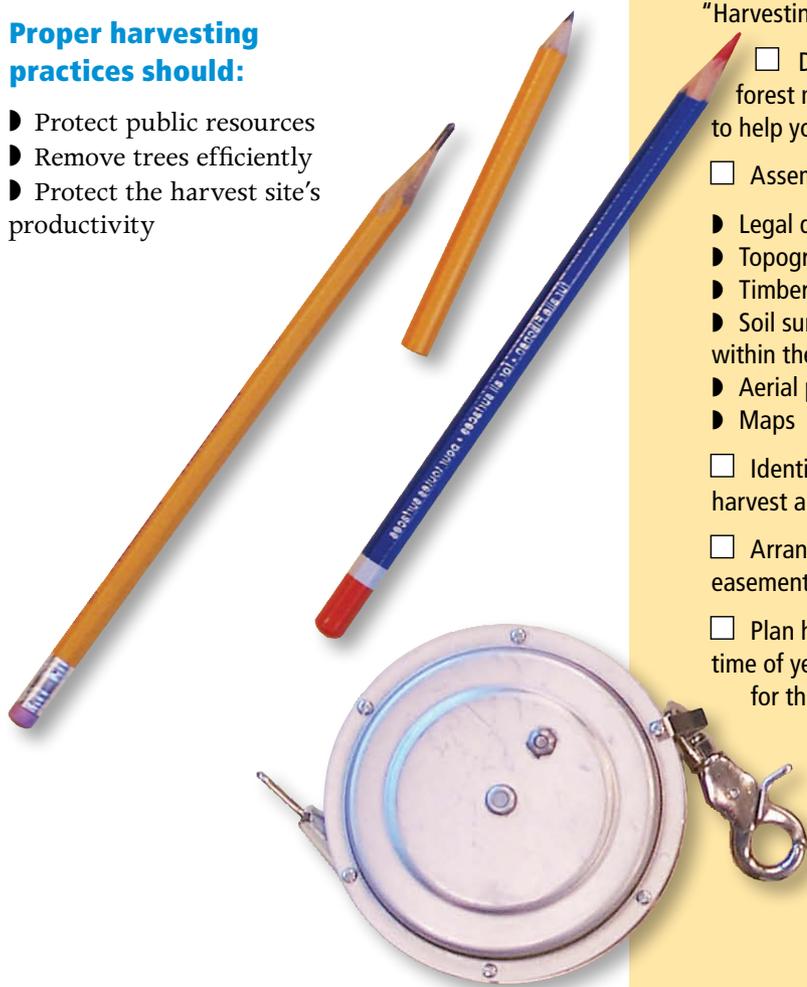
Maintain a water tank near logging operations between April 15-Oct 15.
WAC 332-24-405

Consider the Following When Planning Your Harvest

- ▶ What are the potential effects of this harvest on water quality?
- ▶ Where are the streams and wetlands located?
- ▶ Are there areas that will require special attention?
- ▶ How will the harvest affect fish and wildlife habitat?
- ▶ What kind (Douglas-fir, Western red cedar, etc.) of trees will be planted after harvest is completed and how soon after the harvest?

Proper harvesting practices should:

- ▶ Protect public resources
- ▶ Remove trees efficiently
- ▶ Protect the harvest site's productivity



Suggestions for Success

The following list has suggestions to help you achieve management objectives while protecting long-term investments and public resources. These suggestions may exceed Forest Practices Rules.

- I have read the "Planning and Designing Harvest Units, Roads and Skid Trails"; "Trees and Down Logs for Wildlife Habitat"; "Threatened and Endangered Species"; and "Harvesting Systems" sections.
- Develop a written long-range forest management plan. DNR may be able to help you find assistance.
- Assemble property information:
 - ▶ Legal description of your property
 - ▶ Topographic and stream type information
 - ▶ Timber rights, who owns them
 - ▶ Soil survey [if you are harvesting within the RMZ]
 - ▶ Aerial photos
 - ▶ Maps
- Identify property lines and harvest area boundaries.
- Arrange for access and easements, if needed.
- Plan harvest operations for the time of year most appropriate for the site.



- Plan roads, skid trails and landings that best fit the harvest system and terrain.
 - Identify areas needing protection:
 - ▶ Streams, wetlands, and sensitive sites
 - ▶ Green Recruitment Trees (GRTs) and Wildlife Reserve Trees (WRTs)
 - ▶ Areas identified as sensitive:
 - ▶ Unstable slopes
 - ▶ Archaeological, cultural, and historical sites
 - ▶ Drinking water supply
 - ▶ Threatened or endangered species' critical habitats
 - ▶ Seeps, springs, and headwaters
 - Consider what type of harvest is appropriate for your site: even-aged or uneven-aged. A consulting forester can help you decide what is best for your site.
 - Consider opportunities to enhance and restore fish and wildlife habitat:
 - ▶ Keep understory vegetation, where possible
 - ▶ Create snags from low quality trees
 - ▶ Clump GRTs around large snags
 - ▶ Locate WRTs and GRTs around springs, seeps, streams and wetlands
 - ▶ Leave no-cut buffers and the maximum RMZ width required
 - ▶ Retain down logs and snags in excess of minimum required
 - ▶ Determine the largest living trees that will never be cut and leave them scattered across your harvest unit to provide habitat
 - Select harvest system appropriate for:
 - ▶ Soil conditions
 - ▶ Terrain
 - ▶ Season
 - ▶ Time available for completing operations
 - ▶ Size of harvest planned
 - ▶ Size of timber
- ▶ Type of harvest planned
 - ▶ Areas needing special protection
 - ▶ Minimal post-harvest site preparation
 - ▶ Availability of equipment
 - ▶ Skill level of operators
- Communicate your plans with neighboring landowners.
 - Find out if Watershed Analysis may affect your harvest plans (contact your local DNR region office for assistance).
 - Develop written contracts for loggers and obtain necessary permits from city, county, and state agencies.
 - Contact a consulting forester for assistance with developing a management plan, marketing your timber, and finding a logger who can accomplish your management objectives. They may also help with developing an Alternate Plan if needed.
 - If needed, consult with other agencies, Washington Tribal governments and professionals for advice on soils, fish, wildlife, historical, archaeological, and cultural sites.

Reforestation

TREE PLANTING

Forest landowners play a key role in the life cycle of a forest. That cycle begins with planting trees and ends with harvest. Reforestation is the process of establishing a new forest either naturally by leaving seed trees or artificially by planting seedlings.

Timely reforestation helps establish young trees so that the area will not be overtaken by brush. Planting the harvest area with trees best suited to the site ensures that your trees will grow into a strong and healthy forest.

Several reforestation and harvest techniques can be used to help you achieve a new, healthy forest. Taking the time to become familiar with the practices used for growing trees in your area or seeking the advice of a professional forester will also help you achieve a healthy forest. It is best to evaluate and choose what type of reforestation technique and the type of harvest you want to do before you harvest your timber. Planning ahead will allow you to choose harvest methods that will help create favorable conditions for planting.

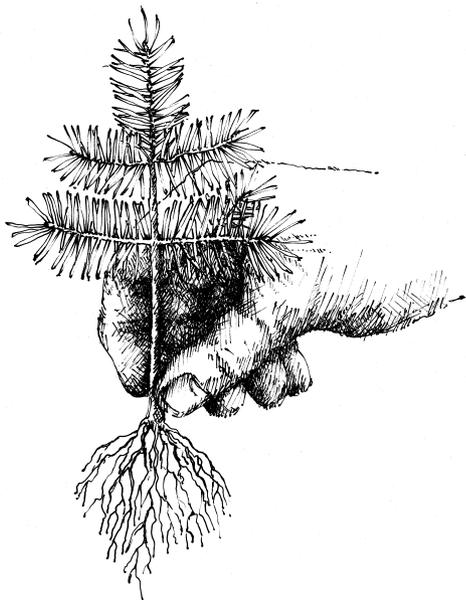
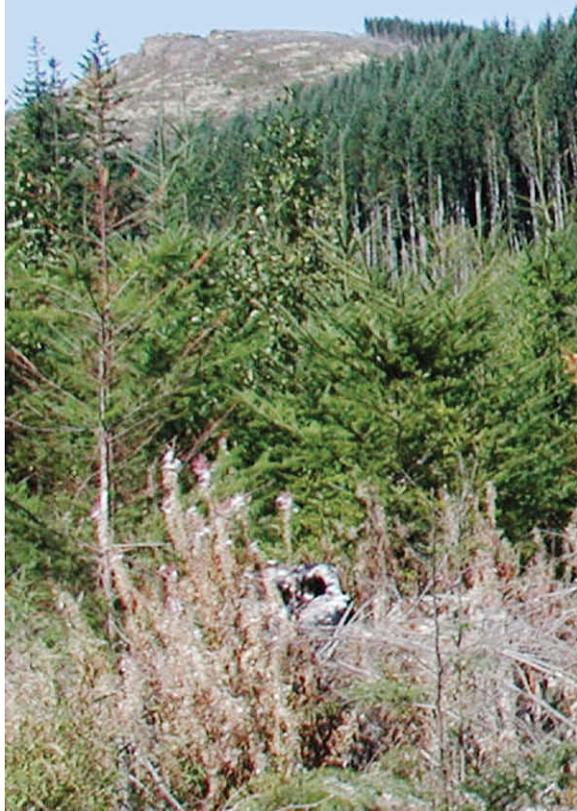


ILLUSTRATION BY JANE CHAVEY / DNR

Planning ahead will allow you to choose harvest methods that will help you create favorable conditions for planting.





Without the planting of seedlings the 40-year old stand behind this plantation would look vastly different. The plantation below will look like this in 40 years and complete the forest cycle to possibly be harvested again.

40 year-old forest



Site Preparation

Site preparation is necessary if the harvest units are left in a condition unsuitable for planting or tree growth. Site preparation includes cutting whips (non-merchantable trees), piling slash, and scattering or burning slash.

If good planting sites are available, no further preparation is necessary. Do not remove all the vegetation and slash as this can lead to browsing by rodents, deer and elk.

Take special care when using heavy equipment to prepare the site for planting. Trees need water and air for growth. Soil that is compressed can delay or prevent the growth of new trees. If the soil is packed too hard a planting shovel cannot dig into the soil to create a planting hole.

If burning is used for site preparation, you must follow the conditions of the permit. Slash burning requires a permit from DNR. The permit's conditions will include measures to protect:

- ▶ Air quality
- ▶ Threatened and endangered species
- ▶ Other property

Soil compaction can delay or even eliminate the start of the next forest. Heavy equipment can squeeze the soil pores, reducing the space for water and air.

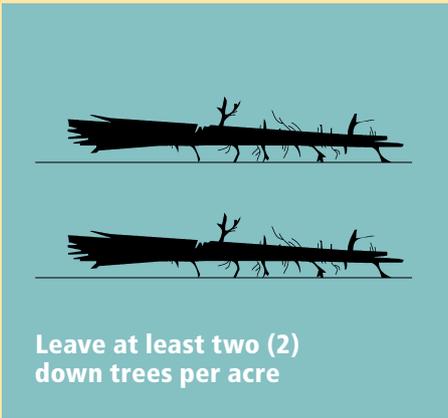


Site Preparation

It is best to plant as soon as possible following harvest. If you wait, you may have large amounts of competing vegetation.



Avoid Soil Compaction



Leave at least two (2) down trees per acre



Slash piles are not allowed in the core zone.



Obtain the proper burn permits and follow the rules.

Suggestions for Success

The following list has suggestions to help you achieve management objectives while protecting long-term investments and public resources. These suggestions may exceed Forest Practices Rules.

- I have read the previous page on "Site Preparation."
- Minimize soil disturbance when using mechanical equipment.
- Use the proper amount and type of site preparation for replanting.
- Leave at least two (2) down trees per acre.
- Specify in the logging contract the person or company responsible for site preparation.
- Slash piles are not allowed in the RMZ or WMZ. Place all slash piles above the 100-year flood plain.
- Slash burning is not allowed in the RMZ or WMZ. Slash burning requires a burn permit from DNR. Contact your local DNR region office for permit information.
- If using herbicides, refer to the chemical section on page 122.
- If you have slash or slash piles within 100 feet of a public road or within 500 feet of a structure, contact your local DNR region office. You may have an extreme fire hazard which must be mitigated.
- If needed, consult your local DNR region office or a forestry consultant.

Reforestation Requirements and Information

There are two main types of reforestation:

- ▶ Planting
- ▶ Natural regeneration

If you are required to reforest, you will need to choose either tree planting or natural regeneration. Natural regeneration relies on leave trees as the seed source. If you choose natural regeneration, you must submit a natural regeneration plan with your FPA/N.

You do not have to reforest when:

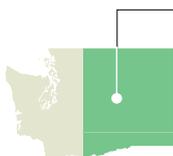
- ▶ You state on your FPA/N that you are converting your forest land to a use other than growing timber within three years. Reforestation is required if conversion is not completed.
- ▶ Your leave trees are considered an established stand. Established means the trees are well distributed, undamaged, vigorous saplings and/or merchantable trees that have survived at least one growing season.



WESTERN WASHINGTON

WITHIN THREE YEARS OF HARVEST

At least 190 trees per acre must be established.



EASTERN WASHINGTON

WITHIN THREE YEARS OF HARVEST

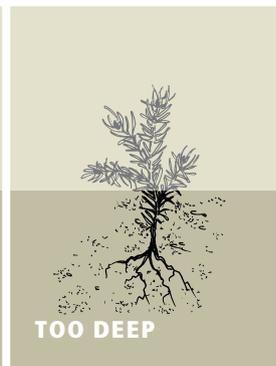
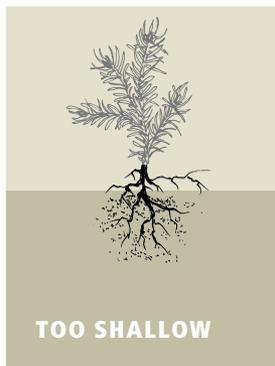
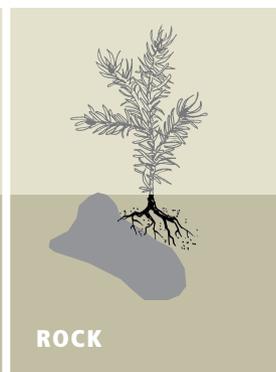
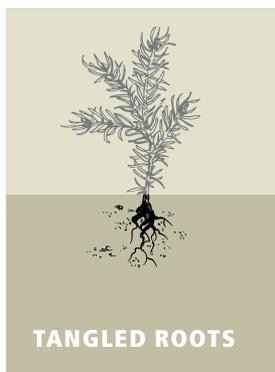
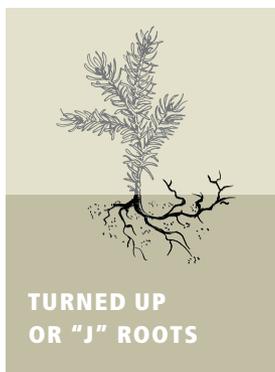
At least 150 trees per acre must be established.

Correct



Choose a species suited to your site. Look for good buds, foliage, stems and roots.

Planting Errors



Things to Consider Before Planting

Seedlings should be planted on cool or cloudy days with little to no wind. If freezing or snow conditions have occurred, wait until the snow has receded and the ground has thawed before planting.

- ▶ Minimize soil disturbance when using mechanical equipment.
- ▶ Determine your site's seed zone and elevation.
- ▶ Choose the best seedling size for your site condition.
- ▶ Consider the amount of competing vegetation you may have.
- ▶ Determine your soil type and its drainage.
- ▶ Consider choosing a species that is not sensitive to frost.
- ▶ Take into account the amount of sunlight and shade your trees will receive.
- ▶ Research how to best protect your seedlings from damage by livestock and wildlife.



CORRECT

Place seedlings in pail or planting bag, keeping roots covered with wet burlap, peat moss or similar moist material.

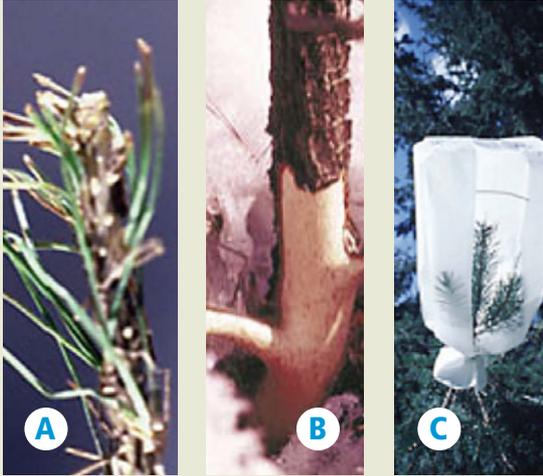


INCORRECT

Do not carry seedlings in your hand. If exposed to the air for even a short time, tiny roots will dry out and cause the tree to die.

Seedlings are living things and should be handled carefully. For highest survival rate, plant them immediately.





- A.** Douglas-fir seedlings appear “bushy” when repeatedly browsed by livestock, elk, and deer.
- B.** Bottom of seedling bark stripped by rodents.
- C.** Bud caps and placing netting around seedlings can help reduce mortality due to browsing.

Allow for Loss of Trees

Planting more trees than required by the Forest Practices Rules allows for the loss of trees due to disease, animals, and improper planting. To help seedlings receive adequate light, water, and nutrients make sure they are evenly spaced throughout the site.

The spacing guide below shows the distance between each tree to achieve the desired number of trees per acre.

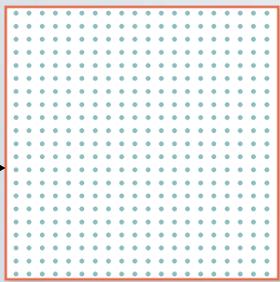
PLANTING DISTANCE BETWEEN TREES	TREES PLANTED PER ACRE
17 feet X 17 feet	150 trees FPA RULE*
15 feet X 15 feet	190 trees FPA RULE*
13 feet X 13 feet	258 trees
12 feet X 12 feet	303 trees
10 feet X 10 feet	431 trees
8 feet X 8 feet	681 trees

*Minimum number of healthy trees remaining after first growing season. Plan for mortality.

Recommended Tree Spacing

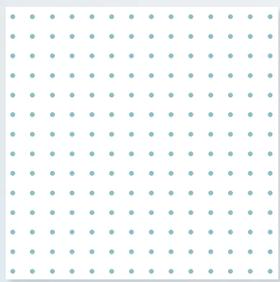
Planting more trees than required by the Forest Practices Rules allows for loss of trees by disease, animals, and improper planting.





431 Trees/Acre

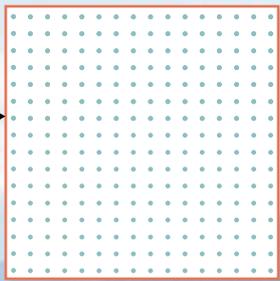
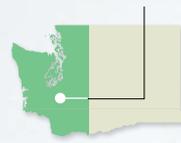
Distance between trees
10 x 10 feet



190 Trees/Acre

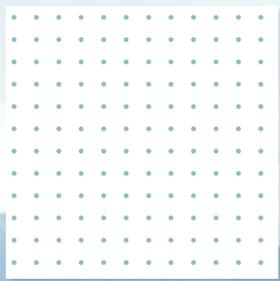
Distance between trees
15 x 15 feet

WESTERN WASHINGTON



258 Trees/Acre

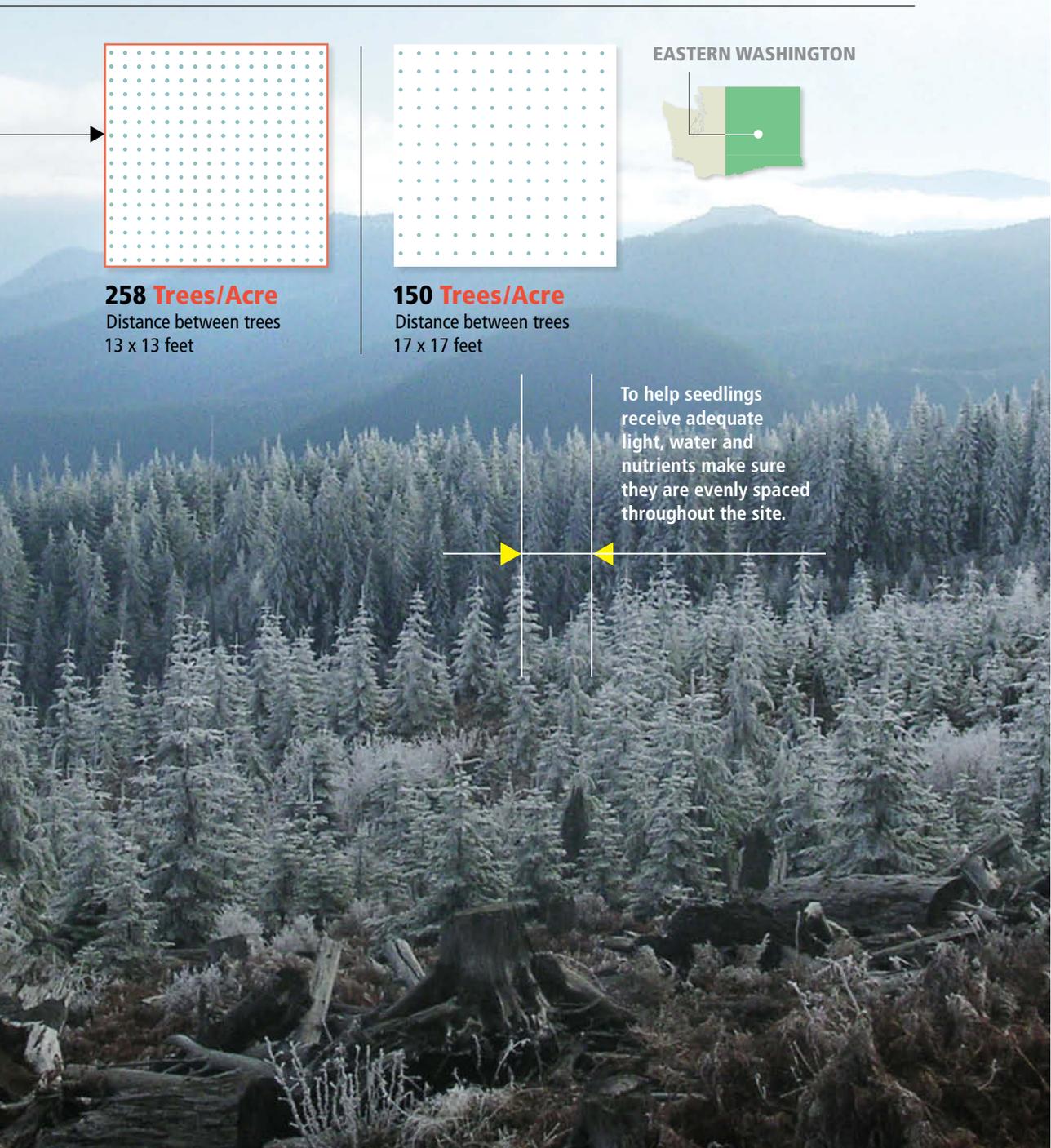
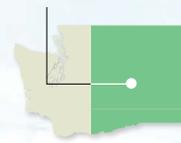
Distance between trees
13 x 13 feet



150 Trees/Acre

Distance between trees
17 x 17 feet

EASTERN WASHINGTON



To help seedlings receive adequate light, water and nutrients make sure they are evenly spaced throughout the site.

STEPS FOR CORRECT TREE PLANTING

Planting With Shovel



Insert shovel vertically with blade reversed, push handle away from you, then pull soil back and out of the hole.



Hold soil back with shovel and insert tree at proper depth, making sure roots are not bent.



Cover the roots and pack soil by stomping firmly around the roots. The sooner seedlings are planted, the sooner growth starts. Never plant in frozen ground or during freezing temperatures.

Planting With Hoe/Adze



Insert hoe and loosen soil.



Pull toward you.



Insert tree at proper depth, making sure roots are not bent.



Cover roots to base.



Pack soil by stomping firmly around the roots.



Tree is planted correctly.

Suggestions for Success

The following list has suggestions to help you achieve management objectives while protecting long-term investments and public resources. These suggestions may exceed Forest Practices Rules.

- I have read the "Reforestation" section.
 - Before harvesting, identify who is responsible (the logger or the landowner) for purchasing and planting seedlings. Include this in your logging agreement.
 - Contact the tree nursery and find out how much advance notice is required to order the seedlings (known as a sowing request). For certain tree seedlings, sowing requests need to be made two to three years before planting.
 - Reforest during the first planting season after harvest. If this is not possible, make sure to reforest no later than the second planting season after harvest.
 - ▶ **Western Washington**
Typically between January and April.
 - ▶ **Eastern Washington**
Typically between March and May, or as soon as the snow has receded.
 - Control unwanted vegetation.
 - Plans for natural regeneration (using leave trees as seed sources) must be submitted with the FPA/N for timber harvest. The plan should include your seed source and whether you will be scarifying the land.
 - Generally, plant no less than 300 evenly spaced trees per acre to account for mortality.
 - Order trees one to two years before the spring planting season to ensure best selection of seedlings.
 - Choose trees that are well adapted to the site conditions:
 - ▶ Elevation
 - ▶ Precipitation
 - ▶ Aspect — does the slope face north, south, east, or west
 - ▶ Site preparation
 - ▶ Types of disease and insects
 - Consider replanting species different than those harvested if another species:
 - ▶ Is better suited to site conditions
 - ▶ Is less susceptible to forest health problems
 - ▶ Has greater economic potential
 - Use proper seedling storage, handling, and planting procedures. Install animal damage protective devices if necessary.
 - Check trees yearly and if necessary
 - ▶ Replant
 - ▶ Protect against animal damage
 - ▶ Control competing vegetation
 - If needed, contact a consulting forester for more information.
- Please refer to the Resource section on page 134 for additional information on how to obtain pamphlets for guidance on reforestation.



Plantation Maintenance

Plantation maintenance is an important component of a healthy and productive forest. Maintenance is the general term used for activities involving site preparation, planting, and controlling competing vegetation and pest species.

There are several ways to maintain, protect, and enhance forest productivity through mechanical or chemical methods. As a landowner, you will need to decide what type and level of management is appropriate to meet your needs. In some cases, the most cost-effective management tool is to do nothing at all. Although this section describes some mechanical maintenance, the focus is on forest chemicals and precautions needed for that particular activity.

The three state agencies that regulate the use of forest chemicals are the Department of Natural Resources (DNR), the Department of Agriculture (DOA), and the Department of Ecology (DOE).





Pruning helps trees grow faster by allowing nutrients to get to the uppermost part of the tree and it can reduce the occurrence of knots.

As a landowner, you will need to decide what type and level of management is appropriate to meet your needs.

Mechanical Maintenance

WHAT IS IT?

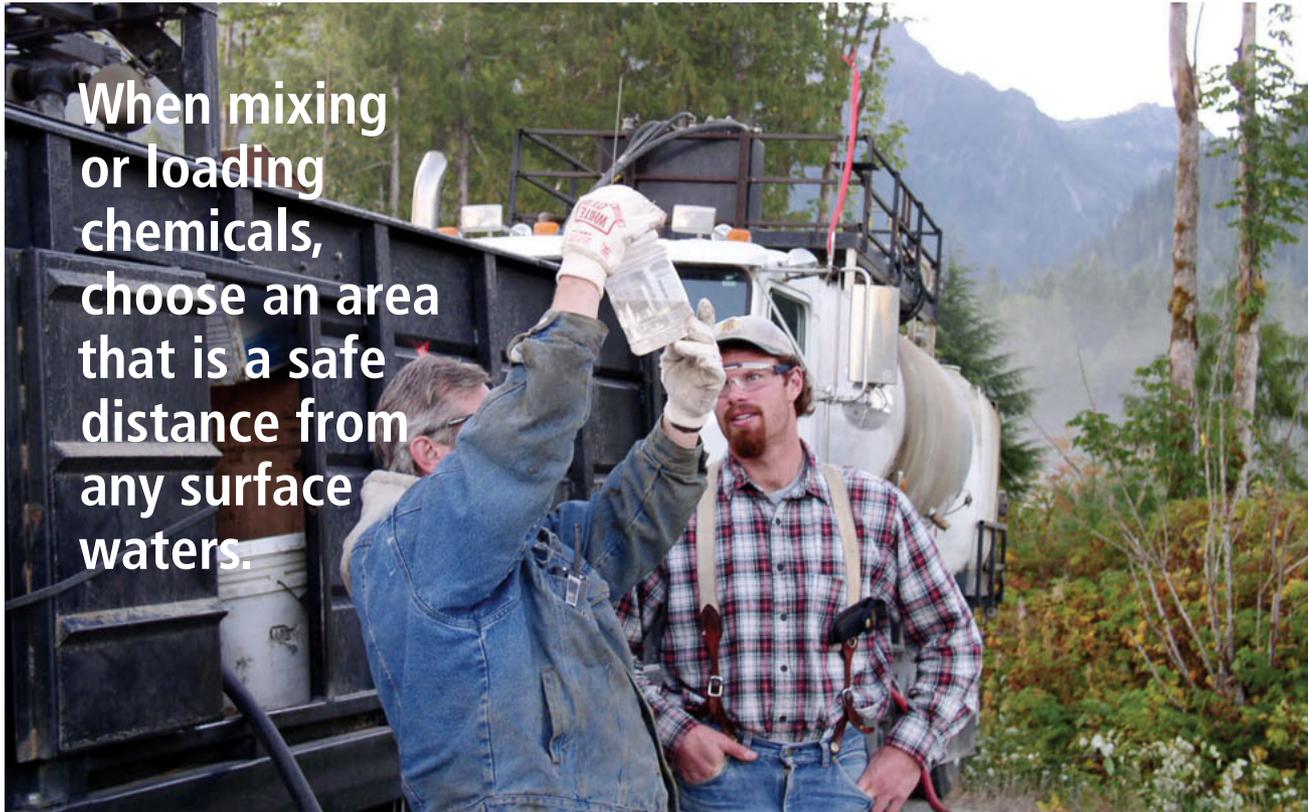
Mechanical maintenance is a common practice when managing timberlands. Using tools and machines to control competing vegetation, scarify soils for planting, and remove breeding habitat for insects and pests can be labor intensive. When deciding which maintenance method to use, consider how much acreage needs to be treated, the frequency of treatment (how often you will need to visit the site before seedlings/ saplings are well established), and the species being treated. Some competing plant and tree species are very aggressive and will require more intensive treatment to eradicate them.

TECHNIQUE

- Mowing or Grazing
- Grubbing and Pulling
- Planting Cover Crop
- Hand Cutting

MOST EFFECTIVE ON

- Grasses, forbs and herbaceous weeds
- Completely removing roots
- Preventing competing vegetation from becoming established
- Larger woody vegetation such as elderberry, big leaf maple, cherry, and alder trees



When mixing or loading chemicals, choose an area that is a safe distance from any surface waters.

Chemical Maintenance

Forest chemicals, when applied appropriately, can be useful management tools for landowners. These chemicals have a range of uses from controlling competing vegetation to fertilizing trees to improve growth. Other uses for chemicals include: controlling insects and diseases, minimizing wildlife damage, maintaining rights of ways, and preparing sites for planting.

These chemicals may be toxic and must be handled carefully. Follow all instructions on the container and do not use or mix chemicals near any surface waters.

Storage, Mixing and Chemical Loading Areas



When mixing or loading chemicals, choose an area that is a safe distance from any surface waters. This will prevent the release of chemicals from accidental spills into streams or wetlands.

Storage and cleaning areas should be located where spillage of pesticides or water used to clean equipment will not enter streams or wetlands. All of these areas should be a minimum of 25' from the bankfull width of any stream(s).



Prevent Forest Chemicals From Entering Water

Avoid mixing, loading or applying chemicals within the bankfull width of any stream(s). Locate mixing and loading areas at least 25' away from the bankfull width where any accidental spills will not enter water or wetlands. Be sure to remove all empty chemical containers from the site for proper disposal.



Leave a minimum of

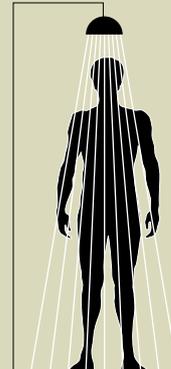


Take Safety Precautions Before Applying Pesticides

Proper gear and cleanup after chemical application are very important to your safety. Chemical labels are often updated from year to year, so it is important to always read the label carefully. The law requires you to read and follow chemical label directions for:

- ▶ Storage
- ▶ Transportation
- ▶ Loading and mixing
- ▶ Application
- ▶ Cleaning of tanks and containers
- ▶ Removal of containers from site
- ▶ Disposal of containers and chemicals
- ▶ Worker protection standards
- ▶ Emergency spills

READ AND FOLLOW LABEL DIRECTIONS



Wash hands and shower after chemical application. Wash all clothes and shoes immediately following chemical application.

GUIDELINES FOR FOREST CHEMICAL APPLICATION

Contact your local DNR region office while planning your spray project to see if you need a FPA/N. You will need to know the following:

- ▶ If you will be spraying with ground equipment or with an aircraft (aerial).
- ▶ The number of acres you will be spraying.
- ▶ The location of the spray project (section, township, and range).
- ▶ The boundaries of the spray project.
- ▶ The product name (such as Oust™, Garlon 4™), or the active ingredient (chemical name, such as Triclopyr), or the EPA number — all of these are on the label.

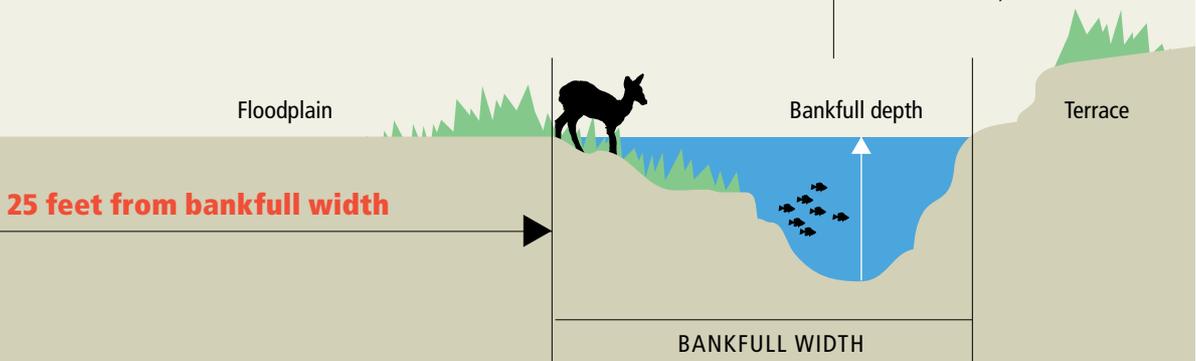


FOREST PRACTICES APPLICATION HINT

Your local DNR region office will tell you if you need a FPA/N and if you need a State Environmental Policy Act (SEPA) environmental checklist. See the following for more information:

Aerial Chemical FPA/N application and instructions

WAC 222-16-070 (pesticides that require a SEPA checklist)





Ground application of pesticides with power equipment is prohibited in the core zone, inner zone, or channel migration zone of any Type S and F streams.



**KEEP CHEMICALS
OUT OF ALL
SURFACE WATER**

Mark the stream crossings before spraying so the operator can see and avoid them.

Motorized Ground Application

Ground application of pesticides with power equipment is prohibited in the core zone, inner zone, or channel migration zone of any Type S and F streams — unless necessary for noxious weed control. See WAC 222-38-020(5) for other requirements.

- ▶ Follow all label requirements
- ▶ The first pass of each application should be made parallel to the buffer zones — but chemicals cannot drift into the buffers
- ▶ Leave a 25' buffer along Type A and Type B Wetlands and on all sides of flowing Type N streams.
- ▶ As a common courtesy, notify neighbors prior to application.

Hand Application

- ▶ Follow all label requirements.
- ▶ The first pass of each application should be made parallel to the buffer zones — but chemicals cannot drift into the buffers.
- ▶ Prohibited in the core zone, inner zone, or channel migration zone of any Type S and F streams.
- ▶ As a common courtesy, notify neighbors prior to application.

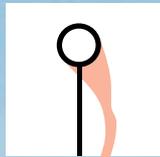


Follow all label requirements

Aerial Application

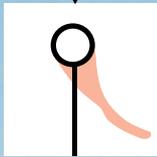
Spray applications should be made when wind speed is less than 5 mph

WINDS LESS THAN **5** MPH



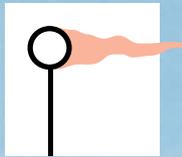
1 MPH

Smoke rises vertically. No foliage movement.



1-3 MPH

Foliage and small twigs sway gently. Grass and weeds sway and bend.



4-7 MPH

Small trees in open sway gently, loose scraps of paper flutter, you feel a slight breeze on your face.

- ▶ Follow all label requirements
- ▶ The first pass of each application should be made parallel to the buffer zones — but chemicals cannot drift into the buffers
- ▶ Leave at least a 100' buffer next to agricultural lands (unless label requirements specify larger)
- ▶ Leave at least a 200' buffer around homes (unless label requirements specify larger)
- ▶ Flag the buffers well and inform the pilot what color of flagging you have used
- ▶ As a common courtesy, notify neighbors prior to application
- ▶ Five days prior to spraying, post signs at all places where people might enter the area. Leave signs posted at least 15 days after application. Signs must include the product name, date of treatment, a contact phone number, and any applicable restrictions



When is it too windy to spray chemicals?

Spray applications should be conducted when wind speed is less than 5 mph. Use drift control agents as directed. The chart to the left will help you estimate wind speed.

Whether applying forest chemicals by hand, by power equipment, or by air, precautions must be taken to protect water. Pesticides and fertilizers entering water can harm fish and other aquatic organisms. Regardless of the application technique used, you are required to keep chemicals out of the water.



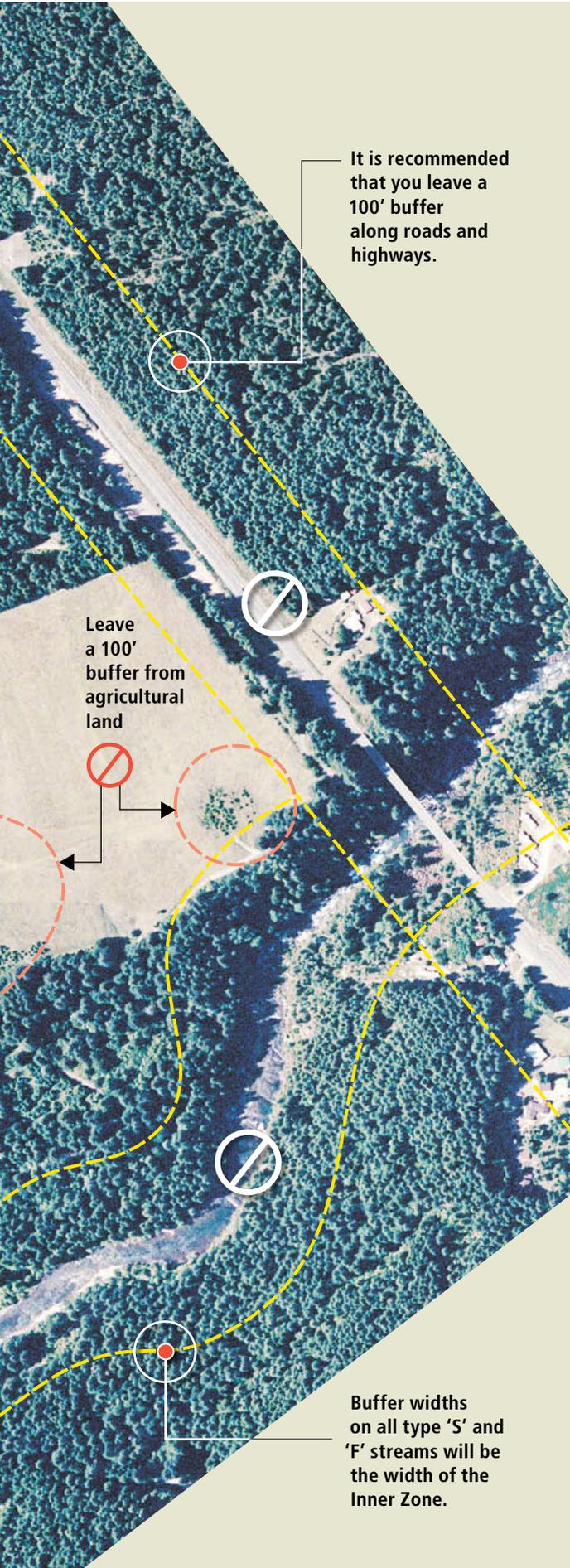


Leave a 200' buffer from homes



WIND BUFFER
You may need to leave additional buffer widths to prevent spray from entering RMZ, homes and agricultural areas.

PHOTO ILLUSTRATION FROM AERIAL IMAGE BY DNR RESOURCE MAPPING SECTION



Buffer Zone Requirements for Chemical Applications

HAND APPLICATION

Hand applications do not require a buffer. However, they must be applied to specific targets, and chemicals must be prevented from entering water.



MOTORIZED GROUND APPLICATION

Leave at least a 25' buffer along Type A and Type B Wetlands and on all sides of Type N streams.

AERIAL APPLICATION

- ▶ Buffer widths depend on the width of the inner zone on Type S or F streams
- ▶ Buffer widths depend on the width of the Wetland Management Zone
- ▶ Spray cannot enter any surface waters
- ▶ Offsets from these buffer widths depend on the height the aircraft is flying, the nozzle type, and the wind direction
- ▶ 200' from homes
- ▶ 100' from agricultural lands

How to Report a Spill



Spills of oil or other hazardous materials must be reported.

WHO TO CALL

National Response Center

1-800-424-8802

AND

Washington Emergency Management Division

**1-800-258-5990 or
1-800-OILS-911**

AND

Department of Ecology Region office

Northwest Region

1-425-649-7000

Island, King, Kitsap, San Juan, Skagit, Snohomish, and Whatcom counties

Southwest Region

1-360-407-6300

Clallum, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, and Wahkiakum counties

Central Region

1-509-575-2490

Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, and Yakima counties

Eastern Region

1-509-329-3400

Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, and Whitman counties

DEPARTMENT OF AGRICULTURE (DOA) RESTRICTIONS

- ▶ All chemicals used in Washington State must be registered.
- ▶ Applicators must have a license for use of some chemicals.

To see if chemicals are registered, check Washington State University Pesticide Information Center (PICOL). PICOL is a database found at <http://wsprs.wsu.edu/index.html>.



A recent federal court ruling has mandated a minimum 300' buffer on some salmon-bearing streams in the State of Washington. This ruling increases buffer size (beyond Forest Practice Rules) on streams when using forest chemicals in certain areas. Check the Washington Department of Agriculture website at <http://www.agr.wa.gov/pestfert/envresources/buffers.htm> or call the Department of Agriculture at 1-877-301-4555 to see if you may be affected.

Complaints

Report label violations (using an unregistered chemical or using a chemical contrary to its label) to DOA. Complaints on sprays for Christmas tree farms should be directed to DOA.

Note: DNR no longer regulates Christmas tree farms.

Spills

Report any spills to DOE.

Chemical Drift

Report chemical drift on forest land to Department of Natural Resources (DNR).

DEPARTMENT OF NATURAL RESOURCES (DNR) RESTRICTIONS

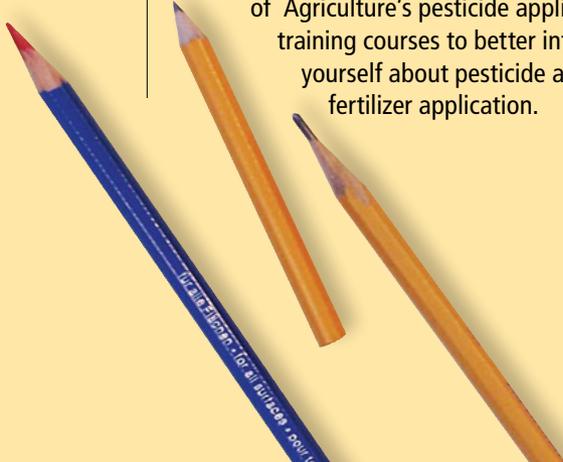
Forest Practices Rules require buffers when applying chemicals near streams and wetlands in the forest.

Suggestions for Success

The following list has suggestions to help you achieve management objectives while protecting long-term investments and public resources. These suggestions may exceed Forest Practices Rules.

- I have read the "Chemical Maintenance" section.
- Read and follow directions on all forest chemical labels.
- Contact a forestry consultant/apPLICATOR for advice on:
 - ▶ Whether you need to use chemicals.
 - ▶ Alternatives (chemical and non-chemical techniques).
 - ▶ Choosing the right chemical for the desired results.
 - ▶ Using the right amount of chemicals, at the right time, in the right places.
 - ▶ Using the appropriate application technique.
- Check with DNR to see if you need a FPA/N for the activity you are proposing.
- Keep chemicals from entering any typed stream or wetland during mixing, loading, and application. 
- Develop an emergency plan for accidental spills.
- For aerial application, keep records of:
 - ▶ Who applied the chemicals.
 - ▶ When, where, and which chemicals were used.
 - ▶ How much was used (rate of application).
 - ▶ Weather conditions.
- Make sure people hired to apply chemicals have proper licenses (contact Washington Department of Agriculture).
- For aerial applications, post signs and notify adjacent landowners.

- Plan chemical applications for the right time and season for resource protection.
- Use protective equipment and gear appropriate to the application, as specified on the label. 
- Make sure applicator knows the location of:
 - ▶ Ground and aerial application of pesticide or fertilizer buffers
 - ▶ Core and inner zones of RMZs (same as harvest core and inner zones).
 - ▶ Channel migration zones.
 - ▶ Sensitive sites.
 - ▶ Type A and B wetlands and their wetland management zones.
 - ▶ Streams (except Type Np and Ns waters with no surface water present).
 - ▶ Lands used for agriculture.
 - ▶ Water intakes (hatcheries and public water systems).
 - ▶ Heliports, loading and mixing areas.
 - ▶ Powerlines.
 - ▶ Roads and trails entering or adjacent to the spray area.
- Remove containers from the site and dispose of properly.
 - As a landowner, attend Department of Agriculture's pesticide applicator training courses to better inform yourself about pesticide and fertilizer application.



Resources

Cultural Resources

Separate from the Forest Practices Act, archaeological sites are protected under chapter 27.53 RCW; and Native American graves, cairns, and glyptic records are protected under chapter 27.44 RCW. Historic cemeteries and graves are protected under Chapter 68.60 RCW.

The Department of Archaeology and Historic Preservation (DAHP) is the primary contact for the two historic registers (National Register of Historic Places and the Washington Heritage Register) that track Washington's historic and cultural resources.

Department of Archaeology and Historic Preservation

Suite 106
1063 South Capitol Way
Olympia WA 98501
360-586-3065
<http://www.dahp.wa.gov/>

State Laws (Partial List)

Chapter 27.44 RCW Indian Graves and Records
Chapter 27.53 RCW Archaeological Sites and Resources
Archaeological Excavation and Removal Permit
RCW 27.53 WAC 25 – 48)

Chapter 68.60 RCW Abandoned and Historic Cemeteries and Historic Graves

No person may knowingly remove, alter, dig into, excavate, deface or destroy any historic or prehistoric archaeological resource without a permit from the Department of Archaeology and Historic Preservation. Violation of chapter 27.53 RCW or chapter 27.44 RCW is subject to criminal and civil penalties.

State laws can be found online at:

<http://www1.leg.wa.gov/lawsandagencyrules/>

Washington County and City Government Laws

Chapter 36.70A.020 (13) Growth Management Act (GMA)

One of the Growth Management Act's (GMA) planning goals includes, "Identify and encourage the preservation of lands, sites, and structures that have historical, cultural, and archaeological significance." Although the GMA does not require a historic preservation or cultural resources element in a comprehensive plan, cities and counties planning under the GMA must consider and incorporate the historic preservation goal. For information about your city or county please contact your city, county, or DAHP.

Municipal Research and Services Center of Washington at
<http://www.mrsc.org/subjects/planning/historic/histpres.aspx>

Local ordinances for counties and cities can be found at:
<http://www.mrsc.org/codes.aspx>

Federal Laws

The National Park Service provides a link to federal laws at: <http://www.cr.nps.gov/linklaws.htm#LAW>



Forest Roads

Washington State Department of Natural Resources (DNR)

Forest Practices
1111 Washington St SE
MS 47012
Olympia, WA 98504-7012
Phone (360) 902-1400
Fax (360) 902-1428
FPD@dnr.wa.gov

Information on road design, location, drainage, maintenance, and stream crossing requirements is available at local DNR region offices:
<http://www.dnr.wa.gov/ContactDNR/Pages/Home.aspx>

Washington State University Cooperative Extension

Natural Resource Sciences
PO Box 646410
Pullman, WA 99164-6410
Phone: (509) 335-2963
Fax: (509) 335-2878
<http://ext.nrs.wsu.edu/landowners/index.htm>

Consulting Foresters

► Contact a consulting forester or forest engineer for information on road and stream crossing design and layout.

(Directory of Consulting Foresters is available from WSU Cooperative Extension office)

Oregon State University Extension Service

Ag. Communications
Oregon State University
Administration Services
101 Ballard Hall
Corvallis, OR 97331-3606
Phone: (541) 737-2513
<http://extension.oregonstate.edu/index.php>

Selected Publications Available:

Planning Woodland Roads (EC 1118)
Road Construction on Woodland Properties (EC 1135)
Designing Woodland Roads (EC 1137)
Maintaining Woodland Roads (EC 1139)
Hauling Logs from Woodland Properties (EC 1140)

Washington State Department of Fish and Wildlife

WDFW Main Office
Natural Resources Building
1111 Washington St. SE
Olympia, WA 98501
Phone (360) 902-2200
Fax (360) 902-2156
TDD (360) 902-2207
wdfw.wa.gov

Mailing Address

600 Capitol Way N.
Olympia, WA 98501-1091

- Assistance with identifying priority habitats and species of interest
- Issue Hydraulics Project Approval permits (HPAs)
- Technical assistance on designing water crossing structures
- Technical assistance for typing streams

Timber Harvest

Washington State Department of Transportation (DOT)

WSDOT Aerial Photo Sales
Aerial Photography Branch

Walk-in: 1655 South 2nd Ave, Tumwater, WA

Fax your request to: (360) 709-5599

Phone: (360) 709-5550

Web: <http://www.wsdot.wa.gov/MapsData/Aerial/>

Be prepared to provide a description of your area of interest by section, township, range and 1/4 section, if possible.

Washington State Department of Natural Resources

Resource Aerial Photography, Orthophotos
Photo & Map Sales (via fulfillment office
at Dept. of Printing)

http://www.dnr.wa.gov/BusinessPermits/Topics/Maps/Pages/photo_and_map_products_and_services.aspx

Available from DNR region office:

<http://www.dnr.wa.gov/ContactDNR/Pages/Home.aspx>

- ▶ Questions about Forest Practices Rules and assistance with applications
- ▶ Consulting Foresters Directory

Selected Publications Available:

- ▶ Guidelines for Selecting Reserve Trees
- ▶ Recognizing Wetlands and Wetland Indicator Plants on Forest Lands

Washington Contract Loggers Association

P.O. Box 2168

Olympia, WA 98507-2168

Phone: (360) 352-5033

1 (800) 422-0074

<http://www.loggers.com/default.asp>

- ▶ List of Accredited Loggers
- ▶ Logger training and accreditation programs

USDA Natural Resources Conservation Service

(Check telephone directory for local office)

<http://www.wa.nrcs.usda.gov/>

- ▶ County Soil Survey (book describing soil types and limitations related to forestry operations)

Washington State Department of Archaeology and Historic Preservation

1063 South Capitol Way, Suite 106

Olympia WA 98501

Phone: (360) 586-3065

Fax: 360-586-3067

<http://www.dahp.wa.gov/>

- ▶ Information and assistance regarding cultural, historic, and archaeological resources.

Selected Publications Available for Review

Online at: <http://http://www.dahp.wa.gov/>

- ▶ A Field Guide to Washington State Archaeology
- ▶ Washington State Standards for Cultural Resource Reporting
- ▶ DAHP Mitigation Options and Documentation Standards
- ▶ A Citizen's Guide to Protecting Historic Places: Local Preservation
- ▶ National Register vs. Local Register
- ▶ Washington State Growth Management Historic Preservation: A Tool for Managing Growth

Washington State University Cooperative Extension

Natural Resource Sciences

PO Box 646410

Pullman, WA 99164-6410

Phone: (509) 335-2963

Fax: (509) 335-2878

<http://ext.nrs.wsu.edu/landowners/index.htm>

- ▶ Educational workshops for forest owners and loggers

Sample of Selected Publications Available Online at:

<http://ext.nrs.wsu.edu/publications/index.htm>

- ▶ Managing Your Timber Sale (EB 1818)



- ▶ Consulting Foresters Directory (EB 1303)
- ▶ Forest Stewardship: A Handbook for Washington Forest Landowners (MISC 0155)

Oregon State University Extension Service

Ag. Communications
Oregon State University
Administration Services
101 Ballard Hall
Corvallis, OR 97331-3606
Phone: (541) 737-2513
<http://extension.oregonstate.edu/index.php>

Sample of Selected Publications Available Online at:

<http://eesc.oregonstate.edu/agcomwebfile/EdMat/>

- ▶ The Impact of Timber Harvest on Soil and Water Resources (EB 827)
- ▶ Timber Harvesting Options (EC 858)
- ▶ Logging Woodland Properties (EC 956)
- ▶ Thinning to Prevent Mountain Pine Beetle in Lodgepole and Ponderosa Pine (EC 1106)
- ▶ Soil Compaction on Woodland Properties (EC 1109)
- ▶ Designated Skid Trails Minimize Soil Compaction (EC 1110)
- ▶ Enhancing Wildlife on Private Woodlands (EC 1122)
- ▶ Felling and Bucking Techniques for Woodland Owners (EC 1124)
- ▶ Management Planning for Woodland Owners: Why and How (EC 1125)
- ▶ Hauling Logs from Woodland Properties (EC 1140)
- ▶ Soil and Water Conservation: An Introduction for Woodland Owners (EC 1143)
- ▶ How to Manage Your Own Timber Sale: Guidelines for Success (EC 1487)

University of Idaho Cooperative Extension System

Ag. Communications Building, J40
Idaho Street
University of Idaho
Moscow, ID 83843-4196
Phone: (208) 885-7982
<http://www.uidaho.edu/extension/>

Selected Publications Available:

- ▶ Forestry Best Management Practices for Idaho (EXT 745)
- ▶ Are Your Streams Healthy? Stream Quality Survey for Managing Private Forest Ecosystems (SB 61)
- ▶ Diameter Limit Cutting: A Questionable Practice (CIS 630)
- ▶ Calculating Timber Removal Costs Under Ecosystem Management (SB 62)
- ▶ Contracting for Timber Harvest Under Ecosystem Management (SB 63)
- ▶ Selling Woodland Timber: Contract Decisions (EXT 759)
- ▶ Evaluating Wildlife Habitat for Managing Private Forest Ecosystems in the Inland Northwest (SB 60)

Selected videos Available:

- ▶ Forest Water Quality (7027)
- ▶ I Want To Log Selectively: A Practical Guide to Partial Timber Harvesting (755)

Washington State Department of Fish and Wildlife

WDFW Main Office
Natural Resources Building
1111 Washington St. SE
Olympia, WA 98501
Phone: (360) 902-2200
Fax: (360) 902-2156, TDD (360) 902-2207
<http://wdfw.wa.gov/>

Mailing Address

600 Capitol Way N.
Olympia, WA 98501-1091

- ▶ Assistance with identifying priority habitats and species of interest
- ▶ Issue Hydraulics Project Approval permits (HPAs). Check with local region office.
- ▶ Technical assistance on designing water-crossing structures
- ▶ Technical assistance for typing waters

Reforestation

Washington State Department of Natural Resources (DNR)

Available from DNR region office:
<http://www.dnr.wa.gov/ContactDNR/Pages/Home.aspx>

Stewardship foresters can provide technical advice on site preparation, reforestation, animal damage control, and on-site consultations about forest management.

Forest Practices coordinators can answer questions about compliance with Forest Practices Rules.

Selected publication available:

- ▶ Planting Forest Seedlings: How to Select, Plant, and Care for Tree Seedlings

Washington State University Cooperative Extension

Natural Resource Sciences
 PO Box 646410
 Pullman, WA 99164-6410
 Phone: (509) 335-2963
 Fax: (509) 335-2878
ext.nrs.wsu.edu/landowners/index.htm

Contact a Forestry Extension Agent for technical advice on site preparation, reforestation, or animal damage control.

Selected Publications Available:

- ▶ Plant Your Trees Right (PNW 0033)

University of Idaho Cooperative Extension System

Ag. Communications Building, J40
 Idaho Street
 University of Idaho
 Moscow, ID 83843-4196
 Phone: (208) 885-7982
<http://www.uidaho.edu/extension/>

Selected Publications Available:

- ▶ Choosing Nursery Stock for Landscaping, Conservation and Reforestation (CIS 923)

Oregon State University Extension Service

Ag. Communications
 Oregon State University
 Administration Services
 101 Ballard Hall
 Corvallis, OR 97331-3606
 Phone: (541) 737-2513
extension.oregonstate.edu/index.php

Selected Publications Available:

- ▶ Successful Reforestation: An Overview (EC 1498)
- ▶ The Care and Planting of Tree Seedlings on Your Woodland (EC 1504)
- ▶ Seedling Care and Handling (EC 1095)
- ▶ Site Preparation: An Introduction for the Woodland Owner (EC 1188)
- ▶ Selecting and Buying Quality Seedlings (EC 1196)
- ▶ Reforestation Planning Guide: Helping Insure Reforestation Success for Woodland Owners (EM 8241)
- ▶ Understanding and Controlling Deer Damage in Young Plantations (EC 1201)



Forest Chemicals

Washington State Department of Natural Resources (DNR)

Available Online at:
<http://www.dnr.wa.gov/BusinessPermits/ForestPractices/>

Washington State Department of Agriculture

1111 Washington Street SE
PO Box 42560
Olympia, WA 98504-2560
Phone: (360) 902-1800 or TDD (360) 902-1996
agr.wa.gov/

- ▶ Pesticide registration
- ▶ Pesticide applicator licensing program
- ▶ Enforcement of label requirements

Washington State Department of Ecology

Physical address:

300 Desmond Drive
Lacey, WA 98503
Phone: (360) 407-6000 or TDD (800) 833-6388
<http://www.ecy.wa.gov>

Mailing address:

PO Box 47600
Olympia, WA 98504-7600

- ▶ Chemical spills
- ▶ Disposal requirements

Washington State University Cooperative Extension

Natural Resource Sciences
PO Box 646410
Pullman, WA 99164-6410
Phone: (509) 335-2963
Fax: (509) 335-2878
ext.nrs.wsu.edu/landowners/index.htm

- ▶ Pesticide applicator training courses

Selected Publications Available:

- ▶ Protecting Groundwater from Pesticide Contamination (EB 1644)
- ▶ Washington Pesticide Laws and Safety (MISC 0056)

- ▶ Private Applicators Pesticide Education Manual (MISC 0126)
- ▶ WSU Pesticide Study Materials Order Form (CO 886)
- ▶ Pesticides: Learning about Labels (MISC 0191)
- ▶ Pesticides: Safe Handling (MISC 0192)
- ▶ Forest Environment Pesticide Study Manual (MISC 0183)
- ▶ Pesticide Handlers and the Workers Protection Standard (VT0066), also available in Spanish
- ▶ PNW Weed Management Handbook (MISC 0049)
- ▶ PNW Insect Management Handbook (MISC 0047)
- ▶ PNW Plant Disease Management Handbook (MISC 0048)
- ▶ Fertilizing Coastal Douglas-fir Plantations (EB 1800)

Oregon State University Extension Service

Ag. Communications
Oregon State University
Administration Services
101 Ballard Hall
Corvallis, OR 97331-3606
Phone: (541) 737-2513
extension.oregonstate.edu/index.php

Selected Publications Available:

- ▶ Calibrating and Using Backpack Sprayers (PNW 320)
- ▶ Introduction to Conifer Release (EC 1388)
- ▶ How Soil Properties Affect Groundwater Vulnerability to Pesticide Contamination (EM 8559)

General Forest Management

Washington State Department of Natural Resources (DNR)

Stewardship Program

- Backyard Forest Stewardship kits can be requested by e-mailing forest_stewardship@dnr.wa.gov or by calling: 1-888-STEWKIT.
- Stewardship foresters and a wildlife biologist are available to provide on-site forest management advice customized to individual landowner needs.

DNR Forest Stewardship Program

P.O. Box 47037
 Olympia, WA 98504-7037
 Phone: (360) 902-1706
 FAX: (360) 902-1757
forest_stewardship@dnr.wa.gov

Small Forest Landowner Office

P.O. Box 47012
 Olympia, WA
 98504-7012
sflo@dnr.wa.gov

- Resource for small forest landowner concerns and policies. Promotes the economic and ecological viability of small forest landowners.

Selected Publications Available On-line at:

http://www.dnr.wa.gov/BusinessPermits/Topics/SmallForestLandownerOffice/Pages/fp_sflo_overview.aspx/

Washington State University Cooperative Extension

Natural Resource Sciences
 PO Box 646410
 Pullman, WA 99164-6410
 Phone: (509) 335-2963
 Fax: (509) 335-2878
ext.nrs.wsu.edu/landowners/index.htm

- Provides educational programs and materials for forest owners, loggers, and resource professionals. Check with your local County Extension Office for a list of publications and information about forestry education programs in your area.

Selected Publications Available On-line at:

ext.nrs.wsu.edu/landowners/index.htm

Consulting Foresters Directory

Association of Consulting Foresters (ACF)
 Certified Consultants
 Forest Health in the Northwest

Selected Publications Available:

- Forestry Education and Assistance Programs for Washington Landowners (EB 1286)
- Terminology for Forest Owners (EB 1353)
- Forest Stewardship: A Handbook for Washington Forest Landowners (MISC 0155)
- Forest Stewardship Planning Workbook (PNW 0490)

Oregon State University Extension Service

Ag. Communications
 Oregon State University
 Administration Services
 101 Ballard Hall
 Corvallis, OR 97331-3606
 Phone: (541) 737-2513
extension.oregonstate.edu/index.php

Selected Publications Available:

- Forest Ecosystem Stewardship (EM 8676)
- Backyard Woodlands: Caring for Trees, Forests, Water, and Wildlife on Small Forested Acreage (EM 8745)

Montana State University Cooperative Extension Service

PO Box 172040
 115 Culbertson Hall
 Montana State University
 Bozeman, MT 59717-2040
 Phone: (406) 994-3273
extn.msu.montana.edu/

Selected publication available:

- Forest Ecosystem Stewardship (EB 0141)



Other Regulations that Apply to Forestry Operations

This list does NOT include all permits that may be needed. Verify all permits needed for your forestry operation by contacting city, county, state, and federal agencies, as well as Tribal governments.

For an idea of what permits you may need, visit the Office of Regulatory Assistance at:

<http://www.ora.wa.gov/> or call (800) 917.0043 to set up an appointment with a caseworker to help you identify which permits you may need.

Wetland Permit (local, state, or federal government requirements)

Working in or near wetlands, areas that are transitional between open water and uplands or that may be periodically inundated or saturated.

Surface Mining Permit (Department of Natural Resources Surface Mining Program)

May be required for rock pits and quarries.

Burn Permit (Department of Natural Resources)

Required for burning forest slash piles.

State Environmental Policy Act (Department of Natural Resources & Department of Ecology)

Required if adverse environmental impacts are identified in association with a forest practices activity.

Construction Stormwater General Permit (Department of Ecology)

May be required if you disturb one or more acres of land in association with a land conversion.

Hydraulics Project Approval Permit (Department of Fish and Wildlife)

Required for work that uses, diverts, obstructs, or changes the natural flow or bed of any of the salt or fresh waters of state, e.g., culvert or bridge installations.

Shorelines Permit (County Planning Department)

May be required if harvesting is proposed within 200' of major waterways such as rivers, lakes, and salt water.

Clearing and Grading Permit (County Planning Department)

County regulations apply to harvested lands that are being converted to non-forest use.

Other County Regulations (County Planning Department or Environmental Division)

Some counties may have additional requirements.

Road Permits (County or State Highway Department)

Needed to connect a logging road to a public road.

Special Forest Products Permit (County Sheriff)

Required to transport special forest products such as Christmas trees, boughs, and cedar bolts on public roadways.

Tree Removal Permit (City)

Some cities have ordinances regarding tree removal within city limits.

Pesticide Applicators License (Washington State Department of Agriculture)

Required to buy or apply Restricted Use Pesticides or to apply pesticides for hire.

Forest Contractors License (Washington State Department of Labor and Industries)

Required of contractors who do forestry work for hire.

Cultural Resources (Department of Community Trade and Economic Development and Department of Archaeology and Historic Preservation)

► Archaeological Excavation Permit <http://http://www.dahp.wa.gov/pages/archaeology/permitting.htm>.

► Required for excavating, altering, defacing, or removing archaeological objects or resources or Native Indian graves, cairns or glyptic records.

► No person may knowingly remove, alter, dig into, excavate, deface or destroy any historic or prehistoric archaeological resource without a permit from the Department of Archaeology and Historic Preservation. Violation of chapter 27.53 RCW or chapter 27.44 RCW is subject to criminal and civil penalties.

Small Forest Landowner Office

Washington's small forest landowners own and manage approximately 4 million acres of forest land and account for nearly 30 percent of the timber harvested in the state. They play a significant role in supporting rural economies and are essential to the conservation of wildlife habitat, clean water and other public resources.

The small forest landowner community is comprised of a diverse array of ownerships. Small woodlots, ranging from five to more than 1,000 acres, are owned and managed by families, small businesses, non-profits, land trusts, and other types of owners.

People choose to become small forest landowners for many reasons, including: enjoying the scenic and aesthetic values of forests, protecting nature, making a long-term investment and creating a legacy for their families.

Owning and managing forest land also brings with it a host of challenges. Changing forest management regulations, fluctuating timber markets, real estate development pressures and limited public recognition of the value of small forestlands can combine to make forestry a difficult undertaking at the small scale.

The Small Forest Landowner Office

The Small Forest Landowner Office (SFLO) was created in 2000 to serve as a resource for small woodlot owners. The office provides technical assistance and administers incentive-based programs that aid Washington's privately owned, non-industrial forest landowners.

With field foresters located around the state, the SFLO delivers on-site assistance to landowners who have questions about how to manage their forests to meet the resource protection goals of the Forest Practices Rules.

Programs and services include:

Forestry Riparian Easement Program

A voluntary compensation program that reimburses eligible landowners for a minimum of 50 percent of the value of the trees they must, by law, leave in riparian areas to protect riparian function, including water quality and wildlife habitat.

Family Forest Fish Passage Program

A cost-share program that provides 75 – 100 percent of the cost of repairing, replacing or removing fish barriers such as culverts, dams, weirs, spillways or other artificial instream structures that block fish from migrating to upstream habitat.

Alternate Plans

Assistance is available for landowners who wish to develop harvest or management plans that propose alternatives to the Forest Practices Rules. This process can be used as a tool to address site-specific issues and provide greater management flexibility.

General Technical Assistance

The SFLO and its field staff are available to assist landowners with making forest management decisions near sensitive ecological areas such as streambanks, wetlands and unstable slopes.

Other Government Financial and Technical Assistance

Many state and federal agencies provide financial and technical assistance to small forest landowners for conservation practices. The SFLO maintains a list of these programs and can aid landowners with identifying the most appropriate program to meet their needs.

Website

The SFLO maintains a comprehensive website with information on its programs and other government and non-government resources. Find more on the web at: http://www.dnr.wa.gov/BusinessPermits/Topics/SmallForestLandownerOffice/Pages/fp_sflo_overview.aspx



Acronyms

While many of these acronyms are not used in this publication, they are used when conducting forest practices activities.

ALP Accredited Logger Program

ALTC Area Likely to Convert (FPAs in ALTCs are processed as class IV-general)

CMER Cooperative Monitoring, Evaluation and Research (TFW committee)

COHP Conversion Option Harvest Plan (may allow applicant to submit FPA in a designated ALTC as a class II or III, rather than class IV-general)

DAHP (Washington) Department of Archaeology and Historic Preservation

DWF (Washington) Department of Fish and Wildlife

DNR (Washington) Department of Natural Resources

DOE (Washington) Department of Ecology

EIS Environmental Impact Statement

FPA/N Forest Practices Application/Notification

FPAB Forest Practices Appeals Board

FPARS Forest Practices Application Review System

FPB Forest Practices Board (adopts Forest Practices Rules — WACs)

FPF Forest practices forester

GRT Green recruitment tree

HPA Hydraulics Project Approval (a permit required from WDFW)

IC Informal Conference (meeting between DNR forester and landowner and/or operator)

ICN Informal Conference Notes (documents IC)

ID TEAM Interdisciplinary Team (meets on-site to resolve concerns about a proposed forest practice; typically includes landowner, operator, DNR forester, representatives from Tribe, WDFW and/or DOE, and an environmental group)

L&I (Washington Department of) Labor and Industries

LOD Large organic debris (used interchangeably with LWD)

LWD Large woody debris (used interchangeably with LOD)

MDNS Mitigate Determination of Non-Significance (after a SEPA checklist is reviewed, a MDNS means the proposal could have adverse environmental impact but may proceed if proposal is mitigated)

NOC Notice of Correction (directs operator or landowner to take action following a violation)

NSO Northern Spotted Owl

NTC Notice to Comply (enforcement order directing operator or landowner to take action)

RCW Revised Code of Washington

RMZ Riparian management zone (area along streams and rivers designated for restricted forest practices use)

RUP Road use permit

SASSI Salmon and Steelhead Stocks Inventory (lists regional waters with depressed fish stocks)

SEPA State Environmental Policy Act (requires a checklist be completed and reviewed for all class IV FPA/N)

SMA Shoreline Management Act

SOSEA Spotted Owl Special Emphasis Area

SWO Stop Work Order (enforcement order requiring operator to stop work immediately)

T&E Threatened and endangered (species)

TAV Technical assistance visit (requested, on site, internal meeting between landowner and/or operator and DNR forester)

TAVCN TAV Compliance Notice (directs operator or landowner to take action following a violation)

TFW Timber, Fish and Wildlife (industry, Tribes, state agencies and environmental groups working together cooperatively through agreements and committees)

TRAXS Total Resource Accessing Cross-Referencing System (computerized database of state resources)

U&A Usual and Accustomed areas (legally designated areas where Native American Tribes assert their rights)

WAC Washington Administrative Code (rules/regulations)

WAU Watershed Administrative Unit (areas, defined by DNR, in which watershed analysis may be conducted)

WDFW Washington Department of Fish and Wildlife

WMZ Wetland management zone (area surrounding a wetland where forest practices are restricted)

WRT Wildlife reserve tree (also referred to as a snag)

Glossary

**This Glossary is to help you understand terms used in this book.
For exact legal definitions, see the Forest Practices Rules.**

Abandoned Road: A forest road that is permanently closed, stabilized, and no longer passable by 4-wheel highway vehicles. Abandonment requests must be submitted in writing and approved by the Department of Natural Resources.

Aerial Application: Applying chemicals from the air by helicopter or plane.

Affected Indian Tribe: Any federally recognized Indian Tribe that requests, in writing from the department, information on Forest Practices Applications and Notification filed on specified areas.

Alluvial Fan: An erosional landform consisting of cone-shaped deposits of water-borne, often coarse-sized sediments.

Alternate Plan: Alternate plans are intended to provide landowners with a means to develop site-specific management plans for all timber activities regulated under state Forest Practices Rules. An Alternate Plan may alter the prescriptions outlined in the Rules as long as the plan provides protection to public resources at least equal in overall effectiveness to the protections offered by the Forest Practices Act and the Forest Practices Rules.

Anadromous Fish: Fish whose life cycle includes time spent in both fresh and salt water.

Archaeology: A systematic, scientific study of human's past through material remains. (RCW 27.53.030 DAHP)

Archaeological object: An object that comprises the physical evidence of an indigenous and subsequent culture including material remains of past human life, monuments, symbols, tools, facilities, and technological by-products. (RCW 27.53.030 DAHP)

Archaeological Site: A geographic locality in Washington, including but not limited to, submerged and submersible lands and the bed of the sea within the state's jurisdiction, that contains archaeological objects (RCW 27.53.030 DAHP).

Armoring: Placing rocks on headwall or fill material around a culvert to prevent water from eroding and undercutting the culvert and flowing under the road.

Ballast: Coarse base rock placed on top of subgrade to stabilize the road bed.

Bankfull Width: The channel width at the estimated water surface elevation required to completely fill the channel.

For streams, the measurement of the lateral extent of the water surface elevation perpendicular to the channel at bankfull depth. For multiple channels, bankfull width is the sum of the individual channel widths along the cross-section.

For lakes, ponds, and impoundments, the line of mean high water.

For tidal water, the line of mean high tide.

For periodically inundated areas associated with wetlands, the line of common and usual periodic inundation determined by examining the edge of the inundated area.

Bare Root: A type of tree seedling grown by a forest nursery in seed or transplant beds (i.e., outdoors and directly in the soil, not in containers in a greenhouse) and when lifted from the nursery bed has its roots free of soil. Bare root seedlings are designated by abbreviated common species name (i.e., DF for Douglas-fir, WRC for western redcedar, PP for ponderosa pine, etc.), years in a seedbed, and years in a transplant bed (e.g., 2+0, 1+1). If germinated as a plug in a greenhouse before transplanted, the letter P supplants the years in a seedbed (e.g., P+1). For example, a plug transplant seedling type might be "RA P+1," pronounced "red alder plug one."

Basal Area: The area in square feet of the cross-section of a tree bole measured at 4.5 feet above the ground.

Best Management Practices (BMPs): Proactive and often voluntary forest stewardship practices that have been determined to be the most effective, practical means of preventing or reducing soil and other pollutants from entering any water; streams, ponds, lakes, etc.

Board of Natural Resources (BNR): As defined and authorized in RCW 43.30.205, the BNR consists of six members: the governor or governor designee, the superintendent of public instruction, the commissioner of public lands, the dean of the college of forestry of the University of Washington, the dean of the college of human and natural resources sciences of Washington State University, and a representative of those counties containing state forest lands acquired by the department. The BNR's duties include establishing department policy and setting appraisal value of lands and valuable materials including timber values offered for sale. See RCW 43.30.205 for more duties of BNR.



Board Foot: The amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide (2.54 x 30.5 x 30.5 cm), abbreviated bd ft –note in trees or logs, board-foot volume is a measure of merchantability, and therefore the number of board feet in a cubic foot depends on tree diameter, amount of slab, and saw kerf; commonly, 1,000 bd ft is written as 1 MBF and 1,000,000 bd ft as 1 MMBF (SAF).

Bog: Wetlands which have the following characteristics: Hydric organic soils (peat and/or muck) typically 16 inches or more in depth (except over bedrock or hardpan); and vegetation such as sphagnum moss, Labrador tea, bog laurel, bog rosemary, sundews and sedges. Bogs may have an overstory of spruce, western hemlock, lodgepole pine, western red cedar, western white pine, Oregon crabapple, or quaking aspen, and may be associated with open water. This includes nutrient-poor fens. (See Board Manual Section 8.)

Bole: A trunk or a main stem of a tree.

Bull Trout Habitat Overlay: Those portions of Eastern Washington streams containing bull trout habitat as identified on the Washington Department of Fish and Wildlife's bull trout map.

Bucking: Cutting logs into specified lengths.

Cable: A rope made of single-strand metal wires.

Cable Yarding System: A category of logging systems that uses cables to pull logs to a landing. Cable yarding systems use a yarder with a tower (generally 30 to 110 feet in height) or other spar at the landing. The two main types of cable yarding systems are highlead and skyline.

Catch Basin: A constructed basin at and immediately upstream of culvert openings, designed to slow water velocity and trap sediment before water flows through the culvert.

Channel Migration Zone (CMZ): The area where the active channel of a stream is prone to move.

Clearcut: A harvest method in which the entire stand of trees is removed in a timber harvesting operation. Except as provided in WAC 222-30-110, an area remains clearcut until:

- ▶ It meets the minimum stocking requirements under WAC 222-34-010(2) or 222-34-020(2); and
- ▶ The largest trees qualifying for the minimum stocking levels have survived on the area for five

growing seasons or, if not, they have reached an average height of four feet.

Confluence: The point at which two or more streams merge into one stream channel.

Conifer: A cone-bearing tree with needles, such as pine, spruce, fir and larch.

Contiguous: Land adjoining or touching by common corner or otherwise. Land having common ownership divided by a road or other right of way shall be considered contiguous.

Critical Habitat (federal): The habitat of any threatened or endangered species designated as critical habitat by the United States Secretary of the Interior or Commerce under Sections 3 (5)(A) and 4 (a)(3) of the Federal Endangered Species Act.

Critical Habitat (state): Those habitats designated by the Forest Practices Board in accordance with WAC 222-16-080.

Relief Culverts: Installed structures, such as culverts, water bars, and rolling dips that move water across or under the road surface to the forest floor.

Crowned Roads: Roads constructed with the highest point in the middle to drain water off half the road to the outside, and half the road to an inside ditch.

Cultural Resource: Archaeological and historic sites and artifacts, and traditional religious, ceremonial and social uses and activities of affected Indian Tribes.

Culturally Modified Tree: A tree that has been altered by native people as part of their traditional use of forests.

Debris: Woody vegetative residue less than 3 cubic feet in size resulting from forest practices activities.

Deciduous: A tree that loses its leaves or needles during the fall and winter. Such as maple, alder and oak trees.

Desired Future Condition (DFC): The stand conditions of a mature riparian forest at 140 years of age.

Diameter at Breast Height (DBH): A tree's diameter measured 4.5 feet above the ground measured from the uphill side.

Ditch-out: Extending the ditch away from the roadway to divert water to the forest floor.

Down Logs: Larger diameter woody debris left on site after harvest to provide wildlife habitat.

Drainage Structure: A construction technique or feature that is built to relieve surface runoff and/or intercepted ground water from roadside ditches to prevent excessive buildup in water volume and velocity. A drainage structure is not intended to carry any typed water. Drainage structures include structures such as: cross drains, relief culverts, ditch diversions, water bars, or other such structures demonstrated to be equally effective.

End Hauling: The removal and transportation of excavated material, pit or quarry overburden, or landing or road cut material from the excavation site to a deposit site not adjacent to the point of removal.

Energy Dissipater: Material, such as rocks or wood, placed at the outlet of a culvert to slow and disperse the flow of water.

Equipment Limitation Zone (ELZ): A 30-foot wide zone measured horizontally from the outer edge of the bankfull width of a Type Np or Ns stream. It applies to all perennial and seasonal non-fish habitat streams.

Even-aged Harvest: Refers to the following harvest methods:

- ▶ Clearcuts
- ▶ Seed tree harvests in which twenty or fewer trees per acre remain after harvest
- ▶ Shelterwood regeneration harvests in which twenty or fewer trees per acre remain after harvest
- ▶ Group or strip shelterwood harvests creating openings wider than two tree heights, based on dominant trees
- ▶ Shelterwood removal harvests which leave fewer than 150 trees per acre which are at least five years old or four feet in average height

▶ Partial cutting in which fewer than 50 trees per acre remain after harvest

▶ Overstory removal when more than 5,000 board feet per acre is removed and fewer than 50 trees per acre at least ten feet in height remain after harvest

▶ Other harvesting methods designed to manage for multiple age classes in which six or fewer trees per acre remain after harvest

Except as provided above for shelterwood removal harvests and overstory removal, trees counted as remaining after harvest shall be at least ten inches in diameter at breast height and have at least the top one-third of the stem supporting green, live crowns. Except as provided in WAC 222-30-110, an area remains harvested by even-aged methods until it meets the minimum stocking requirements under WAC 222-34-010 (2) or 222-34-020(2) and the largest trees qualifying for the minimum stocking levels have survived on the area for five growing seasons or, if not, they have reached an average height of four feet.

Fertilizers: Any substance or any combination or mixture of substances used principally as a source of plant food or soil amendment.

Fill: The placement of earth material or aggregate for road or landing construction or other similar activities.

Fish: For purposes of the Forest Practices Rules, species of the vertebrate taxonomic groups of Cephalospidomorphi and Osteichthyes.

Fish Habitat: Habitat which is used by fish at any life stage at any time of the year, including potential habitat likely to be used by fish, which could be recovered by restoration or management and includes off-channel habitat.

Fish Passage Barrier: Any artificial instream structure that impedes the free passage of fish.

Ford: A constructed or natural stream crossing that can be driven through when the water level is low.

Forest Chemicals: Pesticides, fertilizers, animal repellents and other chemicals applied to forest lands and road surfaces.

Forest Land: All land which is capable of supporting a merchantable stand of timber and is not being actively used for a use which is incompatible with timber growing.



Forest Landowner: Any person in actual control of forest land, whether such control is based either on legal or equitable title, or on any other interest entitling the holder to sell or otherwise dispose of any or all of the timber on such land in any manner: Provided, That any lessee or other person in possession of forest land without legal or equitable title to such land shall be excluded from the definition of "forest landowner" unless such lessee or other person has the right to sell or otherwise dispose of any or all of the timber located on such forest land.

Forest Practice: Activities conducted on forest lands related to growing, harvesting or processing timber that are regulated by the Forest Practices Act. These include road construction and maintenance, thinning and salvage of trees, harvesting, reforestation, brush control, and using fertilizers or pesticides.

Forest Practices Board: The Board is an independent state agency chaired by the Commissioner of Public Lands who administers the Department of Natural Resources (DNR). DNR provides staff support to the Board and implements and enforces the Forest Practices Rules. The Forest Practices Board adopts rules that set minimum standards for forest practices such as timber harvest, pre-commercial thinning, road construction, fertilization, and forest chemical application.

By law, the 12-member board is constituted as follows:

- ▶ Commissioner of Public Lands, board chair (or designee)
- ▶ Director, Department of Community, Trade and Economic Development (or designee)
- ▶ Director, Department of Ecology (or designee)
- ▶ Director, Department of Agriculture (or designee)
- ▶ Director, Department of Fish and Wildlife (or designee)
- ▶ An elected member of a county commission or council, and appointed by the governor.
- ▶ Six members of the general public, each of whom serves a four-year term after being appointed by the governor. The law requires that one of those members own less than 500 acres of forest land; another member must be an independent logging contractor.

Forest Practices Appeals Board: The Forest Practices Appeals Board (FPAB) created by RCW 76.09.210. The FPAB hears appeals from the decisions of the Department of Natural Resources (DNR) including the approval or disapproval of a Forest Practices Application, civil penalties, stop work orders and notices to comply. The FPAB's sole function is to provide all litigants a full and complete administrative hearing, as promptly as possible, followed by a fair and impartial written decision based on the facts and law. The FPAB is an independent, quasi-judicial hearings board entirely separate from DNR and any other state, regional or local unit of government. The Board consists of three members, who are appointed by the Governor and confirmed by the State Senate for staggered six-year terms. One of the three must be an attorney. The presiding officer at each hearing is an Administrative Appeals Judge on staff within the Environmental Hearings Office.

Forwarding: Using a fully-mechanized harvesting system to pick up logs and haul them from the woods to a landing.

Full Bench Construction: A road constructed on a side hill without using any of the material removed from the hillside as a part of the road. This construction technique is usually used on steep or unstable slopes.

Green Recruitment Trees (GRTs): Those trees left after harvest for the purpose of becoming future wildlife reserve trees under WAC 222-30-020(11).

Ground Application: Applying chemicals using motorized power equipment.

Hand Application: Using non-motorized equipment to apply chemicals to specific targets, such as vegetation, trees, stumps, and burrows, or as bait or in traps.

Headwall: Wall constructed of impervious and erosion-resistant material (rocks) at culvert openings to direct water into the culvert and to protect the road fill material from eroding.

Headwall Seep: A seep of water located at the toe of the edge of a cliff and at the head of a type Np stream, which connects to the stream by overland flow, and is recognized by loose substrate and/or fractured bedrock with perennial water at or near the surface throughout the year.

Headwater Spring: A permanent spring at the head of a perennial channel.

Herbicide: Any substance or mixture of substances intended to prevent, destroy, repel, or mitigate any tree, bush, weed or algae and other aquatic weeds.

Highlead: A two-drum cable yarding system in which the yarder is associated with a landing-based tower or spar and that results in reducing the impact to the soil.

Historic: Peoples and cultures who are known through written documents in their own or other languages. As applied to underwater archaeological resources, the term historic shall include only those properties which are listed in or eligible for listing in the Washington State Register of Historic Places (RCW 27.34.220) or the National Register of Historic Places as defined in the National Historic Preservation Act of 1966 (Title 1, Sec. 101, Public Law 89-665; 80 Stat. 915; 16 U.S.C. Sec. 470) as now or hereafter amended (RCW 27.53.030 DAHP).

Historic Archaeological Resources: Properties which are listed in or eligible for listing in the Washington State Register of Historic Places (RCW 27.34.220) or the National Register of Historic Places as defined in the National Historic Preservation Act of 1966 (Title 1, Sec. 101, Public Law 89-665; 80 Stat. 915; 16 U.S.C. Sec. 470) as now or hereafter amended (RCW 27.53.030 DAHP).

Historic Site: Sites, areas and structures or other evidence of human activities illustrative of the origins, evolution and development of the nation, state or locality; or places associated with a personality important in history; or places where significant historical events are known to have occurred even though no physical evidence of the event remains.

Horizontal Distance: The distance between two points measured at a 0% slope.

Hydraulics Project Approval (HPA): Permit from Washington State Department of Fish and Wildlife required for projects in or affecting water.

Inactive Road: A forest road on which commercial hauling is discontinued for one or more harvest seasons, and is maintained for occasional forest management activities.

Interdisciplinary Team (ID Team): A group of varying size comprised of individuals having specialized expertise, assembled by the DNR to respond to technical questions associated with a proposed forest practices activity.

Insecticide: Any substance or mixture of substances intended to prevent, destroy, repel, or mitigate any insect, other arthropods or mollusk pests.

Insloped Roads: Roads constructed to slope toward the inside edge so water drains into a ditch and is drained to stable locations with relief culvert culverts.

J-root: A defect in tree planting in which a seedling's root system is distorted into a J-shape when planted.

Landing: A central location where logs are transported for sorting and loading onto trucks.

Large Woody Debris (LWD): Large pieces of wood in stream channels or on the ground – includes logs, pieces of logs, and large chunks of wood; provides streambed stability and/or habitat complexity. Also called coarse woody debris (CWD) or large down woody debris (LDWD).

Leave Trees: Trees intentionally left standing after a harvest or thinning.

Log: A merchantable length of timber cut from a harvested tree.

Natural Reseeding: Letting on-site or nearby trees reseed the harvest area.

Operator: Any person engaging in forest practices, but does not include employees of the operator with wages as his/her sole compensation.

Outsloped Roads: Roads constructed to slope toward the outside so water drains slowly over the outer edge.



Partial Cut: The removal of a portion of the merchantable volume in a stand of timber so as to leave an uneven-aged stand of fewer than 50 tree per acre of well-distributed residual, healthy trees that will reasonably utilize the productivity of the soil. Partial cutting does not include seedtree or shelterwood or other types of regeneration cutting.

Perennial Stream: A stream that does not go dry any time of a year of normal rainfall. For the purpose of water typing, Type Np waters include the intermittent dry portions of the perennial channel below the uppermost point of the perennial flow.

Perched Landings: Logging debris piled on edge of landings over steep slopes that has the potential to fall and enter water.

Pesticides: Any insecticide, herbicide, fungicide, or rodenticide, not including nontoxic repellents or other forest chemicals (fertilizers).

Plantable Area: An area capable of supporting a commercial stand of timber, excluding lands devoted to permanent roads, utility rights-of-way, that portion of Riparian Management Zones where scarification is not permitted, and any other area devoted to a use incompatible with commercial timber growing.

Planting: Hand-planting seedlings in a harvested area.

Prehistoric: Peoples and cultures who are unknown through contemporaneous written documents in any language (RCW 27.53.030 DAHP).

Public Resources: The Forest Practices Act defines public resources as: water, fish, wildlife, and capital improvements of the state or its political subdivisions (i.e., counties and cities).

Reforestation: Re-establishing a forest in an area where trees have been removed.

Relief Culvert: A type of relief culvert used to divert water from the ditch to the forest floor on the other side of the road. A relief culvert is not used for a stream crossing.

Riparian Area: The area of land adjacent to streams, rivers, lakes and ponds, which provide important fish and wildlife habitat and water quality.

Riparian Management Zone (RMZ):

(1) For Western Washington

(a) The area protected on each side of a Type S or F stream measured horizontally from the outer edge of the bankfull width or the outer edge of the CMZ, whichever is greater (see table below); and

Site Class	Western Washington Total RMZ Width
I	200'
II	170'
III	140'
IV	110'
V	90'

(b) The area protected on each side of Type Np Waters, measured horizontally from the outer edge of the bankfull width. (See WAC 222-30-021(2).)

(2) For Eastern Washington

(a) The area protected on each side of a Type S or F stream measured horizontally from the outer edge of the bankfull width or the outer edge of the CMZ, whichever is greater (see table below); and

Site Class	Eastern Washington Total RMZ Width
I	130'
II	110'
III	90' or 100'*
IV	75' or 100'*
V	75' or 100'*

*Dependent upon stream size.
(See WAC 222-30-022.)

(b) The area protected on each side of Type Np Waters, measured horizontally from the outer edge of the bankfull width. (See WAC 222-30-022 (2).)

Rock Weir: A small rock dam used in a ditch to slow water velocity and to filter sediment.

Rolling Dip: A constructed break in the road grade to allow water to run off; a drivable water bar.

Salvage: Harvesting damaged or defective trees for their economic value or for forest health. Includes salvage of residual cedar, blow-down stands, and fire-damaged stands.

Scarify: To disturb the forest floor and topsoil in preparation for natural regeneration, direct seeding or planting.

Seasonal Stream: A stream where surface flow is not present for at least some portion of a year of normal rainfall.

Sediment: Solid fragments of inorganic or organic material that come from the weathering of rock and are carried and deposited by wind, water, or ice.

Sediment Trap: A constructed basin installed adjacent to stream crossing and/or relief culverts to slow water velocity and settle soil particles.

Sensitive Sites: Areas that are near or next to Np stream and have one or more of the following: headwall seep, side-slope seep, Type Np intersection, headwater spring, or an alluvial fan.

Shorelines of the State: All the waters of the state where the average annual flow is 20 cubic feet per second or greater.

Side Cast(ing): Moving excavated material to the side and depositing such material within the limits of construction or dumping over the side and outside the limits of construction.

Side Slope Seep: A seep within 100 feet of a Type Np stream located on side-slopes which are greater than 20 percent, connected to the stream channel network via overland flow, and characterized by loose substrate and fractured bedrock, excluding muck with perennial water at or near the surface throughout the year. Water delivery to the Type Np channel is visible by someone standing in or near the stream.

Silviculture: The art, science and practice of planting, caring for, harvesting, and regrowing forest stands with desired qualities, based on knowledge of species and their requirements.

Site Class: A grouping of site indices that are used to determine the 50-year or 100-year site class. In order to determine site class, the landowner will obtain the site class index from the state soil survey, place it in the correct index range shown in the two tables provided in this definition, and select the corresponding site class. The site class will then drive the RMZ width. (See WAC 222-30-021 and 222-30-022.)

Site Index: Height of a tree at a specified index or base age. Used as an indicator of site quality.

Site Preparation: Those activities associated with the removal of slash in preparing a site for planting, including scarification and/or slash burning.

Skid Trail: A route used by tracked or wheeled skidders to move logs to a landing or road.

Skidding: Pulling logs with ground equipment or horses from the stump to the landing.

Skyline System: A cable yarding system in which the yarder is associated with a landing-based tower or spar and that is capable of suspending at least one, and often both, ends of logs.

Slash: Pieces of woody material containing more than 3 cubic feet, resulting from forest practices activities.

Snag: A standing dead tree, may have some live limbs toward the top of the tree. Also known as WRT (Wildlife Reserve Tree).

Spar: A standing or raised tree or steel tower used to provide lift for rigging in cable logging systems (SAF).

Spoil: Excess material removed as overburden or generated during road or landing construction which is not used within limits of construction.

Stable Area: A location in the forest that does not have potential to cause a landslide or create resource damage.

State Environmental Policy Act (SEPA): A state policy that requires state and local agencies to consider the likely environmental consequences of a proposal before approving or denying the proposal.

Stream-adjacent parallel roads: Roads (including associated right of way clearing) in a Riparian Management Zone on a property that have an alignment that is parallel to the general alignment of the stream, including roads used by others under easements or cooperative road agreements. Also included are stream crossings where the alignment of the road continues to parallel the stream for more than 250 feet on either side of the stream. Not included are federal, state, county or municipal roads that are not subject to Forest Practices Rules, or roads of another adjacent landowner.

Subgrade: Road surface shaped and graded before application of rock.

Temporary (Seasonal) Roads: A forest road that is constructed and intended for use during the life of an approved Forest Practices Application/Notification. All



temporary roads must be abandoned in accordance to WAC 222-24-052(3).

Threatened or Endangered Species: All species of wildlife listed as “threatened” or “endangered” by the United States Secretary of the Interior or Commerce, and all species of wildlife designated as “threatened” or “endangered” by the Washington Fish and Wildlife Commission.

Timber Owner: Any person having all or any part of the legal interest in timber. Where such timber is subject to a contract of sale, “timber owner” shall mean the contract purchaser.

Turn-outs: A widening of the road to allow oncoming traffic to pass safely.

Type Np Intersection: The intersection of two or more Type Np Waters.

Uneven-aged Harvest: Periodically removing merchantable trees of different ages and sizes, including thinning and salvage, to maintain a stand with a mix of age classes.

Waste Area: A stable location for placing end-haul materials.

Water Bars: Constructed drainage devices in the road surface that divert water to the forest floor.

Stream crossing Structures: Bridges, culverts, arches, fords, and temporary crossings installed in streams to maintain natural water flow.

Wetland Management Zone (WMZ): Area adjacent to Type A or B wetland where specific measures are taken to protect the water quality and quantity, and fish and wildlife habitat.

Wetlands: Areas that are saturated or covered with water long enough and often enough that their soils and plants differ from those in nearby uplands.

Type A Wetlands: At least 1/2 acre of open water for one week during the growing season, with surrounding crown closure less than 30 percent (see Board Manual in Forest Practices Rule book for specifics).

Type B Wetlands: All other non-forested wetlands greater than 1/4 acre.

Forested Wetlands: Wetlands with tree canopy closure of at least 30 percent.

Bog: Wetland consisting of saturated organic material, such as peat and muck, and plants that tolerate acidic soils, such as sedges and bog laurel.

Wildlife Reserve Trees (WRTs): Dead, dying, defective or damaged trees left standing after harvest to provide wildlife habitat. Wildlife reserve trees are categorized as follows:

Type 1 wildlife reserve trees are defective or deformed live trees that have observably sound tops, limbs, trunks, and roots. They may have part of the top broken out or have evidence of other severe defects that include: “Cat face,” animal chewing, old logging wounds, weather injury, insect attack, or lightning strike. Unless approved by the landowner, only green trees with visible cavities, nests, or obvious severe defects capable of supporting cavity dependent species shall be considered as Type 1 wildlife reserve trees. These trees must be stable and pose the least hazard for workers.

Type 2 wildlife reserve trees are dead Type 1 trees with sound tops, limbs, trunks, and roots.

Type 3 wildlife reserve trees are live or dead trees with unstable tops or upper portions. Unless approved by the landowner, only green trees with visible cavities, nests, or obvious severe defects capable of supporting cavity dependent species shall be considered as Type 3 wildlife reserve trees. Although the roots and main portion of the trunk are sound, these reserve trees pose high hazard because of the defect in live or dead wood higher up in the tree.

Type 4 wildlife reserve trees are live or dead trees with unstable trunks or roots, with or without bark. This includes “soft snags” as well as live trees with unstable roots caused by root rot or fire. These trees are unstable and pose a high hazard to workers.

Windthrow: A natural process by which trees are uprooted or sustain severe trunk damage caused by winds.

Yarding Corridor: A narrow, linear path through a riparian management zone to allow suspended cables necessary to support cable logging methods or suspended or partially suspended logs to be transported through these areas by cable logging methods.

Yarding: Moving logs by a cable system from the stump to a landing.





This publication was prepared by the
 Washington State Department of Natural Resources, 2007
 Updated 2009

Project Manager

Donelle Mahan

Editors

Jeannie Abbott
 Gary Graves
 Barbara MacGregor
 Donelle Mahan
 Kyra Nourse

Graphic Design

Luis Prado

Pen and Ink Illustrations

Jane Chavey

Technical Illustrations

Luis Prado

Writers

Jeannie Abbott
 Dave Cole
 Steve DeCook
 Marc Engel
 Sherri Felix
 Tony Gilmer
 Kirk Hanson
 Jill Jones
 Barbara MacGregor
 Donelle Mahan
 Rick Marlowe
 Diane Martinz
 Bruce McDonald
 Charlie McKinney
 Cyril Moya
 Kathy Murray
 Randy Nelson
 Roger Ramsdell
 Charlene Rodgers
 Jack Shambo
 Andrew Skowlund
 Sherry Tomlinson
 Carol Walters
 Joe Weeks
 Ritch Wood

Technical Writer

Barbara MacGregor

Aerial Photography

DNR Resource Mapping

Advisory Group

Steve Bernath
 Jerry Bonagofsky
 Deborah Cornett

Sonny Davis
 John Gorman
 Craig Graber
 Pete Heide
 Sarah Johnson
 Stephenie Kramer
 Chris Mendoza
 Ken Miller
 Bob Penhale
 Allen Pleus
 Tom Robinson
 Heather Rowton
 Jerry Shervey
 Michelle Stevie
 Dave Whipple
 Ned Wright

Photographs Compiled by

Terry Curtis
 Kirk Hanson
 Donelle Mahan
 Luis Prado

Photographs Submitted by

Brian Abbott
 Ted Allison
 Seth Barnes
 Ken Bevis
 Casey Black
 Port Blakely
 Marty Brooks
 Jeff Cederholm
 Terry Curtis
 Steve DeCook
 Dave Dupree
 Nancy Eberle
 Kirk Hanson
 Terry Jackson
 Ernest Keeley
 Marc LeClair
 Donelle Mahan
 Rick Marlowe
 Diane Martinz
 Andy McMillan
 Cyril Moya
 Noelle Nordstrom
 Grover Oakerman
 Scott Potter
 Luis Prado
 Roger Ramsdell
 Dave Roberts
 Mark Sheehan
 Dorian Smith
 Don Strand
 Laura Till

Sherry Tomlinson
 Randy Warnock
 Mandie Willenberg
 Ritch Wood
 John Zapel
 DNR Communications' Photo Library

Web Design

Jeff Schieber

Additional Review

Robert Anderson
 Seth Barnes
 Jeanette Barrecca
 Jerry Bonagofsky
 Sue Casey
 Vicki Christiansen
 David Cole
 Dennis Dart
 Steve DeCook
 Marc Engel
 Steve Gibbs
 Gary Graves
 Pete Heide
 Phil Hess
 Jim Heuring
 Terry Jackson
 Jill Jones
 Jack Kleinhoff
 Stephenie Kramer
 Rick Kuykendall
 Pat McElroy
 Terry Meisenheimer
 Kathy Murray
 Noelle Nordstrom
 Boyd Norton
 Mike Nystrom
 Rick Roames
 Heather Rowton
 Michelle Stevie
 Lee Stilson
 Jeffrey Thomas
 Ned Wright

Additional Review Distribution

Chehalis Tribe
 Colville Tribe
 Cowlitz Tribe
 Kalispel Tribe
 Sauk-Suiattle
 Shoalwater Bay Tribe
 Snoqualmie Tribe
 Spokane Tribe
 Yakama Tribe

The Washington State Department of Natural Resources thanks the following organizations for their assistance in review of this publication

Commissioner of Public Lands' Small Landowner Advisory Committee
 Conservation Caucus
 Northwest Indian Fisheries Commission
 Sammish Tribe
 Washington Contract Loggers Association
 Washington Farm Forestry Association
 Washington Forest Protection Association
 Washington State Department of Archeology and Historic Preservation
 Washington State Department of Ecology
 Washington State Department of Fish and Wildlife

Special Thanks to:

Nancy Charbonneau
 Dawn Hitchens
 Mark Macleod
 Ulli Schluter

Funding for this project has been provided in part through EPA Grant No. C9-00044904-0 to the Department of Ecology from the United States Environmental Protection Agency. The Department of Ecology allocates and administers funding for this project.



**FOR MORE INFORMATION, CONTACT THE NEAREST
DEPARTMENT OF NATURAL RESOURCES REGION IN WHICH
YOUR PROPERTY IS LOCATED**

Olympia Headquarters
Forest Practices Division
1111 Washington Street SE
PO Box 47012
Olympia, WA 98504-7012
(360) 902-1400
information@dnr.wa.gov

Northeast Region
225 S. Silke Road
PO Box 190
Colville, WA 99114-0190
(509) 684-7474
northeast.region@dnr.wa.gov

Northwest Region
919 N. Township Street
Sedro-Woolley, WA 98284-9384
(360) 856-3500
northwest.region@dnr.wa.gov

Olympic Region
411 Tillicum Lane
Forks, WA 98331-9797
(360) 374-2800
olympic.region@dnr.wa.gov

South Puget Sound Region
950 Farman Avenue North
Enumclaw, WA 98022-9282
(360) 825-1631
southpuget.region@dnr.wa.gov

Pacific Cascade Region
601 Bond Road
PO Box 280
Castle Rock, WA 98611-0280
(360) 577-2025
pacific-cascade.region@dnr.wa.gov

Southeast Region
713 Bowers Road
Ellensburg, WA 98926-9301
(509) 925-8510
southeast.region@dnr.wa.gov