3. Alternatives and Analysis

OVERVIEW

Chapter 3 is introduced by a general discussion of the environmental setting of forested state trust lands across the state of Washington. Much of this discussion is focused on the ecological variability and diversity of Washington and, consequently, the forested state trust lands. This discussion is important because many elements of forested state trust land management are driven by the ecological setting, or ecoregion, where the lands are located. This diversity also provides multiple economic opportunities for the trusts. A general understanding of the ecoregions that contain forested state trust lands helps set the context for the alternatives contained in this *Final Environmental Impact Statement on the Policy for Sustainable Forests* (Final EIS).

The remainder of Chapter 3 discusses 25 policy subject areas that are organized within four major policy categories: Economic Performance; Forest Ecosystem Health and Productivity; Social and Cultural Benefits; and Implementation. Each policy subject area has six subsections: Introduction; Affected Environment; Regulatory Framework; Alternatives; Significant Impacts and Mitigation Measures; and Cumulative Impacts. A Board's Preferred Alternative has been identified for each policy subject area. The Board's Preferred Alternative is the one that the Board of Natural Resources feels best meets the purpose, need and policy objectives for the *Policy for Sustainable Forests* (see Chapter 1).

The following documents are incorporated by reference in this Final EIS and are available for review on the Washington State Department of Natural Resources (DNR) website (www.dnr.wa.gov):

- *Final Environmental Impact Statement for the Forest Resource Plan* (Washington State Department of Natural Resources, 1992). This document discusses the environmental impacts of policies guiding the management of 2.1 million acres of forested state trust lands.

- *Determination of Significance and Adoption of Existing Environmental Document and Addendum to the Existing Final Environmental Impact Statement for the Forest Resource Plan* (Washington State Department of Natural Resources, May 24, 2002). The addendum addresses changes concerning the knowledge of existing environmental conditions since the adoption of the 1992 *Forest Resource Plan*.

- *Forest Resource Plan* (Washington State Department of Natural Resources, 1992). This document consists of 40 policies guiding the management of 2.1 million acres of forested state trust lands.

- *Draft Environmental Impact Statement Habitat Conservation Plan* (Washington State Department of Natural Resources, 1996) and *Final Environmental Impact Statement Habitat Conservation Plan* (Washington State Department of Natural Resources, 1997). These documents discuss the potential environmental impacts of implementing conservation strategies to protect threatened and endangered species on forested state trust lands.

- *Final Habitat Conservation Plan* (Washington State Department of Natural Resources, 1997). This document discusses the conservation of threatened and endangered species on forested state trust lands.

- *Draft Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington* and *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington* (Washington State Department of Natural Resources, 2004). These documents discuss the environmental impacts associated with the sustainable harvest level for Western Washington.

- *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources* (Washington Forest Practices Board, 2001). This document discusses the environmental impacts of forest practices activities on aquatic and riparian habitat on private and forested state trust lands, as well as habitat protection for salmonid species which are listed as threatened or endangered under the Endangered Species Act.

- *Final Environmental Impact Statement for the Proposed Forest Practices Rules and Regulations* (Washington Forest Practices Board, 1992). This document discusses forest practices rules and regulations.

The following documents are also incorporated by reference in this Final EIS:

- *Final Supplemental Environmental Impact Statement for the Northwest Forest Plan* (United States Department of Agriculture Forest Service and United States Department of the Interior Bureau of Land Management, 1994). This document discusses an integrated, comprehensive design for ecosystem management, intergovernmental and public collaboration, and rural community economic assistance for federal forests in Western Oregon, Washington and Northern California. For additional information about the *Northwest Forest Plan*, please contact the United States Department of Agriculture Forest Service's Public Affairs Office: Pacific Northwest Region, Public Affairs Office, P.O. Box 3623, Portland, OR 97208-3623, 503-808-2971, or at www.fs.fed.us/r6.

- *Economic Analysis as Prepared for: Washington State Department of Natural Resources* (Deloitte and Touche, LLP, 1996). This document provides information and analyses of land, natural resources, administrative and monetary assets managed

by the Washington State Department of Natural Resources and the Washington State Investment Board. This document was prepared as part of DNR's ongoing development of its *Asset Stewardship Plan*, which is intended to achieve the most substantial and sustainable benefits to current and future trust beneficiaries and the general public. This document can be reviewed at DNR's headquarters in Olympia.

- *Definition and Inventory of Old Growth Forests on DNR-Managed State Lands*, July 2005. The 2004 Washington State Legislature directed DNR to inventory old-growth forest stands on state lands as defined by a panel of scientists. By applying an old-growth habitat indexing method to DNR's Forest Resource Inventory System, potential old-growth stands were identified. This document fulfills this direction.

ECOREGION REPRESENTATION – ENVIRONMENTAL SETTING

The forested lands managed by DNR are diverse. This diversity is shaped by the ecological variation across the state, ranging from low elevation temperate rainforests in Western Washington to open dry forests east of the Cascade Mountains. The physical attributes of the environment are responsible for the diversity of forest ecosystems that have developed in Washington. These ecosystems are products of the interactions over time between the physical attributes of the environment and the plant and animal species present within the environment. There are recognizable patterns to how individual ecosystem types are distributed across the landscape. Understanding the patterns that exist and the factors responsible for those patterns, especially disturbances, is critical to making wise management decisions regarding natural resources.

Ecoregions generally have a distinctive composition and pattern of plant and animal species. Abiotic factors, such as climate, landform, soil and hydrology are important in the development of ecosystems within ecoregions and help define them. Within an individual ecoregion, biotic factors, such as the ecological relationships between species and their physical environment, can be similar.

A description of each of the nine ecoregions represented in Washington is presented in Appendix B, which includes a discussion of the physical attributes of the ecoregions, a characterization of the dominant ecosystems present and the significant natural ecological processes operating within each ecoregion. This appendix is meant to provide an overview of the various biotic and abiotic factors that influence forest management decision-making and provide the environmental context for the Board of Natural Resources' policy decisions in the *Policy for Sustainable Forests*.

3.1 Economic Performance

This major policy category contains policy subject areas related to revenue production and financial performance of forested state trust lands. These subjects address the range of activities and various commodities that should be considered in producing revenue from forested state trust lands. It also includes lands that are deferred from harvest activities. The policies in this major policy category, together with the other policies in this Final EIS, provide the broad context for DNR's economic management of forested state trust lands and production of sustainable revenue for each trust beneficiary.

3.1.1 Financial Diversification

INTRODUCTION

Diversification is an important fiduciary consideration in meeting DNR's obligations to each trust beneficiary. Financial diversification as a policy subject area deals with the forest asset class only and discusses both marketing and sales of forest products, as well as income from non-timber forest products and services. Financial diversification among trust asset classes, such as forestry, agriculture and commercial real estate is guided by DNR's *Asset Stewardship Plan* and is not addressed in this Final EIS.

Although the Financial Diversification policy subject primarily meets the following Policy Objectives:

- Pursue outcome-based management within a flexible framework (Policy Objective 6);
- Promote active, innovative and sustainable stewardship on as much of the forested land base as possible (Policy Objective 7); and
- Capture existing and future economic opportunities for the beneficiaries from the forestland base by being prudent, innovative and creative (Policy Objective 9);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

Financial diversification actions do not change the overall timber harvest level from forested state trust lands. The overall harvest level is determined by the Board of Natural Resources at the time a sustainable harvest calculation is completed. Marketing different forest products and timing the sale of forest products can optimize financial returns for each trust beneficiary.

Special forest products provide revenue opportunities for the trust beneficiaries, as well as supporting a niche for a variety of local businesses. Special forest products can include western greens, Christmas greens and Christmas trees. DNR issues permits and enters

into leases for the harvest and sale of western greens to provide revenue to the trust beneficiaries. Currently, there are approximately 330 western greens leases and permits covering 128,000 acres, eight Christmas greens sales/leases involving a total of 8,100 acres, and seven leases to grow Christmas trees on forested state trust lands, covering less than 300 acres. Leases and permits for collection of western greens, Christmas greens and Christmas trees are categorically exempt from State Environmental Policy Act (SEPA) review. Actions or activities that are categorically exempt are those that would not significantly affect the environment.

No commercial harvesting of mushrooms is authorized on lands covered by the Habitat Conservation Plan (HCP). Recreational mushroom harvesting is allowed, but is limited to five gallons per person per day. Currently, compliance is not monitored and unauthorized commercial-type harvest may be occurring on forested state trust lands.

Illegal harvesting and theft of special forest products can result in detrimental environmental impacts, such as entire removal or stripping of plants resulting in mortality or unauthorized removals and activity in riparian and wetland areas. DNR's permitting and leasing program helps reduce illegal harvesting and minimizes associated environmental impacts.

DNR sells valuable materials and leases forestland for a variety of other uses to supplement revenue for the affected trust(s). Such uses include:

- Approximately 102 commercial communication sites (covering a total area of 65 acres of leased land);
- Eleven commercial sand, gravel, and rock pits are operated by DNR that require a permit under RCW78.44; in addition, twenty three leases for sand, gravel, and rock are administered by DNR;
- Leases have been issued for coal, lead, zinc, silver, and gold; there is no commercial production of these commodities at present;
- Sixteen oil and gas exploration lease auctions have been held since 1947 covering a number of parcels ranging from 50 in 1947-48 to more than 600 in 2004. No exploratory wells have been drilled on state lands in Eastern Washington and only 2 exploratory wells have ever been drilled in Western Washington in 1989 (one each in Lewis and Clallam counties). No commercial production has occurred to date (Final EIS State Land Oil and gas Leasing Program, July 2005);
- Recreation sites (see discussion of recreation sites, potential impacts and mitigation under Public Access and Recreation subject area);
- Energy generation; and
- Potential revenue sources from non-extractive, low-intensity uses may exist, e.g., low-impact recreational use and carbon sequestration.

The impact on the environment of such uses will depend on the nature of the use and is evaluated at the time these uses are proposed.

REGULATORY FRAMEWORK

There are no specific regulations that require or direct financial diversification, although numerous laws govern activities undertaken as part of a financial diversification strategy.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 reflects what DNR recognized in 1992 as an increasing demand for special forest products and increased revenue opportunities. Maintaining Policy No. 8 commits DNR to continue a special forest products program. Special forest products represent one element of financial diversification. Alternative 1 does not appear to meet Policy Objectives 7 and 9 as well as other alternatives.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 8, Special Forest Products: "The department will encourage and promote the sale of special forest products where appropriate and will market them in a manner consistent with the overall policies of this plan."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 generally represents current financial diversification efforts within the forest asset class. Alternative 2 would direct DNR to continue the current practice of offering a mix of forest products timed to take advantage of seasonal market fluctuations to improve revenue generation. DNR would focus primarily on regional markets under Alternative 2. DNR would continue to market non-timber-related commodities like special forest products when it would improve overall financial performance. DNR would increasingly use contract harvesting as one method to improve financial performance through marketing and sales of forest products. DNR would monitor changing land values and land use trends surrounding forested state trust lands to make informed forestland allocation and management decisions.

While Alternative 2 represents a higher degree of innovation and creativity than Alternative 1, it does not recognize the economic potential of ecological and social benefits that can flow from forested state trust lands. Alternative 2 appears to meet Policy Objectives 7 and 9 better than Alternative 1, but not as well as Alternatives 3 and 4.

POLICY STATEMENTS

The department will identify and offer a mix of forest products to take advantage of existing markets and market value fluctuations.

The department will evaluate and capture financial opportunities through production, marketing and sales of both timber and non-timber-related commodities.

The department will continually evaluate land use patterns and changing land values to guide decisions about trust asset management and allocation.

■ ALTERNATIVE 3

DISCUSSION

Alternative 3 includes all of the components of Alternative 2. Additionally, DNR would anticipate future demand for ecological and social benefits. DNR would invest and seek to position trust assets to take advantage of that demand to benefit the trust beneficiaries. Although these benefits may not have immediate revenue potential, they would appear likely to have significant future revenue potential. These benefits have the potential to improve the overall financial performance of forested state trust lands. Examples of future ecological and social benefits that have potential to increase in the future are recreation, tourism, water quantity and quality, forest certification and carbon sequestration.

Alternative 3 represents a higher degree of innovation, creativity and speculation than the other alternatives by directing DNR to anticipate or develop future economic markets for ecological and social benefits and position trust assets to take advantage of those markets. Alternative 3 appears to meet Policy Objectives 7 and 9 better than Alternatives 1 and 2, but not as well Alternative 4.

POLICY STATEMENTS

The department will identify and offer a mix of forest products to take advantage of existing markets and market value fluctuations.

The department will evaluate and capture financial opportunities through production, marketing and sales of both timber and non-timber-related commodities.

The department will continually evaluate land use patterns and changing land values to guide decisions about trust asset management and allocation.

Anticipating increased future demand, the department will actively pursue, evaluate and develop new economic opportunities related to the ecological and social benefits that flow from forested state trust lands.

■ ALTERNATIVE 4

DISCUSSION

Alternative 4 includes all of the components of Alternative 2. Additionally, DNR would expand its marketing efforts to national and international markets. DNR would increase its efforts to capture additional revenue through leasing of forestland for other uses, such as energy generation and communication sites, when there is a clear opportunity to improve the net revenue from forestlands. DNR would continue to evaluate different marketing and sales strategies beyond contract harvesting to improve overall financial performance of the forestlands. DNR would participate in research related to economic and financial trends to identify partnerships and/or additional opportunities to improve financial performance through diversification. Alternative 4 recognizes that forested state trust lands offer unique products in the worldwide market, such as significant volumes of low elevation Douglas-fir. Alternative 4 provides for a higher degree of innovation and creativity by improving economic performance through diversification in the forest products arena. It also prudently seeks sources of income with immediate net revenue potential from forestlands related to non-forest products or ecological and social benefits, such as recreation and tourism. Alternative 4 best meets the applicable policy objectives by directing DNR to actively manage the land base by seeking future economic opportunities, while being prudent and innovative (Policy Objectives 7 and 9).

POLICY STATEMENTS

The department will identify and offer a mix of forest products to take advantage of existing markets and market value fluctuations.

The department will evaluate and capture financial opportunities through production, marketing and sales of both timber and non-timber-related commodities.

The department will continually evaluate land use patterns and changing land values to guide decisions about trust asset management and allocation.

The department will actively expand its efforts to identify, develop and target new national and global markets for forest products.

The department will continually seek opportunities to creatively market and sell forest products to improve overall financial performance.

When there is a clear opportunity to improve the net revenue from forestlands, the department will actively pursue economic opportunities related to ecological and social benefits that flow from forested state trust lands.

The department will pursue additional forecasting services and research related to economic and financial trends to identify additional diversification opportunities.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative builds on Alternative 4 by adding a component of Alternative 3 that directs DNR to pursue future market opportunities for forested state trust lands. The Board's Preferred Alternative meets Policy Objective 9 by capturing future economic opportunities for the trust beneficiaries.

POLICY STATEMENTS

The department will identify and offer a mix of forest products to take advantage of existing markets and market value fluctuations.

The department will evaluate and capture financial opportunities through production, marketing and sales of both timber and non-timber related commodities and uses.

The department will actively expand its efforts to identify, develop and target new national and international markets for forest products and seek opportunities to creatively market and sell forest products to improve overall financial performance.

Anticipating future demand, the department will prudently pursue economic opportunities related to ecological and social benefits that flow from forested state trust lands, to improve the net revenue from forestlands.

To guide decisions about trust asset management and allocation and to identify additional diversification opportunities, the department will:

- **Continually evaluate land use patterns and changing land values; and**
- **Pursue additional forecasting services and research related to economic and financial trends.**

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

An alternative was suggested for analysis that emphasized maximizing and protecting water quality, wildlife habitat, and recreation opportunities. This alternative was not analyzed because it did not meet the purpose, need and objectives of the *Policy for Sustainable Forests*. For additional discussion, refer to the Range of Alternatives subsection in Appendix H: Response to Comments.

Another suggestion was to include a policy or goal statement that promotes balanced age class and species distribution in the primary (forestland) trust asset. These are important considerations in meeting the objectives of sustainable trust management and as such will be considerations of implementing several of the policies, e.g. Financial Diversification, Forest Health, and General Silvicultural Strategy.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Alternative 1 maintains DNR's special forest products program. Because of the low impact nature of the activity, the low level of frequency, and the dispersed nature of the activity, DNR believes the impacts from this program, including cumulative impacts, are not significant. Under Alternative 1, collection of western greens is a self-limiting process, because only part of the foliage of any plant meets commercial quality standards. Thus, harvesting practices result in retention of most of the plant and, consequently, a photosynthetic base for the regeneration of new foliage (Amaranthus and Pilz, 1996). For Alternative 1, no significant environmental damage has been observed as a result of DNR's leases or permits to collect greens. Other mitigation measures include no mechanical or motorized devices used in the harvest of special forest products, except for using helicopters to remove boughs from the forest. All special forest products are harvested by hand. All permits, sales and leases have limitations and guidelines to provide environmental protection and ensure compliance with the HCP.

Alternative 2 envisions a more active approach for identifying and responding to market opportunities for both timber and non-timber products. In identifying and offering a mix of forest products, DNR does not anticipate increasing the overall decadal level of timber harvest. However, development of short-term markets for certain wood products or major price fluctuations could result in an increasing or decreasing level of harvest over the short-term (1 or 2 years), but still within the overall decadal harvest level. Site-specific environmental impacts associated with localized harvest increases of certain products in response to short-term market or price changes will need to be analyzed and any significant impacts will be considered for mitigation as needed at the time the project is proposed. Specific impacts cannot be analyzed now because the nature of these changes and the impacts that may result cannot be anticipated. Alternative 2 envisions using market indicators, including changing land use patterns and land use values, to guide DNR's decisions related to trust asset management and allocation.

Alternative 3 puts more emphasis on anticipating increased future demand relative to the ecological and social benefits that flow from forested state trust lands. Promoting more intense or new uses of forested state trust lands to produce revenue could have either negative or positive impacts on the environment, depending on the type, location and intensity of use. For example, if ecological services or other conservation values can be effectively marketed, that may result in management actions with less environmental effects than resource-extraction uses. Environmental impact analysis of new uses or marketing of new commodities from forested state trust lands in the future would be analyzed when the new uses have been identified and the effects of such activities could be meaningfully assessed in a non-speculative manner.

Under Alternative 4, refining markets for timber products nationally and globally is not expected to affect the decadal timber harvest level or otherwise impact the environment. Alternative 4 envisions a more active effort by DNR to market existing timber products, not increase the decadal level of timber harvest.

Alternative 4 envisions a more active response to market and non-market signals to capture additional economic returns. The potential impacts from Alternative 4 on the

natural and built environments will depend on the opportunities that become available and are pursued and thus, anticipation of types, severity and longevity of impacts is purely speculative at this time. As mentioned above, the marketing of ecological services may lead to fewer impacts where the marketing of new commodities could lead to increased environmental impacts. However, impacts resulting from any new extractions would be analyzed as required by SEPA and considered for mitigation as appropriate at the time they can be identified, as discussed above under Alternative 2.

The Board's Preferred Alternative adds a component of Alternative 3 to Alternative 4. The analysis of the Board's Preferred Alternative is covered by the existing discussion under these two alternatives. The discussions from Alternatives 1, 2 and 3 also apply to the Board's Preferred Alternative. There are no new significant impacts from the Board's Preferred Alternative.

CUMULATIVE IMPACTS

The likelihood of any cumulative impacts from these alternatives is purely speculative for products other than timber, since it will depend on DNR's response to new non-timber markets that are currently unknown.

For the sale and marketing of timber, none of the alternatives are expected to increase the harvest level, which is set by the Board of Natural Resources through a sustainable decadal harvest calculation. Some site-specific environmental impacts could occur as a result of short-term increases in harvest of certain products in response to market and price fluctuations. Conversely, short-term decreases in harvest could also occur in response to market and price fluctuations resulting in a reduction in site-specific environmental impacts. Any probable significant adverse impacts associated with site-specific harvest proposals will be evaluated and considered for mitigation as needed through SEPA at the time of the proposal.

3.1.2 Financial Assumptions

INTRODUCTION

Forest investments are based on various financial assumptions. Assumptions about prices, costs, interest rates and other financial factors reflect national and regional economic conditions, as well as anticipated changes in forest product markets. DNR makes certain assumptions as it uses various investment models to guide decisions related to silvicultural investments; capital investments, such as forest roads; forestland investments; and other investment decisions. The nature and timeliness of reviews and updates of financial assumptions are critical to making sound investment decisions on behalf of each trust beneficiary.

Although the Financial Assumptions policy subject primarily meets the following Policy Objectives:

- Balance trust income, environmental protection, and other social benefits from four perspectives: the prudent person doctrine; undivided loyalty to and impartiality among the trust beneficiaries; intergenerational equity; and not foreclosing future options (Policy Objective 2); and
- Use professional judgment, best available science and sound field forestry to achieve excellence in public stewardship (Policy Objective 5);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

The financial assumptions and DNR's investment analysis programs help DNR allocate scarce financial resources to achieve the optimum economic results. The amount of trust money available for investment varies due to the interaction of several macro-economic and micro-economic factors. Gross and net revenues are determined by market dynamics and operating costs. If there is sufficient investment revenue in the Resource Management Cost Account and/or Forest Development Cost Account, capital is allocated using the various investment models.

REGULATORY FRAMEWORK

There are no specific regulations that apply directly to review of Financial Assumptions.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 directs DNR to review its financial assumptions each year. Economic situations may change more or less frequently than every year. Adjustments to financial assumptions driven by general economic trends may be more effective than annual adjustments. Alternative 1 does not appear to meet Policy Objectives 2 and 5 as well as the other alternatives.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 12, Annual Review of Financial Assumptions: "The department will review and adjust annually its financial assumptions used in management decisions."**

■ ALTERNATIVE 2

DISCUSSION

Under Alternative 2, DNR would track financial trends and periodically adjust its financial assumptions, based on professional judgment, when general economic situations dictate, rather than simply every year. Review and adjustment would be driven by economic trends, not by a set period of time. Alternative 2 places the emphasis for adjustments of financial assumptions on general economic trends. Alternative 2 appears to better meet Policy Objective 2 than Alternative 1.

POLICY STATEMENT

The department will review financial assumptions on a periodic basis and make adjustments when general economic situations dictate.

■ ALTERNATIVE 3

DISCUSSION

Alternative 3 includes all of the components of Alternative 2. Additionally, DNR would develop and utilize a state uplands coordinated approach for reviewing and adjusting financial assumptions to be used for analyzing investment decisions related to managing forested state trust lands. Alternative 3 would provide better consistency within DNR related to investment analysis and financial assumptions. Alternative 3 best meets the applicable policy objective by providing a more prudent approach to reviewing and updating the financial assumptions based on professional judgment and economic information and providing more consistency between upland programs (Policy Objectives 2 and 5).

POLICY STATEMENTS

The department will review financial assumptions on a periodic basis and make adjustments when general economic situations dictate.

The department will utilize a comprehensive approach to periodically review and update the financial assumptions used in forest management decisions.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative is slightly different from Alternative 3, in that the Board's Preferred Alternative directs DNR to review financial assumptions at least once per year, rather than on a periodic basis.

POLICY STATEMENTS

At least once per year, the department will review financial assumptions that affect forest management and will make adjustments when general economic situations dictate.

The department will utilize a comprehensive approach to review and update the financial assumptions used in forest management decisions.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

A suggestion was made to include "net present value" in the policy objectives and the alternatives. Although "net present value" is an important consideration, it is not exclusively used when making financial decisions. Other tools are also utilized when circumstances call for other approaches. See also Appendix H, Financial Assumptions subsection.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Financial assumptions can influence the level of capital investment and management decisions that may modify the environment. The decision concerning the method and frequency that DNR reviews financial assumptions is impact neutral. For this reason, there are no significant adverse environmental impacts associated with this policy choice.

CUMULATIVE IMPACTS

The alternatives being reviewed only concern the methodology used for reviewing financial assumptions and how often these assumptions are reviewed.

3.1.3 Harvest Deferral Designations (formerly "Land Classifications")

INTRODUCTION

Historically, DNR has classified forested state trust lands into two general categories: "on-base" and "off-base." This was done, in part, to comply with RCW 79.10.320. On-base lands are those forested state trust lands considered capable of producing timber revenue. Such lands were included in DNR's timber harvest plans. Off-base lands were trust lands that typically could not produce another timber crop within the next 80 years. Properties where harvesting had been deferred due to the potential risk to public resources were also considered off-base lands. Forestland that was deemed too small, isolated, difficult to access or removed from the harvest base to meet some other specific need or objective has been included in the off-base category. Historically, off-base lands have not been included in a sustainable harvest calculation. The determination of on-base and off-base status was subject to change as new information becomes available. The 2004 sustainable harvest calculation for Western Washington classified lands according to management objectives, such as riparian and wetlands, general management objectives and special management emphasis. As a result, some lands that were traditionally considered off-base for purposes of timber harvest were now included in the sustainable harvest calculation, because they met other objectives even though timber harvest was not intended.

Although the Harvest Deferral Designations policy subject primarily meets the following Policy Objective:

- Ensure policies are succinct, relevant and easily understood by the public and department employees (Policy Objective 3);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

This policy subject area deals with classification or designation of lands that are deferred from harvest for a specified period of time. Harvest deferrals can be short or long-term in duration. If the objective for deferred lands changes in the future, those lands may become available for harvest. For example, in addition to commitments made in the HCP, DNR agreed with the Federal Services to protect a number of northern spotted owl habitat circles until 2007. Therefore, those lands are deferred from harvest for the agreement's duration. After the expiration of the agreement, such lands may be available for harvest, but like the other lands, are subject to existing forest management objectives and constraints, including those identified in the March 2006 Settlement Agreement.

Forested state trust lands not considered for commercial timber management at the current time include, but are not restricted to, those for which timber harvest is

operationally or economically infeasible; those that pose an unduly high risk to public resources; mature natural stands in the Olympic Experimental State Forest, 15,000 acres; old growth research areas, 2,000 acres; gene pool reserves, 2,400 acres; habitat areas having a crucial interim role in a species' persistence (for example, northern spotted owl circles or marbled murrelet reclassified habitat); and lands having special ecological features or local issues that warrant short or long-term deferral from harvest.

A determination of the acreages which are capable of being harvested is made each time the sustainable harvest level is calculated.

There are currently 516,000 of 1.39 million acres (37 percent) in an off-base or deferred from harvest status in Western Washington forested state trust lands (*Final EIS on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*, Table 2.6-4, Chapter 2, pages 2-34). The 1.39 million acres does not include 139,000 acres determined to be non-forested lands, such as roads and waterways.

A sustainable harvest calculation for Eastern Washington has not been recently completed. Therefore, an updated inventory of lands deferred from harvest from the 710,000 acres of forested state trust land in Eastern Washington is not currently available. DNR will be performing an Eastern Washington sustainable harvest calculation within the next five years.

REGULATORY FRAMEWORK

Classification of forested state trust lands is for the purpose of calculating a sustainable harvest level. Identifying lands for inclusion in a sustainable harvest calculation is central to projecting a sustained yield of timber. RCW 79.10.320 directs the sale of timber on a sustained yield basis. It states that "The department shall manage the state-owned lands under its jurisdiction which are primarily valuable for the purpose of growing forest crops on a sustained yield basis insofar as compatible with other regulatory directives. To this end, the department shall periodically adjust the acreages designated for inclusion and calculate a sustainable harvest level." Identifying lands that are available, and therefore those that are unavailable, for harvest at any given point in time is necessary to comply with this statute. However, even those lands which are not "primarily valuable for the purpose of growing forest crops" may serve important habitat and other roles and contribute toward meeting multiple objectives, especially those associated with HCP contractual commitments and conservation strategies. Therefore, such lands may still be a critical consideration in calculating a sustainable harvest level.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 continues designating forested state trust lands as either "on-base" or "off-base" for the purposes of identifying forestlands capable of producing merchantable timber within 80 years for harvesting and for determining what lands are included in the

sustainable harvest calculation. However, this is no longer the most descriptive way to classify lands for a sustainable harvest calculation. Alternative 1 does not appear to meet Policy Objective 3 as well as Alternative 2.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 3, Land Classifications: "The department intends to designate those lands and timber resources that are unavailable for harvest as "off-base." All deferrals will be included in this category."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 recognizes that forested state trust lands are managed to meet multiple economic, ecological or social objectives and are set by state and federal law and other legal agreements, including the HCP and Board of Natural Resources policy. Many of these objectives have evolved since adoption of the *Forest Resource Plan*. All forested state trust lands contribute or have the potential to contribute to one or more of the various objectives. Through a sustainable harvest calculation process, the capability of forestlands and associated forest stands to meet these objectives can be analyzed. DNR currently classifies lands according to management objectives, such as riparian and wetlands, general management objectives and special management emphasis. As a result, some lands that were traditionally considered off-base for purposes of timber harvest will now be included in a sustainable harvest calculation, because they meet other objectives even though timber harvest is not intended. DNR assigns silvicultural regimes for stands at the broad landscape level to examine the outcome of implementing policy objectives over space and time.

The majority of forested state trust lands in Washington will be included in a sustainable harvest calculation to determine their role in meeting Board of Natural Resources objectives.

Some forested state trust lands may play an important role in meeting ecological objectives in their current condition. They will likely be unavailable for harvest during the next decade or longer. These lands will be classified as deferrals in a sustainable harvest calculation and, while not currently available for harvest, will be included in the calculation. For example, old growth research areas help meet older forest targets for HCP planning units, but are currently not available for harvest. Other examples of lands in this category are recreation sites and gene pool reserves. Including lands that are deferred from harvest allows DNR to better predict the future forest conditions on those lands, for purposes of meeting DNR's ecological objectives. Alternative 2 best meets the applicable policy objective by providing more clarity for both the public and DNR employees with regard to the designation of lands available for harvest (Policy Objective 3).

POLICY STATEMENT

The department will designate those lands and timber resources that are unavailable for harvest as short or long-term deferrals.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative is the same as Alternative 2, with some minor edits to ensure the policy is clear and succinct (Policy Objective 3).

POLICY STATEMENT

The department will designate lands and timber resources that are unavailable for harvest as either short-term or long-term deferrals.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

There are no significant adverse impacts as a result of these policy alternatives. The difference between the alternatives is only in nomenclature. Under Alternative 1, lands are moved in and out of off-base designation with changes in deferral status. On-base lands include all lands that are available for harvest, while off-base lands include lands not available for harvest.

Alternative 2 and the Board's Preferred Alternative distinguish between lands available at any point in time for harvest and those not available. All of these lands, however, are included in the harvest calculation, allowing DNR to determine the role of all forested state trust lands in meeting economic, ecological or social objectives. The terminology used in Alternative 2 and the Board's Preferred Alternative accurately capture the various roles played by all DNR-managed lands under today's forest management environment.

There are no significant probable adverse environmental impacts associated with this change to the Land Classifications policy subject area. Per legislative direction (RCW 79.10.320), DNR will determine lands available for harvest at any given time for the purposes of calculating a sustainable harvest level. Therefore, there are no anticipated environmental impacts from any of the alternatives. The name lands are given for purposes of computer modeling sustainable harvest levels simply has no effect on the ground.

CUMULATIVE IMPACTS

Because the change in nomenclature discussed above has no direct or indirect impacts, there are also no cumulative impacts related to these policy choices.

3.2 Forest Ecosystem Health and Productivity

This major policy category contains policy subject areas related to elements of the forest ecosystem that are important to ecological objectives and long-term health and productivity of trust assets. These subject areas provide the broad context for DNR's management and maintenance of the ecological health of forested state trust lands to ensure long-term, sustainable, healthy forest ecosystems and consequently, a sustainable flow of economic and social, as well as environmental benefits for each trust beneficiary and the people of Washington.

3.2.1 Forest Health

INTRODUCTION

A functioning, healthy forest ecosystem has many components, one of which is the forest stand itself. In addition to maintaining other key elements of the forest ecosystem, maintaining healthy stand conditions keeps the forest productive. What constitutes a healthy forest varies by geography, by watershed, climatic zone, etc. Ecoregions, their associated plant communities and natural vegetative series, are the basis for identifying appropriate species and stocking levels at the stand level (see Appendix B). Productive, healthy forests directly provide many economic, ecological and social benefits to each trust beneficiary and to the people of Washington. DNR utilizes a number of silvicultural activities, including prescribed fire and tree removal, to keep forests healthy and resistant to insects, disease and catastrophic fire. Two major components of maintaining forest health are prevention of damage by maintaining appropriate stand level species composition/age and stocking levels; and monitoring and treatment of insects, disease, noxious weeds, animal damage and other similar threats to trust assets, when their impacts are excessive.

Although the Forest Health policy emphasizes the following Policy Objectives:

- Balance trust income, environmental protection, and other social benefits from four perspectives: the prudent person doctrine; undivided loyalty to and impartiality among the trust beneficiaries; intergenerational equity; and not foreclosing future options (Policy Objective 2);
- Seek productive partnerships that help DNR achieve policy objectives (Policy Objective 4);
- Use professional judgment, best available science and sound field forestry to achieve excellence in public stewardship (Policy Objective 5); and
- Promote active, innovative and sustainable stewardship on as much of the forested land base as possible (Policy Objective 7);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

"Forests are defined as healthy if they have sufficient resiliency to respond to and recover from encountered stress while maintaining their capacity to provide necessary ecological process support and generate desired levels of amenities and products" (National Association of State Foresters Forest Health Committee Charter, April 1992). Forest health is a condition of forest ecosystems that sustains appropriate ecological complexity, while providing for human needs. A healthy forest maintains its unique species and processes, while maintaining its basic structure, composition and function. In addition, it has the ability to accommodate current and future needs of people for values, products and services. Forest entomology and forest pathology, the studies of forest insects and forest diseases, focus on forest health. These disciplines emphasize prevention of insect and disease problems through early detection and management activities that maintain appropriate species and structure, enhance tree vigor and discriminate against damage-causing organisms. Species composition and the stocking levels of those species are the primary elements of the affected environment that influence the health of the forest in terms of resistance and resilience to lack of moisture and other stresses characterized by insects and disease. The relationship between forest fire and forest health is discussed in the Catastrophic Loss Prevention policy subject area in this document.

Insects and diseases affect tree vigor and forest structure by slowing tree growth, causing trees to differentiate in size and shape; creating snags and dead wood, creating forest openings; and consuming seeds or stunting seedlings. They also provide food for fish and wildlife, prey on and parasitize other insects, pollinate flowering plants, aid roots in acquiring water and nutrients and decompose dead material. The presence of insects and disease-causing organisms are part of healthy forests.

At this time, forest insects are a more significant disturbance factor in Eastern Washington forests than in Western Washington Forests (see Maps 1 and 2). For example, the dry spring climate in Eastern Washington is more conducive to defoliating insect survival. Seasonal drought stress reduces a tree's capacity to produce pitch and increases tree vulnerability to bark beetles. Conversely, root disease causing fungi and foliage disease organisms are more prevalent in Western Washington, because moisture regimes are suitable for fungal growth and spore reproduction. Under appropriate environmental conditions, such as ice storm damage, multi-layered host crowns, or off-site plantings, insect and disease populations can rise rapidly. These circumstances create epidemic conditions that kill trees, damage tree form, slow tree growth and contribute to fire risk. In general, forest insects can cause severe damage to a single species or size range of trees, while forest diseases can severely affect host trees of all sizes.

Ecoregions reflect broad ecological patterns occurring across a landscape due to significant differences in major physical features, such as climate and soil. Ecoregions generally have distinctive patterns of plant and animal species relationships, composition and interacting ecological processes, such as fire regimes and periodic drought. Within an

individual ecoregion, forest composition, age, and annual and long-term weather conditions influence the presence, abundance and effect of forest insects and disease on trees and, consequently, overall forest health.

Forest composition and structure in many Washington ecoregions (Puget Trough, East Cascades, Okanogan, Blue Mountains, North Cascades, Columbia Plateau and Canadian Rocky Mountains) is significantly influenced by both natural and human-caused fire. Relationships between fire and tree species and size combinations, and the insects and fungi that feed on them have evolved over time. Dry, low-elevation forests burned more frequently and extensively prior to the mid-20th century than they do now. Late 20th century fire reduction was due to grazing and successful wildfire suppression efforts. As a result of lack of fire and prevalent harvesting practices, forest composition has shifted toward higher tree densities, often smaller trees, and domination by shade-tolerant conifers or less fire-resistant trees. The result is high fuel amounts and interconnected canopy layer. The abnormally high tree and fuel densities create a forest health problem, because the composition and structure is particularly vulnerable to damage from defoliating insects, bark beetles, dwarf mistletoe, root disease, drought and severe fire. Wetter, less accessible high-elevation forests that naturally burned fairly infrequently have not been as dramatically affected by successful fire suppression or harvesting, although they are now more likely to burn severely. As the interval since prior fires increases, stands mature and fuel levels build across the landscape.

These forest health issues can be especially detrimental for wildlife species that require relatively large tracts of forest cover, particularly those that currently inhabit eastside forested state trust lands, such as the northern spotted owl along the east slope of the Cascade mountains (the remaining discussion of wildlife habitat for this policy subject area will focus on spotted owls due to their central role in issues related to forest management practices in Washington). Among other potential factors, loss of habitat due to wildfire and defoliation by insects has been implicated as a possible contributor to a rangewide northern spotted owl population decline (Lint, 2005). At epidemic levels, forest insects and disease can remove considerable amounts of forest cover from forest stands, rendering them unsuitable for spotted owls. In addition, overstocked stands with high fuel loads are more susceptible to stand replacement fires that burn dead materials but also have the potential to remove substantial amounts of live materials (See Section 3.2.2-Catastrophic Loss Prevention policy subject area in this document for further discussion). In light of recent declines of northern spotted owl populations, management of drier forests along the east slope of the Cascade Mountains, prone to epidemic levels of disease and insect infestation and severe fire is an important aspect of future northern spotted owl population recovery (Pierce et al., 2005).

Some forests on the east slopes of the Washington Cascades are experiencing serious forest health problems, many of which are within the range of the northern spotted owl. In some of these areas, habitat for the northern spotted owl is experiencing a significant disease-caused degradation of its suitability across entire landscapes, regardless of land ownerships, and leading to loss of habitat (Managing Northern Spotted Owl Habitat in Dry Forest Ecosystems Workshop Synthesis Report, USFWS, 2005). This problem is adversely affecting the northern spotted owl, and will continue to do so unless it is

addressed (Managing Northern Spotted Owl Habitat in Dry Forest Ecosystems Workshop Synthesis Report, USFWS, 2005)**.**

Throughout much of their range, northern spotted owls are strongly associated with forested areas that are classified as structurally complex (DNR, 2004). Important structural components for suitable spotted owl habitat include large trees, large snags, understory development, a multi-storied canopy, and large down woody debris.

Federal lands were determined to be the key for northern spotted owl conservation whereas non-federal lands were expected to complement the effort for species stabilization and recovery (USDI, 1992). Consequently, the U.S. Fish and Wildlife Service designated spotted owl critical habitat solely on federal lands (USDI, 1992).

Additional demographic studies conducted since 1996, have provided evidence that northern spotted owl populations are continuing to decline. Results from the latest northern spotted owl demography workshop held in January 2004 (Anthony et al., 2004) concluded that northern spotted owl populations in Washington State have declined at a 7.5 percent rate per year for the entire period of study (1987 to 2003). Anthony et al., (2004), however, did not provide analyses on the causes for the recent rapid decline. The report suggested possible reasons for the dramatic decline in Washington study areas were: 1) high density of barred owls, 2) loss of habitat due to wildfire, 3) logging of northern spotted owl habitat on state and private lands, 4) forest defoliation caused by insect infestations, and 5) advancing forest succession toward climax for communities in the absence of wildfires. Related to the fifth reason, the natural progression of a stand to climax (that is, stands evolve in the absence of major disturbance) results in forests that are no longer suitable spotted owl habitat.

The Scientific Evaluation of the Status of the Northern Spotted Owl (Courtney et al., 2005) evaluated the current science and biological information on this listed species. The status review did not make recommendations on the listing of the species, but provided: 1) whether new information suggested the species population was increasing, decreasing, or was stable, 2) whether already existing threats were increasing, the same, reduced or eliminated, and 3) if any new threats were identified. The significance of this report is that it identified a decline in the spotted owl populations in Washington State. The report found that there was no evidence that existing threats from disease, predation, or genetics could explain the population decline. The presence of barred owls in northern spotted owl territories was identified as an operational threat that is in need of further research. The identified threat of loss of habitat due to timber harvesting on federal lands has been dramatically reduced since the 1990 status review, though the lag effect of this harvesting still needs to be studied by scientists. New threats identified included West Nile Virus, Sudden Oak Death, and competition between barred and spotted owls. In addition, as timber harvest rates have declined threats of habitat loss due to catastrophic wildfire has been identified as relatively more important. This conclusion is based not only on habitat lost to catastrophic wildfires, but the continued accumulation of surface and ladder fuels. The report noted that little management has taken place to reduce the threat by wildfires and little is known on the effects of widespread thinning to reduce wildfire threat on northern spotted owl habitat. The report also identified information needs such as the natural history of barred owls in the Pacific Northwest, habitat trends on private lands,

and others that are used by scientists to prioritize future research on the species. Based on this report the USFWS concluded that the northern spotted owl continues to warrant protection under the Endangered Species Act as a threatened species. The Northern Spotted Owl Recovery Plan currently being developed by the USFWS uses the information in the status review report to base its recommendations for recovery (refer to discussion in Regulatory Framework section of the Wildlife Habitat policy subject area).

A number of areas designated to contribute to the conservation of the northern spotted owl through the DNR HCP on the east slope of the Cascades are experiencing serious forest health issues. In some of these areas suitable habitat for the northern spotted owl is being degraded or eliminated. The ability for forest managers to treat the forest health issue in the eastern slopes of the Cascade Range is somewhat constrained by the original HCP northern spotted owl conservation strategy related to the maintenance of habitat threshold targets. In spotted owl nesting, roosting, and foraging (NRF) management areas that are below the required habitat threshold target, waiting to treat the forests until NRF habitat degrades into non-habitat from forest health impacts is not prudent for a land manager or species dependent upon those specific habitats.

Current research on climate change and variability has generated two different scenarios, with the basic difference most relevant to forests in Eastern Washington being whether summers are anticipated to become warmer and wetter or whether summers are predicted to become warmer and drier. (Source: Mote P. et al., Impacts of Climate Variability and Change, Pacific Northwest (PDF) National Atmospheric and Oceanic Administration, Office of Global Programs, and JISAO/SMA Climate Impacts Group, Seattle, WA 110 pp. 1999.) Warmer and wetter conditions would likely reduce summer moisture stress, increasing tree growth and insect and disease resistance. It is much less likely to have negative Forest Health consequences. Forest cover could expand. In contrast, warmer and drier conditions would likely reduce seedling survival, enhance survival and reproduction of some insects such as aphids and defoliators, reduce tree resistance to bark beetle attack, increase the frequency and extent of severe wildfires, and potentially reduce forest cover. The forests most likely to be affected by climate change are those where trees are already at their physiological limits such as low- and high-elevation tree line or overstocked communities. The future occurrence of extreme weather events (that often precipitate disturbance by insects, disease, and fire) is not well understood at this time and could have major influence regardless of the prevailing summer moisture patterns.

The 2004 Aerial Insect and Disease Damage Detection Survey (see Table 1) indicated that many areas of Eastern Washington are currently affected by bark beetles (western pine beetle, mountain pine beetle, Douglas-fir beetle, fir engraver beetle and spruce beetle), the western spruce budworm, and balsam woolly Adelgid (an exotic, aphid-like sucking insect). Disease organisms are less well-identified by an aerial survey than insect activity, but Swiss needle cast is observable and is affecting coastal Douglas-fir plantations. The “bear damage” symptom, widely identified throughout the state when dead trees are scattered, may actually be caused by or associated with root disease fungi in many cases. Root disease fungi are very persistent on a site and can continuously affect many generations of host trees. The exotic disease white pine blister rust has severely

reduced the presence and viability of western white pine in many locations and is severely diminishing whitebark pine populations across the state.

Table 1: Percent of Washington Forested Lands Affected by Elevated Levels of Disturbance Agents by Major Landowner (Based on 2004 Aerial Survey)

	Federal	Percent Affected	Private	Percent Affected	Tribal	Percent Affected	State	Percent Affected
Percent of Forested Land	43.6	NA	39	NA	5.8	NA	10.4	NA
Amount of Acres (in millions)	9.541	NA	8.541	NA	1.269	NA	2.27	NA
Douglas-fir Beetle	26,532	0.278	12,092	0.142	6,686	0.527	5,098	0.225
Fir Engraver Beetle	146,642	1.537	77,392	0.906	57,744	4.55	31,349	1.381
Pine Bark Beetle	235,157	2.465	56,229	0.658	112,887	8.896	28,280	1.246
Bear/Root Disease	23,093	0.242	83,679	0.98	11,036	0.87	26,982	1.189
Western Spruce Budworm	169,224	1.774	8,458	0.099	6,559	0.517	8,950	0.394

1. Mortality affecting over 1 percent of an ownership is notable, but should be given further consideration based on the location of the land and management objectives of the landowner.

2. Aerial survey identifies areas with elevated levels of mortality. Not every tree on an affected acre is dead.

Noxious, invasive plant species impact plant communities and ecosystem functions. In the worst case, uncontrolled invasive weeds may replace native plants that eventually lead to altered plant communities, habitat functions and overall biodiversity. Ecosystem functions that can change with exotics species invasions are hydrology, soil chemistry, fire behavior and the overall value of natural resources. Species that have the ability to become dominant may be toxic, poisonous or parasitic and may reduce forest productivity. Currently, 42 percent of the plant and animal species listed by the Federal Services as threatened or endangered have been negatively affected by invasive species. The expansion of invasive, noxious plant populations is costly, and results in loss of production and added expenditures for eradication, control and habitat restoration.

Noxious weeds, both native and non-native, typically are species adapted to disturbed site conditions. They are often tolerant of soils low in organic matter, nutrients and moisture levels. These conditions and subsequent invasions are often the result of forest management activities, such as: 1) equipment used to thin or harvest trees that disturbs

the soil by churning up the surface layer and compacting the soil; 2) equipment, vehicles, people and animal movement that transport seeds from one location to an area not yet infested; 3) disturbance activities in areas that retain seeds or roots in the soil from an older invasion; and 4) fire that removes organic material from the surface layer of the soil, exposing the soil and reducing moisture and nutrient levels.

In general, the spread of noxious weeds tends to increase in response to activities that disturb soil and native plants. The rate and success of spread often depends on different types and durations of disturbance and persistence of the species at a site. The more invasive species, once established, can spread from disturbed sites into undisturbed sites. Noxious weeds may out-compete native species and become dominant or under some situations, become a monoculture. Many noxious weeds are prodigious seed producers capable of producing up to 50,000 seeds or more per plant. Seeds may persist in the soil anywhere from a few years, to 35 years or more. Other invasive species spread aggressively through extensive and rapid root growth and can persist under dense canopies only to re-emerge following forest disturbance.

The Columbia Plateau, Okanogan and Puget Trough ecoregions have the greatest concentration of noxious weeds. All of the remaining ecoregions have noxious weed issues, particularly at lower elevations and riparian areas. In general, noxious weed concerns for forested state trust land management are more numerous in drier forests in both Eastern and Western Washington, particularly those associated with livestock operations, recreational activity and roads.

The most effective prevention strategy for noxious weed control is to prevent them from ever being introduced and established. Preventive measures typically are the most cost-effective means to minimize or eliminate environmental and economic impacts, e.g. controlling vehicle access. Short of prevention, early detection and rapid response is a critical component of any effective noxious weed management program. Prompt and coordinated containment and eradication of new noxious weed species can reduce environmental and economic impacts. Early detection of new infestations requires regular monitoring. Established noxious weeds require a control strategy to minimize their effects and limit their spread. Effective control relies on understanding the target species' biology, the ecosystem infested and effective control tools. Monitoring of control requires persistent follow-through. Control of some infestations may require site restoration with native species and monitoring.

Timber harvest can have various impacts on forest health. For example, tree removal and thinning affect the size and species of trees on a site, their density/growing space and relative vigor. Tree removal prescriptions can be written to achieve many objectives, such as to correct stand conditions that are recognized as being high risk for insect or disease activities. The suite of insects and diseases that affect a mature stand changes in a regenerating stand to pests of small trees with thin bark and foliage in the high humidity region near the ground. Contrarily, some root disease fungi affect large and small host trees equally.

Stand and tree response varies depending on species characteristics, but if partial tree removal favors taking smaller, less vigorous, diseased trees, then average size and vigor will rise and the relinquished growing space will be available for the residual trees. If tree removal is delayed, stand growth may slow and stagnate and, over time, stand composition will shift toward more shade-tolerant species. Mature stands with multiple layers of host foliage are susceptible to defoliating caterpillars and dwarf mistletoe. If the harvest favors taking the largest individual trees, then forest structure and composition shifts to smaller, less vigorous and more shade tolerant species. Tree removal can selectively deplete a given host species, increasing stand vigor if that species is susceptible to disease, but reducing stand vigor if the disease hosts become more prevalent.

Tree planting allows rapid reforestation with fast growing seedlings, selected to thrive on a site and achieve objectives. Although natural regeneration does occur, it is not an effective treatment for root disease and, depending on the sizes of openings and seed sources, may shift species composition away from the desired species. Planted seedlings can be susceptible to drought, insect damage, wildlife damage and frost because they have a small root system, are attractive to some insects and other wildlife, such as deer, may be injured by the storage and transplanting process, and may not be placed in the most ideal microhabitat.

Tree wounding allows decomposer organisms to access woody tissue. It causes decay that lowers wood strength and density and can contribute to tree breakage. Wounds can result in high quality habitat trees for cavity nesting wildlife.

Pruning removes the lower branches of trees and contributes to the formation of clear-grained exterior wood. It can contribute to insect or disease problems when the pruning causes large wounds that allow entry of decay organisms or attract wood-boring insects. Pruning can reduce fuel ladders and increase the resistance of white pine trees to white pine blister rust disease.

An integrated strategy to implement silvicultural activities in order to mimic the forest density, species composition and stand architecture once maintained by natural disturbance regimes can successfully address the forest health consequences of past harvesting practices and fire suppression success. Direct treatment of forest pests is an effective way to reduce the pest populations and suppress insect or disease activity until susceptible stand conditions or favorable environmental conditions change.

Forestry activities that improve the survivability of seedlings, reduce stand susceptibility to drought stress (maintain stand density below the biological carrying capacity of the site, favor species with the capacity to endure drought), and reduce the volume and connectedness of forest fuel loads will likely reduce the impact of future climate change and variability, especially if the warmer and drier summer scenario comes to pass.

REGULATORY FRAMEWORK

The basic constraints on pesticides and their use are described by federal law. The Federal Insecticide, Fungicide and Rodenticide Act governs the licensing or

“registration” of pesticide products. The Federal Food, Drug and Cosmetic Act governs pesticide residue levels in food or feed crops.

The Washington State Department of Agriculture performs a number of activities, including registering pesticide products in the state, investigating complaints of possible misuse, maintaining a registry of pesticide sensitive individuals and administering a waste pesticide collection program. These duties are performed under the authority of the Washington Pesticide Control Act (chapter 15.58 RCW), the Washington Pesticide Application Act (chapter 17.21 RCW), the General Pesticide Rules (chapter 16-228 WAC), the Worker Protection Standard (chapter 16-233 WAC) and a number of pesticide and/or county specific regulations. The Washington State Department of Agriculture also regulates the management of weeds (chapters 17.04-17.10 RCW) and plant pests (chapter 17.24 RCW and chapter 15.08 RCW).

Forest management activities, including special activities such as pesticide applications to suppress insect or disease, are regulated by the forest practices rules (chapter 222-38 WAC) in order to protect public resources, such as water, fish and wildlife. In addition, DNR is required to implement integrated pest management practices (chapter 17.15 WAC) when carrying out duties related to pest control. Moreover, forest insects and diseases are regulated by chapter 76.06 RCW (forest insect and disease control) which describes insects and diseases that threaten permanent timber production as a public nuisance. It requires that owners of timber lands make every reasonable effort to control, destroy and eradicate such forest insect pests and forest tree diseases that threaten the existence of any stand of timber.

In 1997, the DNR entered into a long-term agreement with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (currently NOAA Fisheries Service) to implement a multi-species HCP to address state trust land management issues relating to compliance with the federal Endangered Species Act. The plan covers approximately 1.6 million acres of state trust lands managed by DNR within the range of the northern spotted owl (DNR HCP 1997). Northern spotted owl habitat requirements are addressed in the HCP through the provision of Nesting, Roosting, and Foraging (NRF) Management Areas and in Dispersal Management Areas. In NRF and Dispersal Management Areas, the HCP requires a threshold habitat target in each Watershed Administrative Unit in these areas.

For DNR, this plan allows timber harvesting and other management activities to continue while providing for species conservation as described in the federal Endangered Species Act (ESA). Section 10 of the ESA authorizes a landowner to negotiate a conservation plan to minimize and mitigate any impact to threatened and endangered species while conducting lawful activities such as forest practice activities. The HCP offsets any harm caused to individual listed animals with a plan that promotes conservation of the species as a whole. Incidental take, including the disturbance of habitat of a threatened or endangered species, is allowed within limits defined by the incidental take permit issued by the Federal Services.

The land covered by this HCP includes state trust lands within the range of the northern spotted owl. This includes lands (outside of urban areas and areas leased for commercial, industrial, residential, and agricultural use) in the western part state as well as state trust lands on the east slopes of the Cascade Range.

Under the DNR HCP, the conservation objective for the northern spotted owl is to provide habitat that makes a significant contribution to demographic support, maintenance of species distribution, and the facilitation of dispersal. The strategy is intended to provide nesting, roosting, and foraging and dispersal habitat in strategic areas in order to achieve the conservation objectives (NRF and Dispersal Management Areas). This conservation strategy is also intended to create a landscape in which active forest management plays a role in the development and maintenance of structural characteristics that constitute such habitat (DNR HCP, 1997).

In the Biological Opinion for the HCP (USDI, 1997), it was assumed the all suitable habitat inside northern spotted owl circles outside of NRF and Dispersal Management Areas would be harvested within the first decade of the HCP. However, an important commitment made by the DNR in the HCP was to consider U.S. Fish and Wildlife recommendations when harvesting northern spotted owl habitat outside of NRF and Dispersal Management Areas during the first decade of the HCP. Hence, the DNR committed to provide additional protection for the highest priority 56 northern spotted owl circles for the first decade (1997-2007).

DNR, in collaboration with the U.S. Fish and Wildlife Service, the Washington Department of Fish and Wildlife, and the Yakama Nation, recently amended its HCP northern spotted owl conservation strategy for the Klickitat Planning Unit to address forest health issues for this portion of northern spotted owl habitat in Eastern Washington (DNR, 2004). Through this administrative amendment, DNR uses active management (variable density thinning to change species composition, retain large, difficult to grow structure such as large trees, snags, and down woody debris) to manage for long-term, sustainable spotted owl habitat. Continued emphasis on stocking control in all habitat types is a primary strategy to address current and future forest health conditions in Eastern Washington. In addition, DNR will use active management to focus on NRF habitat creation and NRF habitat protection where ecologically feasible. DNR also addresses the forest health issue of overstocking and inappropriate species composition by adjusting stand composition to favor long-lived seral species and by developing mixed species and more structurally complex stands (depending on vegetation series). Once treated, these stands are more representative of historic stand conditions and consequently are more resistant to negative environmental impacts such as insect infestation, disease, and stand replacing fire. The goal over time is to establish a more historic forest composition and manage each landscape based on its ability to grow and sustain suitable northern spotted owl habitat.

For additional protection of known northern spotted owl sites, the administrative amendment establishes and implements 10-year nest-site protection plans for all occupied northern spotted owl nest sites regardless of location, even in lands designated to have no role under the HCP toward northern spotted owl conservation. Based on annual demographic surveys conducted to these sites on DNR-managed lands, there are currently

eleven occupied spotted owl nest sites that will receive this additional protection. The site protection plans will be re-evaluated in 10 years, in consultation with the U.S. Fish and Wildlife Service.

Nest sites previously selected by spotted owls for nesting (but are not currently occupied) may have a higher probability of re-occupancy than other sites in the landscape. Consequently, spotted owl nest sites that are currently unoccupied will also receive 10-year protection measures as outlined in the administrative amendment. As habitat conditions improve over time around the unoccupied nest sites, re-occupancy by spotted owls may be expected. Based on annual demographic surveys conducted to these sites on DNR-managed lands, there are four un-occupied spotted owl nest sites that will receive this additional protection. These protection measures will also be re-evaluated in 10 years, in consultation with the U.S. Fish and Wildlife Service.

In the two remaining planning units on the east slopes of the Cascades (Yakama and Chelan planning units), in areas designated to provide NRF habitat, DNR provides a target condition of at least 50 percent of managed lands measured within each watershed administrative unit as NRF habitat. In Dispersal Management Areas, 50 percent of designated Dispersal Management Areas within a quarter township is maintained in dispersal habitat. Adjustments similar to the Klickitat amendment are also needed to address forest health issues in these two units.

Forest health conditions in Western Washington may not be as severe or acute as the forest health conditions in Eastern Washington. However, in Western Washington, areas that may contain forest health concerns and are located inside designated northern spotted owl management areas will continue to follow the species conservation commitments outlined in the HCP. Additionally, in Western Washington, the habitat inside known northern spotted owl circles which are located outside of the HCP designated spotted owl management areas is also provided protection as agreed to in the Settlement Agreement dated, March 2006. Essentially, the March 2006 Settlement Agreement ensures the protection of northern spotted owl habitat in Western Washington in excess of that required by the HCP, through at least 2014. DNR's contractual commitments require the preservation of spotted owl habitat in areas of known occupancy.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 is designed to limit unacceptable damage to trust assets. Under Alternative 1, excessive levels of insects, diseases and other significant threats to trust assets from other sources, such as noxious weeds and animal damage, will be controlled through the appropriate management activities. While Alternative 1 allows the application of longer-term solutions to forest health problems, such as addressing inappropriate species composition and/or stocking levels, these are not emphasized. Alternative 1 does not appear to meet Policy Objectives 2, 4, 5 and 7 as well as Alternative 2.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 9, Forest Health: "The department will incorporate forest health practices into the management of state forestland to bring about a net benefit through the reduction or prevention of significant forest resource losses from insects, diseases, animals and other similar threats to trust assets."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 includes all of the components of Alternative 1 and builds on them by emphasizing development of long-term landscape strategies to monitor and address the fundamental causes of forest health problems. Alternative 2 also encourages DNR to work closely with the scientific community, other agencies and other landowners as new approaches to forest health issues are developed. Alternative 2 encourages active management on as much of the land base as possible to prevent significant forest health problems. Alternative 2 best meets the applicable policy objectives by balancing trust income, environmental protection and other social benefits (Policy Objective 2). In addition, Alternative 2 encourages partnership opportunities to promote forest health (Policy Objective 4), as well as encourages professional judgment, best available science and sound field forestry for department employees (Policy Objective 5). Lastly, Alternative 2 promotes innovation and sound stewardship (Policy Objective 7).

Alternative 2 would increase the emphasis on addressing overstocking and inappropriate species composition. This is of particular importance in the dry forests of Eastern Washington where fire suppression and past harvesting practices have contributed to stands that are highly susceptible to forest insects, disease and fire due to overstocked stands consisting of late-successional, relatively shade tolerant conifers (Douglas-fir and grand fir).

POLICY STATEMENTS

The department's priority is the development of landscape strategies at an appropriate scale to address the forest health issues of overstocking and/or inappropriate species composition. Using vegetative series, the goal is to adjust stand composition and density to favor species best adapted to the site.

The department will also incorporate cost-effective forest health practices into the management of forested state trust lands to reduce or prevent significant forest resource losses from insects, diseases, animals, noxious weeds and other similar threats to trust assets.

The department will work closely with the scientific community, other agencies and other landowners to incorporate new effective forest health approaches.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative is the same as Alternative 2, with some minor edits to ensure the policy is clear and succinct (Policy Objective 3). For example, this alternative recognizes that other appropriate guidance may be available, in addition to vegetative series to help determine species composition and stocking levels.

POLICY STATEMENTS

The department's forest health priority is the development of landscape strategies at an appropriate scale to address the forest health issues of overstocking and/or inappropriate species composition. Using vegetative series or other appropriate guidelines, the goal is to adjust stand composition to favor species best adapted to the site.

The department will incorporate cost-effective forest health practices into the management of forested state trust lands to reduce or prevent significant forest resource losses from insects, disease, animals, noxious weeds and other similar threats to trust assets.

The department will work closely with the scientific community, other agencies and other landowners to effectively address forest health issues.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

As stated in the Affected Environment subsection of this policy subject area, the primary significant threats to healthy functioning forests and the elements of the environment represented in those forests, i.e., water, wildlife, vegetation, forest structure and soils are lack of resistance and resilience to the influences of insects and disease. This potential threat is directly related to stand-level species composition and stocking levels, thus making these two factors the primary evaluation criteria for this policy subject area.

Although animal damage and noxious weed species are considered potential threats to a healthy functioning forest ecosystem, these are not identified as significant threats to a healthy functioning forest ecosystem on forested state trust lands. However, both of the alternatives recognize and address the need to respond to impacts from sources other than insects and diseases.

Under Alternative 1, until recently, forest health improvement efforts have been focused on site-by-site and stand-by-stand treatments, when infestations or outbreaks have

occurred. These efforts have also been directed by short-term economic considerations and have tended to ignore the long-term economic and ecological consequences of not treating the underlying causes of forest health issues. Because of this, there is a higher risk of long-term adverse impacts to the natural elements of the environment that make up healthy, functioning ecosystems, as forests become less resilient to major infestations or outbreaks. The weakening of the forest leads to an increased risk of landscape-scale wildfire and impacts to water quality, earth (erosion), plants and animals (wildlife habitat), recreation and aesthetics.

By focusing on a more reactive, management activity based approach to dealing with forest health issues, as suggested under Alternative 1, the suitability of habitat for spotted owls on state trust lands will likely decline over time. Treatments on the scale of individual forest stands or timber sales may result in the short-term, localized protection, or improvement, of spotted owl habitat by targeting individual disease or insect outbreaks. However, forests across the landscape would remain susceptible to large-scale insect outbreaks and continue on a trajectory of substantial tree mortality, increased fuel loading, and increased risk of stand replacement fire (Mendez-Treneman, 2002), which may result in further deterioration of suitable spotted owl habitat.

Under Alternative 1, changes in vegetation cover, landscape attributes and the range of historical variability in Eastern Washington forests would likely continue to adversely alter the quality and quantity of suitable spotted owl habitat. As such, forest stands that currently support spotted owls in Eastern Washington may be less likely to do so over the long-term. Although on the east slope of the Cascade Range spotted owls are not as closely associated with mature and old growth forests as they are elsewhere, they do require forests with some of the same attributes, including the presence of large snags, sufficient overstory cover, and an open understory for foraging opportunity (Blakesley, 2004). Irwin and Thomas (2002) hypothesized that succession toward dense, shade-tolerant understory trees on the east side of the Cascades, amplified by decades of fire suppression efforts, may reduce northern spotted owl occupancy, presumably because of reduced prey abundance and/or access in these stands. Given the need for a landscape level approach to managing spotted owl habitat, Alternative 1 would be less effective than Alternative 2 and the Board's Preferred Alternative in contributing to the preservation and improvement of spotted owl habitat over the long-term.

Under Alternative 1, there have been recent efforts to design strategies to control stocking levels and species composition across broad landscapes over the long-term. The recently adopted sustainable harvest calculation employs silvicultural strategies to treat dense stands to improve overall vigor and health of Western Washington forests. Recent efforts in Eastern Washington within the Klickitat HCP planning unit include development of landscape strategies to treat species composition and overstocking to improve forest health, e.g., the Klickitat amendment to the HCP.

Under Alternative 1, however, lack of focus on emphasizing broader strategies across the entire forested state trust land base to treat species composition and overstocking makes it incomplete and less effective in dealing with forest health issues, with greater ecological consequences for the long-term than in Alternative 2.

Under all alternatives, DNR will continue to control the spread of noxious weeds. These efforts will reduce impacts to the integrity of native plant communities and healthy functioning ecosystems, such as those related to hydrology, soil chemistry, fire behavior, habitat and overall diversity. DNR employs mitigation measures of an integrated pest management (IPM) program to minimize impacts of controlling noxious weeds. The IPM program provides a broad range of management practices which are intended to prevent and mitigate the spread of noxious weeds. These practices range from controlling access, mechanical eradication methods, biological controls, to aerial application of chemicals, depending on the severity of the problem, the potential for environmental impacts as a result of the control method, costs and the likelihood of success. These impacts are assessed through SEPA at the time projects are proposed.

Although timber harvesting may increase in some areas under the policy, the purpose of these harvests is to improve the health of the forest ecosystem and, consequently, the elements of the environment listed under Alternative 1. The specific adverse impacts that could be related to any activities that implement this policy will be analyzed under SEPA, as plans and projects are proposed within specific geographic locations. Additional emphasis on restoring stands to dominance of late or long-lived seral species composition under Alternative 2 and the Board's Preferred Alternative will have significant long-term benefits. These benefits include improving forest resistance and resilience to forest pests and reducing catastrophic wildfires and the future need for direct suppression. As more stands are treated over time, the landscape will begin to reflect more historic conditions where frequent low and moderately severe fire events lowered fuel loads and reduced tree density, creating sustainable, fire-resistant stands.

Under Alternative 2 and the Board's Preferred Alternative there could be a temporary reduction in the suitability of spotted owl habitat (normally within a decade or less) in areas that are thinned or where other treatments are applied that open dense forest canopies, such as the removal of broken, decayed or diseased trees, or dense canopy cover of a vulnerable species. The preservation of some of this stand component and its future replacement with a less susceptible or less contagious component can be evaluated and targeted in the development of the future stand as a means of mitigating those impacts. Under Alternative 2 and the Board's Preferred Alternative, forest insects and diseases will not be eliminated, but the intensity, extent and duration of outbreaks are likely to be reduced. The response time to these activities will vary depending on growth conditions of the site and the intensity of the treatment. Likewise the amount and duration of suitable spotted owl habitat being temporarily reduced depends on treatment intensity and which stands are targeted, though generally areas of suitable spotted owl habitat are not the target stands for this type of treatment. Treatment may be accompanied by a short-term reduction in habitat available for northern flying squirrels, the primary prey of northern spotted owls in Washington, by creating openings that inhibit mobility between trees and reduce protection from predators. However, these short-term negative impacts on northern spotted owl habitat would be mitigated by the following:

- All management activities on state trust lands must comply with the DNR HCP conservation strategies, Forest Practices Rules, the Administrative Amendment for the HCP Northern Spotted Owl Conservation Strategy in the Klickitat Planning Unit,

and the March 2006 Settlement Agreement. Activities will also be influenced by effectiveness and validation monitoring of the HCP conservation strategies, the priority on-going research projects being conducted on spotted owl ecology, and the ability to adaptively manage based on the latest scientific information. DNR will continually re-assess the effects its management activities have on northern spotted owl populations and make on-going adjustments accordingly through the adaptive management process. It can be assumed in light of any forest health issues that arise, northern spotted owl habitat will remain protected in strategic locations as outlined in the HCP. Therefore, Alternative 2 and the Board's Preferred Alternative should have no potentially significant negative adverse impact on Western or Eastern Washington northern spotted owl populations; and

- The long-term benefits of the broader approach taken under Alternative 2 and the Board's Preferred Alternative. By working to shift the composition and density of forest stands across the landscape, these alternatives would promote long-term forest health and longevity by reducing the risk of future, epidemic levels of insect infestation and disease, and thus the risk of catastrophic wildfire that could completely remove substantial amounts of spotted owl habitat or directly affect birds and nests. As such, Alternative 2 and the Board's Preferred Alternative would better meet the recommendations of Pierce et al., (2005), of long-term landscape planning for promoting spotted owl recovery efforts.

The future impacts of forest health on the current northern spotted owl populations on DNR-managed lands in Washington State are highly speculative. It is anticipated that through the implementation of agency policies, plans, and procedures, future adverse impacts to northern spotted owl populations on DNR-managed lands will be minimized.

The Pierce et al., (2005) report was published on the effects of harvest rates over several years on northern spotted owl habitat. In 1997, there were approximately 350,000 acres of suitable spotted owl habitat on westside DNR-managed lands (Biological Opinion–USDI, 1997). This comprises approximately 12 percent of suitable spotted owl habitat in Washington State (Biological Opinion–USDI, 1997). In response to a request by the Forest Practices Board, the WDFW recently completed an analysis of harvest rates between 1996 and 2004 on private, state, and federal lands, as part of a review of the Forest Practices Board's rules regarding northern spotted owl habitat (Pierce et al., 2005). Overall results of the study indicate a decline in habitat in varying degrees depending on location within or outside of owl management circles, spotted owl special emphasis areas, or HCPs.

As forest management activities are increased in eastside forests, adverse environmental impacts will also be mitigated by adherence to road-building standards and riparian protections. As tree biomass is reduced and more snowfall accumulates on the ground, additional water may be available. The resulting stands will be more in balance with the water and light resources available on the site and may provide more understory diversity, such as grasses and shrubby vegetation. There will be a reduction of susceptibility to severe disturbances related to uncharacteristically severe wildfire and damaging insect outbreaks associated with overcrowded stands. The potential for

undesirable effects to soils, water and wildlife habitat caused by direct suppression of fire or insects and diseases will also be reduced.

It is anticipated that Alternative 2 and the Board's Preferred Alternative will be more likely to restore productive forest stands at the landscape level; protect future management options, which will better enable DNR to achieve ecological, as well as economic and social objectives; protect public resources; and prevent undesirable damage than will Alternative 1.

CUMULATIVE IMPACTS

The likelihood of cumulative adverse impacts to the natural and built environment is greater under Alternative 1. This is due to the greater emphasis on a site-by-site approach that responds to major insect and disease outbreaks. This results in very large portions of the landscape not addressed by landscape strategies over a longer period of time with an ongoing increased potential for significant impacts to state trust lands and adjacent lands from the effects of insect and disease outbreaks, including the risk of landscape scale wildfire. Under Alternative 2 and the Board's Preferred Alternative, the increased susceptibility of larger landscapes to cumulative adverse impacts related to major insect and disease outbreaks are mitigated by developing and implementing landscape-scale strategies to reduce overstocking of stands and promote species compositions reflective of historical stands. Historical stand compositions are also more likely to be resistant to the potential negative impacts of future climate change and variability, especially under a warmer and drier summer scenario.

Any cumulative adverse impacts that could result from harvesting will be mitigated by adherence to the DNR's HCP; forest practices rules and other Board of Natural Resources policies, e.g., Riparian Conservation and Watershed Systems.

DNR's Integrated Pest Management practices that are discussed under the General Silvicultural Strategy policy subject area in this Final EIS provide additional mitigation of the potential for cumulative adverse impacts that could result from treatments of insect and disease outbreaks, animal damage or noxious weeds. Integrated pest management is a sustainable approach to managing pests by combining biological, physical and chemical tools in order to minimize economic, health and environmental risks.

3.2.2 Catastrophic Loss Prevention (formerly "Wildfire and Catastrophic Loss Prevention")

INTRODUCTION

One of DNR's primary fiduciary responsibilities is the protection of trust assets from loss due to catastrophic wildfire or other factors, such as wind, insects and disease. Prevention of catastrophic losses helps protect the economic, ecological and social features of forested state trust lands and assures progress toward meeting trust objectives. Wildfire and other catastrophic loss prevention involve identifying, planning and implementing prevention efforts, sometimes with adjacent landowners, to minimize impacts. It also involves fuel reduction on forested state trust lands to prevent losses due to wildfires. Overall, healthier forests are less likely to experience catastrophic losses.

Although the Catastrophic Loss Prevention policy subject primarily meets the following Policy Objectives:

- Balance trust income, environmental protection, and other social benefits from four perspectives: the prudent person doctrine; undivided loyalty to and impartiality among the trust beneficiaries; intergenerational equity; and not foreclosing future options (Policy Objective 2);
- Seek productive partnerships that help DNR achieve policy objectives (Policy Objective 4); and
- Capture existing and future economic opportunities for the beneficiaries from the forestland base by being prudent, innovative and creative (Policy Objective 9);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

Since statehood, land management practices and wildfire exclusion have changed the composition of forest stands in Washington State. This is especially true in Eastern Washington. Much of the forests of Western Washington and in higher elevations and montane portions of Northeastern Washington tend to experience infrequent, high severity fires. Consequently, the historic condition of most forests in the Eastern Washington Cascade mountain range, the northern Rocky Mountains and the Puget lowlands were maintained by frequent low and moderately severe fire events. The latter fire regime tends to maintain stands with lower fuel loads and reduced stem densities, as well as create a sustainable, fire-resistant stand. The result of frequent low and moderately severe fires creates a mosaic of forest types, fuel loading and habitats across the landscape.

Today, fire exclusion and other past management practices in areas that formerly supported low and moderately severe fires have created stands with heavy fuel loading

and high stand densities across entire landscapes. Stands in this condition are difficult to sustain over time, because they are overstocked, often with shade-tolerant tree species that are vulnerable to forest pests and disease. The stress from overstocking affects all tree species. This stress, combined with increased fuel loading, puts entire landscapes at higher risk of large stand-replacement fires.

Fire events are part of the natural environment and forest succession in the Pacific Northwest. Many plant species need fire to propagate. Fire reduces competition among species and promotes the creation of snags and down woody debris for wildlife. However, the environmental impacts of large stand-replacement fires can seem to be catastrophic, particularly where low and moderately severe fire regimes have been altered.

The effect of fire on the environment is highly variable and complex. It can provide new habitat and rejuvenate some species, yet eliminate habitat and diminish other species. The organic layer of litter and other organic material that has accumulated over decades on the forest floor is reduced or removed, depending on fire intensity. Fire effects on erosion are related to the destruction of ground cover and soil organic material. The loss of groundcover exposes mineral soil that is subject to overland flow and raindrop impact. The removal of this cover may change site productivity; affect water retention, movement and percolation; contribute to mass wasting, soil erosion and local flooding; and limit reforestation efforts.

In large fire events, air emissions increase as thousands of tons of organic material are consumed rapidly and particulate matter is carried over hundreds of miles. Local communities and adjacent valleys are often burdened with particulate matter far above acceptable health levels for days and weeks.

Watershed hydrology includes the amount, intensity and timing of water movement. The impacts of a large wildfire could have significant impacts on forest hydrology. The timing and volume of surface runoff is changed, contributing to peak flows that can adversely impact public safety and infrastructure. Although percolation is reduced, groundwater is not as sensitive to changes in the forest environment as surface water and is much more dependent on local geology.

Large, severe fires alter whole plant communities and successional regimes for decades or centuries. However, many plant species require fire as part of their life cycle, while other plants are adapted to vigorously resprout or to invade and establish in open, nutrient-rich growing environments following a fire.

The immediate impacts of large stand-replacement fires are abrupt and severe. Specific habitats, niche micro- and macro-environments, are often lost from a landscape for decades or longer. Critical habitat for some threatened and endangered species is lost; cover, forage and prey for wildlife is altered. Wildlife may be killed directly by the heat and smoke of fires and, at the landscape level, some wildlife populations may subsequently die from lack of food, water or habitat loss. The loss of key organisms, such as pollinators and decomposers, can significantly affect the recovery of a forest ecosystem. Tremendous quantities of carbon that have been sequestered in the forest are

consumed by fire and redistributed to the atmosphere. However, in the months and years following a large wildfire, the changing composition of groundcover vegetation can provide an alternate or superior food source for other animals and insects. Fire effects on vegetation cover alter the distribution of wildlife populations across the landscape.

Compared to historic stocking levels, much of the land DNR manages, particularly in Eastern Washington, is overstocked. However, at a landscape level, variable stand density, including higher-stocked stands, have always been present and are part of the forest integrity. Overstocking may provide habitat structure for some threatened and endangered species, while eliminating habitat for others. One species that inhabits trust lands along the east slope of the Cascade Mountains is the northern spotted owl, which has been at the forefront of the ongoing debate over forest management practices in the Pacific Northwest. In contrast to other parts of their range, spotted owls in this area are not as closely associated with mature and old-growth forests, but do require many of the same stand attributes including sufficient canopy cover, large diameter snags, and open understories suitable for detecting prey and maneuvering while flying (Blakesley 2004). However, as these stands become overstocked they lose their suitability for this species. In a study of spotted owl habitat associations in the eastern Cascades of Washington, Irwin et al., (2002) hypothesized that the development of dense understories of small diameter, shade tolerant trees, resulting from fire suppression since 1910, may have led to the abandonment of 45 owl territories in mesic forests of their study area. Please refer to the Forest Health policy subject area for a more complete discussion of the Eastern Washington habitat relationship to declining forest health.

Overstocked stands greatly influence wildland fire behavior and effects by contributing to the quantity, arrangement and size of fuels. On a local scale, the fuels directly in front of an ongoing fire affect fire behavior. More importantly, long-term landscape level spatial fuel problems indicate persistent and potential catastrophic fire problems. Long-range weather predictions indicate that fuel moistures may reach historic lows if prevailing climatic trends continue for the next 20 to 30 years.

Current drought conditions are contributing to the increasingly widespread insect infestations found in many forest ecosystems in Eastern Washington. Insects kill the stressed trees, drying and accumulating large amounts of fuel, thus making the forests easily susceptible to extreme wildfire.

Human population growth in the state of Washington has resulted in thousands of homes in the wildland/urban interface, adjacent to or within forested state trust lands. Privately developed property complicates fire suppression efforts and influences forest management alternatives that would reduce stocking levels and fuel loading. In addition, increasing public use on forested state trust lands increases the risk of fire starts.

Over the last decade, long-term drought, subsequent forest health impacts to fuel loading along with increased populations in rural areas, have contributed to the large catastrophic wildfires that are increasing in frequency during fire seasons. These events have shown DNR that land managers need to be much more aggressive in dealing with factors contributing to landscape-wide fuel loading and overstocking in state forests to prevent or lessen the incident of catastrophic wildfire. Failure to take aggressive active management

to treat overstocked stands and associated fuel loading will continue the trend of large catastrophic stand-replacement fires at a landscape level, particularly in Eastern Washington.

REGULATORY FRAMEWORK

Levels and management of forest insects and diseases are regulated by chapter 76.06 RCW (forest and disease control), which describes insects and diseases that threaten permanent timber production as a public nuisance. It requires that owners of timber lands make every reasonable effort to control, destroy and eradicate such forest insect pests and forest tree diseases that threaten the existence of any stand of timber. The regulatory provisions of this law are currently being reviewed by the Legislature.

Fire hazards on forestland are regulated by RCW 76.04.060. This law states the owner of land and the person responsible for the existence of an additional fire hazard shall take reasonable measures to reduce the danger of fire spreading from the area and may abate the hazard by controlled burning or other satisfactory means.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 directs DNR to initiate supplemental protection measures to reduce losses from wildfire when the costs of these practices are less than the cost of leaving the resources at risk. Alternative 1 does not support active management as well as Alternative 2 and the Board's Preferred Alternative. Therefore, Alternative 1 does not appear to meet Policy Objectives 2, 4 and 9 as well as Alternative 2 and the Board's Preferred Alternative.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 10, Fire Protection: "The department will supplement the state's fire protection program to bring about a net benefit through the reduction of significant resource losses from wildfire on department-managed land."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 more clearly links DNR efforts to maintain healthy forests with the added benefit of preventing catastrophic wildfire loss through fuel reduction. It also reinforces the dual benefits of such strategies to each trust beneficiary and all the people of Washington. In addition, Alternative 2 states that salvage of timber damaged through catastrophic events is important. Alternative 2 meets the applicable policy objectives by balancing trust income, environmental protection and other social benefits (Policy

Objective 2). In addition, Alternative 2 encourages partnership opportunities to reduce the risk of forest resource loss (Policy Objective 4), and provides for capturing economic opportunities through salvage (Policy Objective 9).

POLICY STATEMENTS

The department will incorporate wildfire and other catastrophic loss prevention strategies, including development of fire-resistant stands, into its management of forested state trust lands. Forest stands that have been materially damaged by fire, wind, insects or diseases will be salvaged when such actions are in the best economic and ecological interests of each trust beneficiary. The objective is to reduce or prevent significant forest resource losses to each trust beneficiary and to all the people of Washington.

The department will coordinate with local, state and federal fire prevention programs; the scientific community; other agencies; and other landowners to reduce the risk of forest resource loss from catastrophic events.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative is essentially the same as Alternative 2 with the following additions: language has been added to make it clearly understood that salvage will be conducted in compliance with state and federal law, contractual obligations, and Board of Natural Resources policy (Policy Objective 3). The Board's Preferred Alternative also clarifies that salvage will occur when in the best interest of any trust that is affected (Policy Objectives 2 and 9).

POLICY STATEMENTS

The department will incorporate strategies to prevent catastrophic loss into its management of forested state trust lands. These strategies include development of fire-resistant stands.

When in the best interest of the trust(s), forest stands that have been materially damaged by fire, wind, insects or disease will be salvaged. Such salvage will be conducted in compliance with state and federal law, contractual obligations, and Board of Natural Resources policy.

The department will coordinate with local, state and federal fire prevention programs; the scientific community; other agencies; and other landowners to reduce the risk of forest resource loss from catastrophic events.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Alternative 1 directs DNR to continue its aggressive fire suppression activities on both state and private land. DNR managers are directed to consider supplemental protection measures during planning efforts to minimize the impacts on forested state trust lands and promote the increased use of wood residue. These actions are largely focused on small scale projects and emerging opportunities.

Under Alternative 1, there is an increased risk of catastrophic fires because of the less aggressive approach to create fire-resistant stands and to coordinate with others in reducing the risks of resource loss due to catastrophic fire. This results in increased risks of short-term impacts of deteriorated air quality and multi-year impacts to watershed hydrology and overland flows, as well as increasing the risks to human life and improved property. Alternative 1 also increases the risk of long-term adverse impacts to whole plant communities and critical wildlife habitat. Northern spotted owls, for example, could be impacted by catastrophic fire through the direct killing of birds, removal of substantial amounts of habitat, and destruction of nests (Blakesley 2004). Spotted owl habitat could be further reduced by the delayed mortality of fire-damaged trees and insect caused tree mortality. If these losses were substantial they could have the potential to impact site occupancy and reproductive output in areas affected by fire. Although spotted owls have been observed returning to areas that receive low and medium intensity burns where larger, unburned trees remain, they generally discontinue use of severely burned areas, at least temporarily (Blakesley, 2004; and Ingalsbee, 1998).

Catastrophic fire increases fragmentation on a landscape level, particularly if large tracts of forest burn. Isolation of sub-populations, reductions in territory occupancy and nest success, and the preclusion of future colonization of unoccupied, suitable spotted owl habitat are all possible consequence of fragmentation (Blakesley 2004). These impacts are especially important given the supporting role that DNR-managed lands play in spotted owl conservation (See Section 3.2.1-Forest Health for further discussion). Indirectly, catastrophic fires also have the potential to impact the prey base for spotted owls, though this impact would depend on the severity of the fire, the resulting ground litter depth, log volume, and soil moisture (Meyer et al., 2005). These factors would determine the length of time for the food sources of these mammals to become re-established within the burned areas.

With no focus on developing fire-resistant stands, Alternative 1 severely hampers DNR's efforts to recover and restore listed threatened and endangered species and to act on initiatives related to non-listed species.

Alternative 2 and the Board's Preferred Alternative are focused on active stand management to reduce fuel loading at the landscape level. There may be some short-term environmental impacts associated with road building and harvests, such as accelerated erosion, especially in areas with steep slopes, highly erodable soils, and severely burned watersheds; short-term increases in fuel loads; and loss of desirable habitat or site features such as abundant snags and surviving trees that provide seed and shade. However, these activities are expected to result in sustainable forests with a substantially reduced risk of catastrophic stand-replacement wildfire and retain the long-term integrity

of the forest environment. Management efforts will be focused on forested state trust lands that historically have had a mixed severity of fire with a frequency of 35 to 100 years. This fire regime should primarily exist in dry grand fir, Douglas-fir and Ponderosa pine forests.

Under Alternative 2 and the Board's Preferred Alternative, fuel management considerations are incorporated into landscape strategies to meet an array of structural conditions across the landscape. DNR will continue to implement prevention efforts with adjacent landowners to minimize wildfire impacts on forested state trust lands and on neighboring lands. DNR will also continue to work with various groups, both public and private, to promote increased utilization of wood residue to reduce fuel loading.

Wildfires that may occur under Alternative 2 or the Board's Preferred Alternative in this environment would have much shorter and less intense impacts on air quality, because of the reduced size and intensity. Impacts to watershed hydrology and over land flows would be largely confined to drainages, instead of landscapes. Impacts to plant communities and critical wildlife habitat would be at a more historic and sustainable level, providing a mosaic of diversity across the landscape that would aid DNR's initiatives related to non-listed species.

Alternative 2 and the Board's Preferred Alternative could have minor short-term adverse impacts to northern spotted owls. As noted above, project related activities (e.g., road building, harvest activities, etc.) would be sources of potential disturbance. Even if activities occurred outside of the breeding season, individual spotted owls may be temporarily displaced. In addition, some minor habitat loss would occur as a result of tree removal and reductions in canopy cover. These localized changes to forest structure could also reduce habitat suitability for northern flying squirrels, the primary prey of spotted owls in Washington, if forest openings are created that inhibit mobility between trees or are too open to provide protection from predators. Salvage logging, described in more detail below, would also result in the loss of snags used by northern flying squirrels for nesting. Adverse impacts to spotted owls, and other wildlife, would be minimized on the project level with the application of appropriate state forest practices rules (e.g., seasonal restrictions), the DNR HCP conservation strategies, the Administrative Amendment for the HCP Northern Spotted Owl Conservation Strategy in the Klickitat Planning Unit, and the March 2006 Settlement Agreement.

Additional measures such as the retention of biological legacies (large diameter trees, snags and course woody debris) in areas of timber harvest would shorten the time necessary for those areas to achieve the habitat complexity of suitable northern spotted owl habitat. Please refer to the Forest Health policy subject area for additional discussion on the impacts and mitigation measures to northern spotted owls.

Loss of snags and other biological legacies, displacement of wildlife, and loss of habitat would also occur in the event of a catastrophic fire, although to a much greater extent. Over the long term, Alternative 2 and the Board's Preferred Alternative would create additional spotted owl habitat in areas that are currently overstocked and at greatest risk of catastrophic fire, while improving current habitat.

Salvage of timber following wind, wildfire, and insect or disease outbreaks can have positive and/or negative impacts, depending on the size of the affected area, magnitude of the disturbance, desired future condition of the affected area, soil type and soil damage sustained, slope, role of this disturbance in an appropriately functioning forest ecosystem, and the forest management activities that take place. Potential positive effects of timber salvage include reducing fuels or pest habitat in order to reduce the threat of additional disturbance, protecting the forest floor with slash, breaking up hydrophobic soil layers, and facilitating management activities that promote forest regeneration. Potential negative effects of timber salvage include accelerated erosion, especially in areas with steep slopes, highly erodable soils, and severely burned watersheds; short term increases in fuel loads; and loss of desirable habitat or site features such as abundant snags and surviving trees that provide seed, needlecast, and shade. Short-term impacts to water quality over several years are likely to result from the salvage of timber that has been damaged by wildfire through increased sedimentation until new plants occupy the site. Structure that will be needed to meet future habitat objectives and facilitate prompt reforestation will be identified and protected during salvage activities. Salvage operations will also be mitigated by forest practices rules and other policy subject areas in this Final EIS, e.g. Forest Health, Riparian Conservation, Wildlife Habitat, General Silvicultural Strategy and Watershed Systems.

CUMULATIVE IMPACTS

Alternative 1 continues to address forest health issues through small-scale projects and a reactive approach. This will lead to continued forest health impacts associated with overstocked stands and landscape-wide fuel loading on state and other lands. This, in turn, is expected to result in a continuation of large catastrophic wildfires at the landscape level across all ownerships. This will increase the risk of impacts to soils, wildlife habitat and special ecological features, and pose additional risk to human life and improved property. Potential impacts include those related to changes in forest hydrology, including the quantity and timing of peak flows; alterations of whole plant communities and vegetative cover patterns; other destruction of critical habitat, including forage and prey; release of large amounts of sequestered carbon to the atmosphere; loss of forest floor litter and other organic material; erosion due to exposure of mineral soils; and the loss of key organisms, such as pollinators and decomposers essential to the recovery of healthy forests..

Any short-term impacts to water quality through increased sedimentation that may occur over several years associated with forest health and catastrophic loss prevention operations are substantially mitigated by the Forest Practices Act and state forest practices rules, DNR’s HCP requirements, and other Board of Natural Resources policy, e.g. Forest Health, Riparian Conservation, Wildlife Habitat, General Silvicultural Strategy and Watershed Systems. Moreover, because this policy will be implemented over vast areas of space and time, it is anticipated that any adverse environmental impacts that may occur in defined areas over several years will be mitigated by the dispersal of any activities under this policy over the range of state forested trust lands, especially in Eastern Washington. Individual forest health and catastrophic loss prevention operations will continue to have further SEPA review at the project level to identify any project-

specific potential impacts. In addition, implementing landscape objectives using the vegetative series should enable adjacent landowners to implement similar cost-effective prevention efforts.

3.2.3 Genetic Resource

INTRODUCTION

The genetic makeup of tree populations is a key factor affecting forest health and productivity. For this policy subject area, the genetic makeup of native tree populations will be referred to as the "gene pool." DNR recognizes the importance of maintaining and protecting this genetic resource. As a result, DNR considers the native gene pool to be one of the trusts' assets worthy of protection. The gene pool is protected both by carefully managing the reforestation seed supply and by maintaining a system of gene pool reserves. These reserves are deferred from harvest to ensure that native genetic material, well-adapted to local conditions, will be available to DNR in the future.

Although the Genetic Resource policy subject primarily meets the following Policy Objective:

- Use professional judgment, best available science and sound field forestry to achieve excellence in public stewardship (Policy Objective 5);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

The primary element of the environment affected by this policy subject area is the native tree gene pool.

Within a tree species, genetically-controlled growth characteristics vary from one location to another in response to differing environmental conditions. This genetic variation in response to the environment is referred to as adaptation. Maintaining the adaptation of trees to their growing sites is one of the key considerations in managing forests. Also important to forest health and productivity is maintaining long-term genetic diversity, which enables populations of a single species to change in response to changing environmental conditions, such as new diseases or different climates. Finally, genetic growth potential affects the rate that stands are reestablished following harvest, the ability of seedlings to release from competing vegetation, wood volume production and in some cases, resistance to damaging agents, such as insects or fire. In most cases, high growth potential is more desirable than low growth potential.

The most important influence that humans have on the genetic makeup of tree populations is through decisions about tree removal and the seed source used for regeneration. This is particularly true when the majority of young trees are established by planting, which is the standard and most reliable regeneration method in many silvicultural objectives, i.e., not in lodgepole or larch. If inappropriate sources of seed are used, the results can range from immediate mortality of the young trees, to slower growth and predisposition of trees to insect and disease damage in later years. Use of seed that

maintains adaptation and genetic diversity is central to maintenance of healthy and productive forests. Therefore, proper management of seed supply is the most critical aspect of protecting and maintaining the native tree gene pool.

Three main approaches are used to manage seed supply. The first is natural regeneration in some forest types, i.e, hemlock, lodgepole pine). The second relies on collection of cones from the forest. With this approach, seed zones are used to govern where seed collected from a given area can be used. The third approach is operation of a seed production program. This approach allows for more certainty and control over issues like adaptation, diversity, growth potential and disease resistance. Testing of potential parent trees leads to more knowledge of their characteristics than is possible when collecting cones in the forest. However, seed production programs involve significant expense and can only be justified where seed needs are high. Therefore, any realistic genetic resource conservation program will involve a combination of natural regeneration, cone collection from the forest and seed production programs where seed needs justify the expense. DNR relies on a combination of these three approaches.

In addition to carefully managing seed supply, provisions should be made to address uncertainty in both current knowledge of genetic structure and conservation of rare genes. Although the principles used for managing seed supply are based on the best available science, current knowledge will never be perfect. For this reason, DNR maintains a system of gene pool reserves, which are unmanaged natural stands, each of which contain enough trees to serve as a base population (see Map 3). This would allow DNR to restore the pre-management genetic structure of the tree populations, if problems were to occur. A second important function of gene pool reserves is the conservation of rare genes, which may be useful or important in the future. Conserving rare genes is extremely difficult to achieve by collecting cones in the woods or in seed production programs, because it requires much larger numbers of trees than can be handled using those approaches. The gene pool reserve system includes tens of thousands of trees and is, therefore, capable of containing a large number of rare genes. Thus, gene pool reserves serve both as an insurance policy to back up carefully designed management practices and also as a repository of rare genes that could be important in the future.

DNR’s approach to managing and conserving tree genetic resources affects not only the 2.1 million acres of forested state trust lands, but also many acres owned by non-industrial private landowners who buy their seedlings from DNR for reforestation. DNR defers gene pool reserves from harvest, because timber harvest and associated road-building activities impact gene pool reserves in different ways. If all the trees are cut, the function of the gene pool reserve is lost completely. If a partial cut occurs, the value as a gene pool reserve is diminished primarily by the reduction in the number of individual trees. It may also be affected if trees with certain genetic characteristics are cut. This is the reason why unmanaged stands were originally selected for gene pool reserves. In some cases, a gene pool reserve may have to be thinned to maintain the health of the stand. In such cases, careful design with consideration of genetic issues can minimize the risk of selection pressure.

Existing gene pool reserves have been identified in several DNR systems. They are listed in the Asset Performance System, which appears in the Total Resource Application

Cross-Reference system, as well as in the Planning and Tracking system. Gene pool reserves are also delineated as forest management units in the Planning and Tracking System, which allows users to see the spatial location. The criteria for selection of a gene pool reserve includes: 1) naturally regenerated stand; 2) at least 20 acres in size; 3) at least 400 trees of the species intended to be conserved; and 4) low probability of damage from wind, fire, harvest, development, etc.

At present, there is not a system for identifying gene pool reserves on lands other than state lands, because there have been no gene pool reserves designated for DNR use off of state lands. Any gene pool reserves not on state lands would need to meet the same criteria used to determine suitability on state lands. Additionally, DNR would need written agreement from the landowner on whose land the gene pool reserve was located to allow DNR to collect reproductive materials (cones, seed, etc.) from the site for an indefinite period of time.

Although seed zones, rather than ecoregions, are used as the stratification system for managing genetic resources, activities can be described by ecoregion. In all ecoregions, seed supply is carefully managed, using both cone collection and seed production program approaches. At present, gene pool reserves have been designated in the Northwest Coast, Puget Trough, North Cascades and West Cascades ecoregions. No gene pool reserves have been designated in the East Cascades, Okanogan, Canadian Rocky Mountains, Columbia Plateau or Blue Mountains ecoregions, as there are very few stands left in these ecoregions that meet the requirements of a gene pool reserve due to past harvesting practices.

Natural Area Preserves and Natural Resources Conservation Areas as described in the Special Ecological Features policy subject area also act as repositories for native tree gene pools.

REGULATORY FRAMEWORK

The regulatory framework for tree genetic resources is the forest practices rules requirement, “Except as approved by the department to qualify as acceptable reforestation, the seedlings or seeds must be from an appropriate seed source zone. The department shall establish seed zones and guidelines for their use” (WAC 222-34-010 (4)(a)(ii)). DNR has established these guidelines and they are available via the internet at www.dnr.wa.gov/webster/seedzonebook/.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 ensures that the genetic resource is adequately represented and protected on forested state trust lands and does not rely on other non-trust DNR lands or other governmental or private landowners to protect and ensure availability of genetic material on behalf of each trust beneficiary. Alternative 1 best meets the applicable policy

objective by directing DNR to use professional judgment, best available science and sound field forestry to ensure maintenance and protection of the trusts' genetic resource (Policy Objective 5).

POLICY STATEMENT

***Forest Resource Plan* Policy No. 15, The Genetic Resource: "The department will protect and enhance a diverse gene pool of native trees on state forestlands to ensure well-adapted future, commercial forests."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 relies on other non-trust DNR lands and other governmental or private landowners as a source for genetic material to meet trust needs. Gene pools that are not well-represented on these other ownerships would be maintained and protected on forested state trust lands. Alternative 2 does not appear to meet Policy Objectives 2 and 5 as well as Alternative 1 and the Board's Preferred Alternative because DNR has less control of these other lands.

POLICY STATEMENT

The department will maintain, protect and enhance gene pools of native trees on forested state trust lands to supplement gene pools protected and accessible on other department lands or other ownerships.

■ ALTERNATIVE 3

DISCUSSION

Alternative 3 seeks to ensure genetic diversity in the face of catastrophic events. This provides a higher level of insurance and protection, but may be in excess of what is needed to fulfill the trust obligation. Alternative 3 does not appear to meet Policy Objectives 2 and 5 as well as Alternative 1.

POLICY STATEMENT

The department will, in addition to maintaining existing gene pools, increase the number of gene pools of native trees on forested state trust lands to ensure gene pool diversity in the face of catastrophic events.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative differs from Alternative 1 in that the word "commercial" has been removed so as not to inadvertently limit the intent of the policy to strictly currently commercial tree species where it may be ecologically inappropriate.

Thus the Board's Preferred Alternative appears to meet both Policy Objectives 2 and 5 better than Alternatives 1, 2 and 3.

POLICY STATEMENT

The department will protect and enhance a diverse gene pool of native trees on forested state trust lands to ensure well-adapted future forests.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

There are no significant adverse environmental impacts to the native tree gene pool from Alternative 1. Alternative 1 requires that the native tree gene pool on all forested state trust lands be protected and enhanced. This means that careful management of seed supply will ensure that all reforested areas will have appropriate genetic makeup and that the existing system of gene pool reserves will be protected on forested state trust lands. This is the most comprehensive strategy because it addresses the gene pool on all forested state trust lands by requiring attention to adaptation and diversity on all forested trust acres and provides for the gene pool reserve system to serve as an insurance policy backing up responsible management practices and conserving rare genes that are very difficult to conserve through normal reforestation procedures. Options that do not provide for protection of the gene pool across trust acres increase the risk of forest health problems on those acres due to inadequate provisions for adaptation, genetic diversity or growth potential. Alternative 1 also provides the most control for ensuring the continued existence of the gene pool reserve system, because it does not depend upon other landowners whose goals or management practices may be inconsistent with DNR's, or may change over time.

The likelihood of significant adverse impacts to the native tree gene pool as a result of Alternative 2 is increased. Like Alternative 1, Alternative 2 requires that the native tree gene pool on all forested state trust lands be protected and enhanced. This means that careful management of seed supply will ensure that all reforested areas have appropriate genetic makeup. However, Alternative 2 emphasizes shifting the insurance and rare gene conservation functions of gene pool reserves to other ownerships wherever possible. This approach has more risk, because it relies on other landowners continuing to manage their lands in a manner compatible with the functions identified by DNR for a gene pool reserve. The magnitude of this risk is probably small, because realistically not many acres of gene pool reserves would be shifted to other ownerships. The reasons for this are that many gene pool reserves are located in areas that are already constrained from timber management activities for other reasons. Therefore, the gene pool reserves would not be eliminated that are otherwise unconstrained tend to be in areas where few stands meet the requirements for a gene pool reserve, so opportunities for relocation are limited.

There are no significant adverse impacts to the native tree gene pool as a result of Alternative 3. Alternative 3 requires that in addition to the protections provided by Alternative 1, additional gene pool reserves will be created to minimize risk in the event of catastrophic events. If additional gene pool reserves were designated, the most prudent approach would be to locate them in places that provide better protection for a wider range of species. The original gene pool reserve system was created with a primary focus on Douglas-fir, and the greatest need is for better protection of other species. However, for many of these other species, the most effective strategy may be carefully designed gene conservation plantings rather than the gene pool reserve approach. For instance, grand fir and western red cedar in Western Washington occur as scattered individuals at a fairly low frequency in most stands. Capturing enough individuals of these species using a gene pool reserve approach would require very large areas. Ponderosa pine or western larch grow in Eastern Washington where historic practices of high-grading may have eroded the native gene pool. These are species for which designating small existing stands might not be as valuable as planting a collection of carefully selected seed sources that might more closely represent the original gene pool. Therefore, Alternative 3 does not provide any additional protection of gene pools than Alternative 1.

The Board's Preferred Alternative reduces the risk even further by focusing the need for a diverse gene pool of native trees on forested state trust lands to ensure well adapted forests, versus those primarily targeted for commercial purposes. Although meeting trust obligations is a component of one of the primary objectives of the *Policy for Sustainable Forests*, non-commercial forests that are targeted specifically to meet other objectives, e.g., special ecological features, are now covered under the Board's Preferred Alternative for protection of the genetic resource.

CUMULATIVE IMPACTS

Cumulative impacts of the policy alternatives for the gene pool could be positive or negative, depending on whether the alternatives result in forests that are better adapted or more poorly adapted to their growing sites across forested state trust lands than the forests currently growing there. Cumulative impacts occur in proportion to the rate at which existing stands are replaced with newly regenerated stands, because this is the point where DNR has a significant effect on the genetic makeup of the forest and is determined by implementation of the sustainable harvest level.

Alternative 1 minimizes negative cumulative impacts, because it requires protection of the native tree gene pool, thus minimizing the risk of any accumulation of problems with forest health or productivity.

Alternative 2 has a similar low potential for negative cumulative impacts as Alternative 1, because it also requires protection of the gene pool. However, it includes a moderately higher risk by shifting the insurance and rare gene conservation functions of some gene pool reserves to other landowners whose management goals could change over time.

Alternative 3, like Alternative 1, minimizes negative cumulative impacts, because it requires protection of the gene pool, thus minimizing the risk of any accumulation of problems with forest health or productivity.

Under the Board's Preferred Alternative, the risk of cumulative impacts should be reduced even further by applying the policy to all forest types and not limiting the policy to protecting and enhancing the native tree gene pool for commercial forests only.

3.2.4 Special Ecological Features

INTRODUCTION

Special ecological features are those species, ecosystems and other natural features that are in need of special management consideration for their long-term survival. This includes rare species and rare ecosystem types, as well as widespread ecosystem types that are threatened in some manner. These features may be priorities for inclusion within the statewide system of natural areas, including Natural Area Preserves and Natural Resources Conservation Areas. Features that are priorities for inclusion within these systems include those that are of conservation concern and all of those naturally-occurring features of the state for which there is inadequate or no representation within the natural areas system.

This group of features may include common ecosystem types. The goal of the statewide system of natural areas is to include examples that are in good ecological condition of all ecosystem types. “Good ecological condition” is a relative term, but it is meant to convey a sense of minimal human-related disturbance within a landscape context where natural ecosystem processes are still functioning.

The distribution of ecosystem types and individual species, including special ecological features, are influenced by geology, climate, natural disturbances and ecological processes. Each species and each ecosystem type occupies that portion of Washington that is suitable in terms of those factors. They are neither uniform across the landscape, nor are they random in their distribution. Therefore, the list of special ecological features varies considerably from one ecoregion to another. Some special ecological features occur in more than one ecoregion while others are limited to a single ecoregion.

Although the Special Ecological Features policy subject primarily meets the following Policy Objectives:

- Seek productive partnerships that help DNR achieve policy objectives (Policy Objective 4); and
- Identify trust lands that provide special ecological, social or cultural benefits that are incompatible with active management, and look for opportunities to protect such areas through creative partnerships and funding mechanisms with appropriate compensation to the trusts (Policy Objective 8);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

The elements of the environment affected by this policy subject area range from rare plant and animal species and rare ecosystems to representative ecosystems that meet the term “good ecological condition.”

Forest management, such as constructing a road through a population of a rare species or across a rare ecosystem type, can impact special ecological features directly. Special ecological features can also be impacted indirectly. For example, forest management may alter fire regime/behavior, thereby affecting ecological processes that, in turn, influence the viability of a small patch ecosystem type or the immediate environment of a rare species. The nature and degree of impact of forest management varies for each special ecological feature.

Many of Washington's forested ecosystem types are widespread and much of their conservation value can be maintained through ecologically sound forest management practices. However, many of these common forest types have not yet been included in the statewide system of natural areas, so they remain priorities to be represented within a Natural Area Preserve or a Natural Resources Conservation Area.

It should be noted that there are important exceptions. There are forest ecosystem types that are quite limited in their distribution. Special management considerations may be needed for these rare forest types. They may need to be included within a Natural Area Preserve or a Natural Resources Conservation Area, or be transferred out of trust ownership into some other conservation status.

Many ecosystem types have little or no forest component to them, yet they occur within landscape settings that are forested and are potentially affected by how those forests are managed. For example, the high quality coastal estuaries are ecologically dependent upon the adjacent upland forests and the streams flowing off of those uplands. Many other wetland types, including bogs, ponds, lakes and riparian areas, are similarly ecologically dependent on the health of the adjacent uplands.

At the species level, the greatest level of conservation concern is for species that are endemic to a very limited area, i.e., they occur nowhere else on earth. Washington has several areas that are rich in endemic species, including the Olympic Mountains within the Northwest Coast ecoregion; the Columbia River Gorge, spanning the East Cascades and West Cascades ecoregions; the Wenatchee Mountains in the East Cascades ecoregion; and the Columbia Plateau ecoregion.

Many other species are rare in Washington, but not necessarily rare globally. These species warrant special management consideration, in part as insurance against future listing needs. Many of these species are rare because Washington happens to be at the edge of their natural range. Many of the rare species in the North Cascades, Okanogan and Canadian Rocky Mountains ecoregions are more common to the north, reaching the southern limits of their distribution within Washington. Some of the rare species in the North Cascades actually have a distribution pattern that arcs northward through Canada and westward across Alaska to Russia and the Kamchatka Peninsula. Other rare species in the Okanogan and Canadian Rocky Mountains ecoregions are more common in the Rocky Mountains. Similarly, the ecoregions that encompass the southern boundary of the state have species at the northern limits of their ranges.

Another group of rare species are characterized by being disjunct from the main portion of their range. For example, many rare species in the Columbia Plateau portion of Washington are more common in the Great Basin.

DNR's *Natural Heritage Plan* provides the basic framework for identifying and listing special ecological features of the state. The *Natural Heritage Plan* also provides a process by which sites with such features may be selected for designation as a Natural Area Preserve. A number of forested trust sites have been moved from trust status to natural areas status using this basic framework. The process requires knowledge of the status and distribution of any given special ecological feature and a very detailed knowledge of the specific areas being considered for special management consideration (including being moved out of trust status). The inventory effort on forested state trust lands has lagged behind the effort on other lands, particularly federal lands. A considerable amount of additional inventory is needed to understand the overall distribution of the full suite of special ecological features occurring on forested state trust lands. The Natural Area Preserves system presently includes 31,000 acres on 51 sites distributed throughout the state and thirty Natural Resources Conservation Areas, totaling more than 88,000 acres exist in Washington.

REGULATORY FRAMEWORK

For the most part, special ecological features receive little direct protection within the regulatory framework. Animal species that are listed under the federal Endangered Species Act are the primary exceptions; plant species, however, do not receive the same level of protection. Animal species that have been listed as endangered or threatened by the Washington State Department of Fish and Wildlife are also given limited protections. The protections provided by the federal Endangered Species Act are specifically directed toward the habitats of individual species that are listed. The ecosystems that are included under this policy as "special ecological features" are, however, not specifically identified as the targets of the protections provided by any regulations, but they are indirect beneficiaries of efforts to protect wetlands, riparian areas, etc.

A limited number of terrestrial habitats receive some potential protection under DNR's HCP, but only where there is an established tie to animal species of concern. Rare plant communities and most plant species considered to be rare in Washington, as listed in the *Natural Heritage Plan*, receive no protection under the HCP, except coincidentally as a result of conservation strategies for special habitats.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 requires DNR to identify forested state trust lands with special ecological features and seek legislation and funding to remove these lands from trust ownership. In the past, funds appropriated by the Legislature for this purpose have enabled DNR to set aside properties as Natural Area Preserves or Natural Resources Conservation Areas, or

to transfer ownership to other appropriate governmental agencies. These funds, about $400 million since the late 1980s, were included as part of DNR's approved budget by the Legislature. Separate legislative action has not been required. Alternative 1 does not appear to meet Policy Objectives 4 and 8 as well as Alternative 2.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 13, Special Ecological Features: "The department will identify state forestlands with special ecological features that fill critical gaps in ecosystem diversity, and it will seek legislation and funding to remove these lands from trust ownership."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 clarifies that the focus is generally on features of regional or statewide significance, many of which are already identified by the Natural Heritage Program. It further recognizes that DNR utilizes a variety of strategies to protect special ecological features, including funding from the Legislature. Alternative 2 best meets the applicable policy objectives by protecting the special ecological features by compensating the trusts where appropriate (Policy Objective 8). In addition, Alternative 2 encourages partnering to protect special ecological features (Policy Objective 4).

POLICY STATEMENT

When in the best interest of each trust beneficiary, the department will identify forested state trust lands with special ecological features of regional or statewide significance that fill critical gaps in ecosystem diversity. The department will protect such areas through disposal, retention, creative partnerships and funding mechanisms.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative is the same as Alternative 2, with some minor edits to ensure the policy is clear and succinct (Policy Objective 3).

Special ecological features may be priorities for inclusion within the statewide system of natural areas, including Natural Area Preserves and Natural Resources Conservation Areas. In many cases, such features on forested state trust lands can be transferred out of trust status, with full market value compensation to ensure their protection. In other cases, special features may be small enough or located such that their continued protection is consistent with trust management.

POLICY STATEMENTS

The department will identify forested state trust lands with special ecological features of regional or statewide significance that fill critical gaps in ecosystem diversity.

The department will protect such areas through means consistent with trust objectives, including transfer out of trust status, retention in long-term deferral status, creative partnerships or other available mechanisms.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

The risk of adverse environmental impacts to rare plants, sensitive species, specialized habitats, ecosystems and other natural features is greater under Alternative 1 than under Alternative 2 and the Board's Preferred Alternative. Although DNR would remove all lands with "…special ecological features that fill critical gaps in ecosystem diversity…" from trust ownership, Alternative 1 does not explicitly indicate intent to protect the special ecological features. It simply states that such areas will be moved out of trust ownership. In practice, Alternative 1 has resulted in a limited number of trust sites with special ecological features being transferred to a Natural Area Preserve or a Natural Resources Conservation Area category. Most of these sites remain in trust ownership with little flexibility for providing protection for the special features.

The potential for significant adverse impacts to the environment, e.g., to rare plants and plant communities, are minimized under Alternative 2 and the Board's Preferred Alternative. Alternative 2 and the Board's Preferred Alternative provide greater flexibility and include explicit language regarding intent to "…protect such areas…" Alternative 1 differs from Alternative 2 and the Board's Preferred Alternative primarily with respect to whether or not DNR will retain lands with special ecological features within trust ownership. The option of moving some lands out of trust ownership is retained, but with the qualification that the special ecological features would be "protected." This could be accomplished through transfer to a DNR-administered natural area category or through transfer to another agency or organization with a conservation or protection orientation.

Under Alternative 2 and the Board's Preferred Alternative, DNR would also have other options. Where it is possible to do so, DNR could retain lands with special ecological features yet continue to manage them for revenue generation, as long as adequate protection for those features is provided. For example, a rare plant species occurring within a specific micro-site, e.g., a rock outcrop within a forested landscape, may be protected with little or no change to timber management for the site.

CUMULATIVE IMPACTS

Many special ecological features occur in very specialized, non-forested habitats occurring within a forested setting. Others, particularly those associated with wetlands and riparian areas, receive some level of protection from existing laws, regulations, agreements, etc. As previously stated, the requirements of DNR's HCP will result in the protection of some special ecological features that would not otherwise be protected. Alternative 2 and the Board's Preferred Alternative also include specific language regarding the intent of the policy being to "protect" the features and by adding flexibility to protect special ecological features without the requirement to transfer the lands to other ownerships, the protection of special ecological features should increase over time in comparison to Alternative 1.

All of the alternatives rely on the *Natural Heritage Plan* to provide the framework for defining "special ecological features." By relying on the *Natural Heritage Plan,* the list of special ecological features targeted under this policy will be reviewed and revised every two years. The review and analysis takes into account factors that affect the statewide conservation status of each of the special species and ecosystems. Positive factors, such as protection efforts, and negative factors, such as declining populations or increased threats, are both considered. And because of this consistent approach throughout the state, along with a statewide view, positive and negative factors are assessed across all categories of land ownership (federal, state and private). As a result, the list of special ecological features is regularly revised to account for cumulative impacts from activities across all ownerships of the state.

3.2.5 Old-Growth Stands in Western Washington (formerly "Older Forests and Old Growth")

INTRODUCTION

This policy subject area addresses old-growth stands on forested state trust lands in Western Washington. Old Growth in Eastern Washington is discussed in the Affected Environment subsection. The environmental analysis on large, structurally unique trees from the *Draft* and *Final Environmental Impact Statement Habitat Conservation Plan*, page 4-487, and the discussion on large, structurally unique trees from the *Final Habitat Conservation Plan*, pg. IV-156 and IV-157, are incorporated by reference.

The significance of the policy debate on old-growth forests stems from the economic, ecologic and social importance that is associated with old growth forests and DNR's trust management responsibilities (Smith et al., 1995; and Thomas et al., 1993). The significance of old growth forests arises largely from the difference between its historical range of variability and the current range. Prior to the 1850s (referred to as pre-European settlement), the historical range of variability of old growth forests was estimated at between 54 and 70 percent of the entire forested area in Western Washington, while today only about 13 to 18 percent of the forest area is estimated to be in an old growth condition (National Research Council, 2000). Of the current extent, 80 percent is estimated to be on federal forestlands (Bolsinger and Waddell, 1993).

Although the Old-Growth Stands in Western Washington policy subject primarily meets the following Policy Objectives:

- Balance trust income, environmental protection, and other social benefits from four perspectives: the prudent person doctrine; undivided loyalty to and impartiality among the trust beneficiaries; intergenerational equity; and not foreclosing future options (Policy Objective 2); and
- Identify trust lands that provide special ecological, social or cultural benefits that are incompatible with active management, and look for opportunities to protect such areas through creative partnerships and funding mechanisms with appropriate compensation to the trusts (Policy Objective 8);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

Western Washington

Old growth forests demonstrate enormous heterogeneity in terms of their composition, function and structure. The nature of old growth leads to multiple definitions of old growth forests, even when the discussion is restricted to a limited geographic zone (Pacific Northwest Science Update, 2003; Franklin and Spies, 1991; Forest Ecosystem Management Assessment Team, 1993; and Spurr and Barnes, 1973). While the end-state

of old growth seen today is significant in terms of conservation, current science is placing as much ecological importance on how old growth forests develop as in the end-state (Spies et al., 2002).

In the Pacific Northwest, old growth forests are commonly defined in structural terms as having very large living trees; large living trees with decadent limbs and crowns; large standing dead trees (snags); large down logs or woody debris; a variety of live tree sizes distributed in two or three tree canopy layers at different heights within the stand; and spatial heterogeneity across a stand in terms of clumps of trees and gaps in the forest canopy. Plant associations provide valuable information on probable historic disturbances that lead to the development of the current conditions (Spies et al., 2002). The extent of the forest stand is recognized as an important component in the definition of old growth. Stand size is an appropriate measure of the functionality of the stand within its landscape context (Old Growth Task Force, 1984).

Having multiple definitions poses a problem not only in terms of estimating the area of old growth within a forest inventory, but also for communicating with the public and decision-makers about what type of forest is actually being discussed. The term "old growth" is well-used, but has different meanings for different groups. A recent United States Department of Agriculture Forest Service publication provided an illustrative summary: "The term 'old growth' came from foresters in the early days of logging. In the 1970's research ecologists began using the term to describe forests at least 150-years old that developed a complex structure characterized by large, live and dead trees; distinctive habitats; and a diverse group of plants, fungi, and animals. Environmental groups use the term 'old growth' to describe forests with large, old trees and no clearly visible human influences" (Pacific Northwest Science Update, 2003).

A definition of old growth that relates to forested state trust lands is in the HCP glossary: "A successional stage after maturity that may or may not include climax old-growth species; the final seral stage. Typically contains trees older than 200 years. Stands containing Douglas fir older than 160 years, which are past full maturity and starting to deteriorate, may be classified as old growth. DNR's GIS forest classification for old growth is a dominant dbh of 30 inches or greater; usually more than eight dominant trees/acre; three or more canopy layers with less than complete canopy closure; several snags/acre with a 20 inch dbh or greater; and several down logs per acre with a 24 inch dbh or greater" (*Final Habitat Conservation Plan* glossary, page 10).

Table 1 displays the current acreages of old growth on Western Washington forested state trust lands, as defined by the HCP, using the criteria included in the HCP definition.

In addition to the HCP definition, DNR has distinguished those old growth forest stands on forested state trust lands that are 80 acres and larger (Old Growth Definition Task Group, 1986). Stands of less than 80 acres are often influenced by edge conditions and are not expected to provide interior fully functioning old growth forest conditions. Still, stands less than 80 acres may provide the forest structures that may still play important ecological roles within a landscape context.

Table 1: Estimated Extent of Old-Growth Stands (as defined by the HCP)							
HCP Planning Unit	Old Growth acreage deferred from harvest to meet existing regulatory or HCP Requirements*			Old Growth acreage not deferred from harvest to meet existing regulatory or HCP Requirements			
	Stand size (acres)			Stand size (acres)			
	0-80	>80	Sub-total	0-80	>80	Sub-total	Total
Columbia	1,110	1,180	2,290	510	320	830	3,120
North Puget	12,640	16,850	29,490	2,260	170	2,430	31,920
OESF**	250	39,750	40,000	-	-	-	40,000
South Coast		10	10	-	-	-	10
South Puget	250	330	580	-	-	-	580
Straits	10	-	10	-	-	-	10
Total	**14,260**	**58,120**	**72,380**	**2,770**	**490**	**3,260**	**75,640**

The estimated area of old growth in the Olympic Experimental State Forest comes from a combination of DNR's Forest Resource Inventory System with a field assessment (Horton, S., personal communication). Inventory only estimate is approximately 20,800 acres.
*Deferred from harvest to meet HCP commitments relates to nesting, roosting and foraging and dispersal habitat thresholds, marbled murrelet habitat, riparian habitat and older forest condition landscape targets in the Olympic Experimental State Forest; but does not include deferrals to meet older forest targets outside of the Olympic Experimental State Forest as required by current Board of Natural Resources policy.
**While old growth in the Olympic Experimental State Forest as defined by HCP helps meet contractual commitments, harvest operations that further the HCP and Olympic Experimental State Forest objectives related to research may occur in old-growth stands subject to the March 2006 Settlement Agreement.

Recent legislation in 2004 (Engrossed Substitute House Bill 2573, section 905) directed DNR to convene a scientific committee to both define and inventory old growth forests on forested state trust lands in both Western and Eastern Washington. The Old Growth Definition Committee developed a method to estimate the extent of old growth forests on forested state trust lands in Western Washington. This work was completed by June 30, 2005. This method is based on assessing how forest stands on state trust lands compare with reference conditions in old growth forests of Western Washington. A full description of this method and an inventory of potential old growth using this method is contained in DNR's report, "Definition and Inventory of Old Growth Forests on DNR-Managed State Lands." This method, known as the Weighted Old Growth Habitat Index (WOGHI) (2005), and is based on previously published and unpublished work (Spies and Franklin, 1988; Franklin and Spies, 1991). The WOGHI integrates four key elements of old forests:

- Large trees (number of trees per hectare greater than or equal to 100 centimeters in diameter at breast height);
- Large snags (number of standing dead trees per hectare greater than or equal to 50 centimeters in diameter at breast height and greater than or equal to 15 meters tall);
- Volume of down woody debris (cubic meters per hectare);
- Tree size diversity.

Table 2 shows the acreages of old growth as defined by the Old Growth Definition Committee on forested state trust lands in Western Washington land classes. As discussed in the report, 52,666 acres in Western Washington have a high probability of being old growth, while 35,769 additional acres are potential old growth, but require secondary screening (Table 2). Based on some early field verification efforts, it appears that the actual acres of old growth will be closer to the 52,666 acreage using this method (Land Management Division, summer 2005).

Using either the HCP or the WOGHI method definition, all old growth is currently deferred from harvest to meet existing regulatory and HCP requirements, as well as older forest targets as directed by current Board of Natural Resources policy, with one exception. Old-growth stands in the Olympic Experimental State Forest may be available for harvest operations to meet research objectives of the Olympic Experimental State Forest and the HCP, except stands that are currently identified as occupied marbled murrelet sites. Any harvest of old growth must also be in accordance with DNR's decision to enter into a Settlement Agreement in March 2006. Under the terms of that agreement and for the length of the Agreement, DNR will not authorize or conduct any harvest in old-growth stands in the Olympic Experimental State Forest. Using the HCP definition, there are potentially about 40,000 acres of old growth in the Olympic Experimental State Forest. Using the WOGHI, there are about 27,000 acres having a high probability of old growth in the Olympic Experimental State Forest.

Table 2: Status of Old Growth Definition Committee Defined Old Growth (acres) by Land Class in Western Washington (all figures are estimates, subject to field verification)

Status	Sustainable Harvest Land Classes	Old Growth (WOGHI = 60+)[1]	Potential Old Growth (WOGHI = <60)[2]	Total
Currently contributing to regulatory or HCP conservation strategies	Owl Habitat	4,424	2,057	6,481
	Marbled Murrelet	2,689	1,278	3,967
	Riparian	15,245	14,059	29,304
	OESF[3]	14,101[4]	15,863	29,964
	Other	1,573	507	2,080
Permanently deferred	Natural Areas	14,379	1,266	15,645
Not currently contributing to regulatory or HCP conservation strategies	Stand size ≥ 80 acres	107	536	643
	Stand size < 80 acres	147	204	351
Total		52,666	35,769	88,435

1 – Weighted Old Growth Habitat Index (WOGHI) score of 60 or more out of 100 have a high probability of being old growth.
2 – Stands with a WOGHI score less than 60 may be old growth but need secondary screening.
3 – Harvest operations linked to the research objectives of the Olympic Experimental State Forest and HCP may occur in some old-growth stands and that are also in accordance with the March 2006 Settlement Agreement.
4 – This number does not include approximately 12,900 acres of old growth in riparian areas in the Olympic Experimental State Forest. These acres are part of the 15,245 acres identified in the riparian land class. Using the WOGHI method, there are approximately 27,000 acres in the Olympic Experimental State Forest that have a high probability of old growth.

Eastern Washington

The Scientific Committee on Old Growth could not define nor can DNR inventory old growth forests on forested state trust lands in Eastern Washington at this time (see page 15 of the *Definition and Inventory of Old Growth Forests on DNR-Managed State Lands* (2005) report). For Eastern Washington, insufficient research data exists to define an old-growth reference condition and for this reason, the committee was unable to create an old-growth habitat index for Eastern Washington within the timeframe provided in the legislation. During the 2006 legislative session, ESSB 6384 section 189 was added as a condition to the 2006 supplemental budget to direct DNR to conduct an inventory of old growth forests located on state lands east of the crest of the Cascade mountains. This inventory is to be completed in two phases. The first phase, to be completed by July 1, 2007, will identify reference stands for various plant associations; while the second phase, to be completed by December 15, 2007, will use the definition to produce an inventory of old growth forests. This information will then be used in the Eastern Washington sustainable harvest calculation. At that time, DNR will assess the need for Board of Natural Resources policy to address Eastern Washington old growth forests. The Eastern Washington sustainable harvest calculation is expected to be completed within the next five years. Until that time, DNR, in its land management strategies for Eastern Washington, is retaining forest structures thought to be elements of older forests in Eastern Washington. Along the east slope of the Cascades and within the range of the northern spotted owl, DNR is maintaining and developing sub-mature and mature habitat that is expected to develop into older forest structures. In the Klickitat HCP planning unit, DNR is retaining an average of six to 12 trees per acre of the largest diameter classes as part of its forest health and HCP Northern Spotted Owl Conservation Strategy. In Northeast Washington, DNR is also developing late successional forests as part of its *Loomis State Forest Final Landscape Plan* (June 1996). In addition, DNR retains selected large diameter trees as part of its land management activities across all of Eastern Washington.

The remaining discussion relates to Western Washington only.

Old growth forests have important ecological functions. Old growth forests in general are biotically more complex than forests in most earlier successional stages and, as a consequence, provide important habitat for various species. For example, approximately one-third of the vertebrate species using western forests were identified as likely associated with older forest conditions, including old growth (Thomas et al., 1993).

The wet, temperate, locally variable forest environment and high richness of plant species in the western Pacific Northwest are highly conducive for growth of a wide variety of fungi. Forest fungi are ecologically important to the region, because of their important role in forest food webs (Forest Ecosystem Management Assessment Team, 1993). Recent research has revealed that the diversity and productivity of mycorrhizal fungi are higher in older stands of Douglas-fir than in young or clearcut stands (Amaranthus et al., 1994). Scientists have identified 527 species of fungi that are closely associated with older and old growth forests in the Pacific Northwest (Forest Ecosystem Management Assessment Team, 1993).

Seventeen species of salamanders, including 14 endemic species, and the tailed frog are closely associated with older and old growth forests (Forest Ecosystem Management Assessment Team, 1993).

Forest dwelling mammals that are closely associated with old growth forests in the Pacific Northwest include martens, fishers, red tree voles, and several species of bats (Forest Ecosystem Management Assessment Team, 1993; and Thomas et al., 1993). The geographic distribution of martens and fishers has decreased during this century primarily due to habitat loss (Aubrey and Houston, 1992; Powell and Zielinski, 1994; and Buskirk and Ruggiero, 1994).

Old growth forests with diverse understory vegetation and abundant snags and coarse woody debris typically support one and a half times more biomass and wildlife species than do young forests (Carey, 1995; and Carey and Johnson, 1995).

Nine species of forest-dwelling bats, including Townsend's big-eared bats, are assigned some level of special status in states where they occur. Most of these species also were targeted for special consideration in the *Northwest Forest Plan*. Most common bat species in the Washington Cascades and Oregon Coast Range are up to ten times more abundant in old growth forests than in younger forests (Thomas and West, 1991). Several species are closely associated with old growth forests, because they roost in large trees and snags with deeply furrowed bark and cavities (Perkins and Cross, 1988; Thomas, 1988; Thomas and West, 1991; Cross, 1993; Cross and Waldien, 1994 and 1995; and Perkins, 1994).

Thomas et al., (1993) listed 38 species of birds closely associated with older and old growth westside forests, including Vaux's swift (Bull and Collins, 1993), northern goshawks (Reynolds, 1989) and pileated woodpecker. Suitable cavity-nesting substrates are assumed to occur at highest density in the large trees and snags found in old growth forests (Mannan and Meslow, 1984).

The bird species that are most closely associated with old growth forests are marbled murrelets, northern spotted owls and Vaux's swifts (Ruggiero et al., 1991). Long-term declines in the availability of suitable breeding and nesting habitat prompted the listing of the marbled murrelet and the northern spotted owl as threatened under the Endangered Species Act (ESA). The northern spotted owl, in particular, has been the centerpiece of the debate about forest management practices in the Pacific Northwest for the last several decades because of its preference for large tracts of old-growth forest (Thomas et al., 1990, 1993; Forest Ecosystem Management Assessment Team, 1993). Ongoing northern spotted owl population declines documented on 14 study areas in the Pacific Northwest have been attributed to several factors including declines in prey abundance, changing weather patterns, emerging threats such as competition with barred owls and West Nile virus, and habitat loss from timber harvest and catastrophic wildfire (Anthony et al., 2004; Courtney and Gutierrez, 2004).

Some recent information has been published on the effects of harvest rates over several years on northern spotted owl habitat. In 1997, there were approximately 350,000 acres of suitable spotted owl habitat on westside DNR-managed lands (Biological Opinion –

USDI, 1997). This comprises approximately 12 percent of suitable spotted owl habitat in Washington State (Biological Opinion -USDI 1997). In response to a request by the Forest Practices Board, the WDFW recently completed an analysis of harvest rates between 1996 and 2004 on private, state, and federal lands, as part of a review of the Forest Practices Board's rules regarding northern spotted owl habitat (Pierce et al., 2005). Overall results of the study indicate a decline in habitat in varying degrees depending on location within or outside of owl management circles, spotted owl special emphasis areas, or HCPs.

Land ownerships differ in terms of the role forested lands play in supporting northern spotted owl recovery efforts. For example, USFWS designated spotted owl "critical habitats," which are defined under Section 4 of the ESA as geographic areas "on which are found those physical or biological features essential to the conservation of the species and which may require special management consideration or protection". In Washington State, these critical habitat designations occur solely on federal lands (USDI, 1992). This is due to the greater quantity and continuity of forests constituting habitat on federal lands. Critical habitat areas are thought to be essential to maintaining the life processes and successful reproduction of a species. To this end, federal lands in Washington are vital for spotted owl conservation efforts, supporting source populations where reproductive rates exceed mortality rates (Minkova and Riepe 2004). In contrast, nonfederal lands appear to play a supporting role in spotted owl conservation (see the role of non-Federal lands in Spotted Owl Conservation, *DNR HCP Draft Environmental Impact Statement*, Executive Summary, pg. ix and x). The primary means for protecting spotted owl habitat on state trust lands in Washington is through the DNR's HCP (DNR 1997) which contains provisions for designating northern spotted owl Nesting, Roosting, and Foraging (NRF) and Dispersal Management Areas. These areas are intended to provide some demographic support for northern spotted owls, but are most important for maintaining the overall distribution of the species within its historic range and for facilitating species dispersal (i.e., movement of individuals between subpopulations). Additionally, a percentage (40 percent) of each landscape within the Olympic Experimental State Forest is maintained in a condition that supports spotted owls. Support for northern spotted owls on private forest lands is provided through HCPs and the state forest practices rules.

Old growth stands on forested state trust lands can play varying roles in northern spotted owl support, depending on size of the stand and its location on the landscape with respect to spotted owl habitat on federal lands and within HCP designated nesting, roosting and foraging or dispersal habitat areas.

REGULATORY FRAMEWORK

A number of other DNR policies and management strategies potentially affect the management status of old growth forests on forested state trust lands, including old growth research areas, the Commission on Old Growth Alternatives and the HCP.

In 1984, the Board of Natural Resources approved the *Forest Land Management Program*, a comprehensive plan for managing state lands and the precursor to the *Forest Resource Plan*. A section of the *Forest Land Management Program* directed DNR to

establish seral stage deferral sites: “The department will identify and remove certain old-growth stands in Western Washington from the sustainable harvest base during this planning period to retain the option of acquiring information on old growth ecological relationships which may have application to intensive timber management” (*Forest Land Management Program*, page 54).

Based on this direction, DNR identified 12 old growth research areas covering approximately 1,800 acres in Western Washington. All sites are over 80 acres in size. These areas were deferred from harvest with the intent to carry out research to help DNR manage second growth forests for all ecological values. The *Forest Resource Plan* continued the deferral of these sites for much of the same purposes as identified in 1984.

In 1989, an Old Growth Commission was established by Public Lands Commissioner Brian Boyle. This commission recommended formation of the Olympic Experimental State Forest to gain and apply knowledge about old growth forests and modern commercial forest management. The Olympic Experimental State Forest was to be managed for both forest commodities and for ecological values. The commission also recommended 15,000 acres of “mature natural stands” to be deferred from harvest until 2007 (*Forest Resource Plan).*

The HCP conservation strategies and requirements influence the management of all existing old growth forest on forested state trust lands in Western Washington. The specific HCP conservation strategies determine how older forests are managed for riparian areas, the northern spotted owl, the marbled murrelet, multiple unlisted species and conservation research strategies in the Olympic Experimental State Forest. These strategies are designed to develop forests that will have characteristics of function, composition, and structure similar to “old growth” forests. These older forests will be managed over time to develop and maintain the specific forest conditions of structurally complex forests, while providing revenue to the trusts. Silviculture will be used as the principle disturbance regime, in combination with natural processes. In addition, the HCP’s multiple unlisted species conservation strategy of retaining large, structurally unique trees should result in old growth components dispersed across the landscape outside of HCP designated Nesting, Roosting and Foraging (NRF) and Dispersal Management Areas for the northern spotted owl.

In addition to the HCP conservation strategies, the Board of Natural Resources approved a policy in the 2004 sustainable harvest calculation process targeting 10 to 15 percent of each Western Washington HCP planning unit for old forests based on structural characteristics (Final HCP, page IV 180 and Board of Natural Resources Resolution No. 1134) and that DNR will focus on existing old-growth, as defined by the HCP, as a priority in achieving these targets. This Board of Natural Resources direction and the HCP management strategy influence the designation of forest stands for conservation and management. Currently, DNR conserves all of the existing old growth forests as a result of HCP conservation strategies. Although, harvest operations in old-growth stands in the Olympic Experimental State Forest may occur in the future to meet research objectives of the Olympic Experimental State Forest, the March 2006 Settlement Agreement does not allow any harvest of old growth during the term of the Agreement.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 would continue to defer from harvest for ten years, 12 old growth research areas, representing approximately 1,800 acres in Western Washington. The 1992 deferral of 15,000 acres of structurally complex forests in the Olympic Experimental State Forest would continue until 2007. Alternative 1 also retains existing old growth as defined by the HCP to meet the old forest targets, which are currently expected to take up to 70 years. Once old forest targets are met, old growth in excess of that needed to maintain the target may be available for harvest. Alternative 1 does not appear to meet Policy Objectives 2 and 8 as well as other alternatives.

POLICY STATEMENTS

***Forest Resource Plan* Policy No. 14, Old Growth Research Area Deferrals: "During this planning period, the department will continue to defer from harvest certain old growth research stands in Western Washington to maintain the ability to acquire information on ecological relationships which may affect intensive timber management."**

The department will continue deferral of 15,000 acres of structurally complex forest in the Olympic Experimental State Forest until 2007.

The department will target, over time, 10 to 15 percent of each Western Washington *Habitat Conservation Plan* planning unit for old forests based on structural characteristics. In meeting these targets, old growth research areas will continue to be deferred and existing old growth (as defined by the *Habitat Conservation Plan*) and older stands will be a priority focus in developing the *Habitat Conservation Plan* planning unit targets.

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 would permanently defer from harvest all old-growth stands, as defined by the HCP, outside of the Olympic Experimental State Forest, regardless of stand size. Under Alternative 2, once HCP targets were met, any old growth stand no longer needed to meet HCP or regulatory requirements or targets would likely be transferred out of trust status to permanently protect those stands from harvest activities, with full market value compensation to the trusts.

Old-growth stands within the Olympic Experimental State Forest may be subject to experimental application of silvicultural techniques, if consistent with the HCP and Olympic Experimental State Forest research objectives. However, the March 2006 Settlement Agreement does not allow any harvest of old growth during the term of the Agreement. The purpose of the Olympic Experimental State Forest is to experiment with

harvest and regeneration methods to enhance habitat characteristics and commodities production.

Under Alternative 2, all old growth research areas currently meet the HCP's definition of old growth and would be permanently deferred from harvest. However, under Alternative 2, they would no longer be classified as old growth research areas. In addition, Alternative 2 replaces the term "old" forest with "older" forest to ensure consistency in terms.

Under Alternative 2, exceptions to the policy for operational considerations could be made with Board of Natural Resources review. For example, these exceptions could include removal of some individual trees that are part of an old growth stand to allow road construction, where no feasible alternatives for road location were available. Criteria for field operations would be developed to guide these exceptions. In all cases, Board of Natural Resources review would be required for any exceptions.

Small clumps of large diameter old growth trees (greater than or equal to 30 inches in diameter at breast height) and individual old growth trees would be the focus in complying with HCP retention requirements for large, structurally unique trees. Old-growth stands, older forest stands and small clumps of large diameter old growth trees that are socially or culturally-significant would be considered for transfer out of trust status with compensation, when in the best interest of the trusts. Alternative 2 appears to meet Policy Objective 8 better than Alternative 1.

POLICY STATEMENTS

The department will target, over time, 10 to 15 percent of each Western Washington *Habitat Conservation Plan* planning unit for older forest conditions. The department will use retention of existing old-growth stands, as defined by the *Habitat Conservation Plan*, as a priority in achieving these targets. Any exceptions to this policy for operational considerations will be reviewed by the Board of Natural Resources.

Inside the Olympic Experimental State Forest, the department may conduct research in old-growth stands to meet the objectives of the Olympic Experimental State Forest and the *Habitat Conservation Plan*.

The department will retain large diameter (greater than or equal to 30 inches in diameter at breast height), old growth trees to meet *Habitat Conservation Plan* retention requirements for large, structurally unique trees. Department proposals to harvest any large *diameter old growth trees not retained to meet Habitat* Conservation Plan retention requirements, will be reviewed by the Board of Natural Resources, as will any other exceptions to this policy for operational considerations.

When in the best interest of the trusts, the department will transfer old-growth stands and small clumps of large diameter old growth trees having high social or cultural value, out of trust status, when full compensation is secured.

■ ALTERNATIVE 3

DISCUSSION

Alternative 3 differs from Alternative 2 in that all old-growth stands would not automatically be permanently deferred from harvest. Under Alternative 3, all old-growth stands greater than 80 acres in size will be deferred from harvest to achieve HCP targets for older forest structures. Under Alternative 3, once HCP targets were met, any old growth stand no longer needed to meet HCP or regulatory requirements or targets would be evaluated for either transfer out of trust status with full compensation to the affected trusts or considered for harvest activities.

Old-growth stands within the Olympic Experimental State Forest may be subject to experimental application of silvicultural techniques including harvest operations, if consistent with the HCP and Olympic Experimental State Forest research objectives. However, the March 2006 Settlement Agreement does not allow any harvest of old growth during the term of the Agreement. The purpose of the Olympic Experimental State Forest is to experiment with harvest and regeneration methods to enhance habitat characteristics and commodities production.

As with Alternative 2, under Alternative 3 and the Board's Preferred Alternative, exceptions to the policy for operational considerations could be made with Board of Natural Resources review. Old-growth stands less than 80 acres that are not already deferred from harvest would be evaluated for their contribution to HCP older forest targets and management decisions will be made based on that evaluation. Under Alternative 3, some of the old-growth stands smaller than 80 acres, i.e., currently a total of 2,770 acres using the HCP definition or approximately 147 acres using the WOGHI method (Table 3), may be made available for harvest activities at some point in time, when and where they do not contribute to attainment of HCP commitments, and are in excess of acreage needed to meet HCP older forest targets.

Individual and small clumps of large diameter old growth trees would be the focus in complying with DNR's HCP retention requirements for large, structurally unique trees. Old-growth stands, older forest stands and small clumps of large diameter old growth trees that are socially or culturally significant would be considered for transfer out of trust status with full compensation, when in the best interest of the trusts. Alternative 3 meets the applicable policy objectives by providing balance between trust income and environmental protection (Policy Objective 2), including permanent protection of special old-growth stands through full compensation to the affected trust beneficiaries (Policy Objective 8).

The severity of the effects of harvesting old growth under Alternative 3 would vary with the stand size, location and structural characteristics of the stand. Small (less than 80 acres), isolated stands may lack interior forest conditions and connectivity to other old-growth stands (Old Growth Definition Task Group, 1986). As such, habitat in small, isolated stands is less likely to provide all of the ecological functions described in the Affected Environment subsection.

POLICY STATEMENTS

The department will target, over time, 10 to 15 percent of each Western Washington *Habitat Conservation Plan* planning unit for older forest conditions. The department will use retention of existing old-growth stands, as defined by the *Habitat Conservation Plan*, 80 acres and larger as a priority in achieving these targets. Any exceptions to this policy for operational considerations will be reviewed by the Board of Natural Resources.

Old-growth stands smaller than 80 acres not already deferred from harvest by regulatory and *Habitat Conservation Plan* requirements, will be evaluated for contribution to *Habitat Conservation Plan* objectives, for their social and cultural significance and conserved or managed based on that evaluation. Any proposal to harvest any old-growth stands smaller than 80 acres will be reviewed by the Board of Natural Resources.

Inside the Olympic Experimental State Forest, the department may conduct research in old-growth stands to meet the objectives of the Olympic Experimental State Forest and the *Habitat Conservation Plan*.

The department will retain large diameter (greater than or equal to 30 inches in diameter at breast height), old growth trees to meet *Habitat Conservation Plan* retention requirements for large, structurally unique trees. Department proposals to harvest any large diameter old growth trees not retained to meet *Habitat Conservation Plan* retention requirements, will be reviewed by the Board Natural Resources, as will any other exceptions to this policy for operational considerations.

When in the best interest of the trusts, the department will transfer old-growth stands and small clumps of large diameter old growth trees having high social or cultural value, out of trust status, when full compensation is secured.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative defers harvest of all old-growth stands with the exception of old-growth stands in the Olympic Experimental State Forest, to meet a variety of objectives. This policy defines old-growth stands as stands five acres or larger with a natural origin prior to European settlement (year 1850) and in the most structurally complex stage of stand development, also referred to as the fully functional stage of stand development.

All three criteria must be met for a stand to be identified as old growth for the purposes of this policy.

However, as with all of the alternatives, if an old-growth stand suffers blowdown, fire, etc., such that it no longer retains the structure that makes it old growth, it would no longer be subject to the old growth policy statements. The stand would then be managed according to other Board of Natural Resources' policy, legal and contractual obligations,

including the possibility of being protected, salvaged, or retained as a special ecological feature.

Similar to Alternatives 2 and 3, exceptions to this policy for operational considerations can be made with notification to the Board of Natural Resources. This policy also focuses single tree retention on very large, structurally unique trees, rather than trees of a certain diameter (Policy Objective 3). It was determined that specifying a diameter threshold (i.e., 30 or 40 inches) may not be consistent with the HCP requirements for very large, structurally unique trees. There can be trees with very large diameters that are not structurally unique and therefore, do not meet the intent of the HCP's conservation strategy. Trees targeted for retention under this policy, sometimes referred to as *old-growth remnants*, are characterized by very large diameters (may be 60 to 90 inches or more, depending on the species and growth environment) and possess large, strong limbs; open crowns; large, hollow trunks; broken tops and limbs; and deeply furrowed bark and are the focus for retention to meet HCP requirements for very large diameter, structurally unique trees.

As in Alternatives 2 and 3, old growth in the Olympic Experimental State Forest may be subject to experimental application of silvicultural techniques including harvest operations, if consistent with the HCP and the Olympic Experimental State Forest research objectives. However, the March 2006 Settlement Agreement does not allow any harvest of old growth during the term of the Agreement. The purpose of the Olympic Experimental State Forest is to experiment with harvest and regeneration methods to enhance habitat characteristics and commodities production.

When in the best interest of the trust, old-growth stands will be transferred out of trust status if the trust receives full market value for the lands transferred. Such transfers can occur at any time and in such a way that these old-growth stands can continue to contribute to HCP habitat requirements and older-forest targets, even when no longer in trust status.

As in Alternatives 2 and 3, old-growth stands would be subject to transfer out of trust status with full market value compensation to the trust with a priority on those old growth stands not subject to protection under the HCP.

POLICY STATEMENTS

The department will defer from harvest old-growth stands (stands 5 acres and larger that originated naturally, before the year 1850), in order to help meet DNR's *Habitat Conservation Plan* and regulatory requirements, older-forest targets, and social/cultural values. This policy is subject to the following conditions:

- **The Board of Natural Resources will be notified of any exceptions to this policy for operational considerations; and**
- **The department will retain known very large diameter, structurally unique trees to meet DNR's *Habitat Conservation Plan* requirements for large, structurally unique trees. The department will notify the Board of Natural Resources of**

proposed harvests that may involve removals of very large diameter, structurally unique trees.

Inside the Olympic Experimental State Forest, the department may conduct operations in old-growth stands consistent with the requirements of DNR's *Habitat Conservation Plan* to meet the research objectives of the Olympic Experimental State Forest.

When in the best interest of the trust(s), the department will actively seek to transfer old-growth stands and areas containing very large diameter trees of high social or cultural significance out of trust status, when full market value compensation to the trust(s) is secured. In seeking to transfer such stands out of trust status, the department will immediately prioritize old-growth stands that are not subject to protection under DNR's *Habitat Conservation Plan* or other applicable regulations.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

A suggestion was made that old growth should be protected down to 5 and 10-acre stands. The Board's Preferred Alternative has been amended to defer harvest of old growth for stands 5 acres and larger that originated naturally before the year 1850.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

The comparative impacts of the alternatives using the HCP definition for old growth and the WOGHI method are illustrated in Table 3, by assessing the extent of old growth forests that may be subject to disturbance through silvicultural activities. The distinction between the alternatives is relatively small, due to influence of existing policies and HCP commitments.

Table 3: Summary of Western Washington Old Growth Policy Differences Among the Alternatives using HCP & WOGHI Definitions

Assumption		Alternative 1 (No Action)	Alternative 2 (Permanent Protection)	Alternative 3 (Protection > than 80 Acres)	Board's Preferred Alternative
Acres of Old Growth Deferred for HCP and Board of Natural Resources Policy *	HCP Definition	75,640	75,640	72,380	75,640
	WOGHI	52,666	52,666	52,519	52,666
Acres of Old Growth Not Deferred	HCP Definition	0***	0	2,770 acres < 80 acres	0**
	WOGHI	0***	0	147 acres < than 80 acres	0**

*Harvest operations consistent with the HCP and the Olympic Experimental State Forest research objectives and the March 2006 Settlement Agreement may occur in old-growth stands in Olympic Experimental State Forest.
** Old growth as defined by Board of Natural Resources policy is pre-European prior to 1850, 5 acres and larger and stands in the most structurally complex stage of stand development.
*** Once older forest targets are met, acres of old growth not needed to maintain the targets may be available for harvest.

Under all four alternatives, most existing old growth on forested state trust lands would be conserved as part of the strategies to achieve existing Board of Natural Resources policy and HCP objectives. Under Alternative 1, all 75,640 acres (using the HCP definition) or 52,666 acres (using the WOGHI method), are deferred from harvest until HCP and Board of Natural Resources targets for habitat and older forests are met, in approximately 60-90 years. Under Alternative 2, old-growth stands would continue to be permanently protected (primarily through transfer from trust status with full compensation), even after HCP requirements were met. Under Alternative 3, all but 2,770 acres using the HCP definition for old growth or 147 acres using the WOGHI method are deferred to meet regulatory and HCP requirements and Board of Natural Resources policy. It is likely that some of this 2,770 acres or 147 acres would be protected to help meet older forest targets. Under all the alternatives, harvest operations in old-growth stands in the Olympic Experimental State Forest could occur consistent under the HCP and the research objectives of the Olympic Experimental State Forest. However, the March 2006 Settlement Agreement does not allow any harvest of old growth during the term of the Agreement.

Under Alternative 1, old growth forests may be impacted by harvest activities after HCP requirements and older forest targets are met in approximately 70 years. Alternative 1 would then release approximately 3,260 acres of old growth (using the HCP definition) or 254 acres of old growth (using the WOGHI method), which represents approximately .1 percent and .009 percent of the existing suitable spotted owl habitat in Western Washington respectively (Biological Opinion - USDI, 1997). Because release of these acres could take up to 70 years, as noted above (once HCP requirements are met), Alternative 1 would have no impacts until the targets are met (see discussion of policy adopted under sustainable harvest in the Regulatory Framework section of this policy subject area).

Under Alternative 2, all old growth forests are permanently deferred from harvest both before and after HCP requirements and older forest targets are met with the exception of harvest operations consistent with the HCP in old-growth stands in the Olympic Experimental State Forest directly tied to research objectives. However, the March 2006 Settlement Agreement does not allow any harvest of old growth during the term of the Agreement. As under Alternative 1, Alternative 2 would have no short-term impacts on the availability of northern spotted owl habitat, as all old growth outside the Olympic Experimental State Forest would be deferred during the life of the HCP. Within the Olympic Experimental State Forest, all old growth is deferred from harvest during the term of the March 2006 Settlement Agreement and only experimental harvesting of old growth related to research could occur after the term of the Settlement Agreement. The additional mitigation of impacts provided by the policy adopted under sustainable harvest related to using existing old growth stands to meet older forest targets is previously discussed in the Regulatory Framework section of this policy subject area. However, the permanent deferral of old growth proposed under Alternative 2 and the Board’s Preferred Alternative would provide the greatest long-term protection to northern spotted owls and other old growth associated species, compared to Alternatives 1 and 3. Over time, a greater amount of northern spotted owl habitat would exist collectively between the

existing old growth, and the creation of new suitable northern spotted owl habitat through active management on other trust lands.

Under Alternative 3, some old growth forests in stands greater than 80 acres may be impacted by harvest activities after HCP requirements and older forest targets are met (targets are not expected to be met for 70 years or more). Old growth forests in stands smaller than 80 acres (HCP 2,770 acres and WOGHI 147 acres) may be impacted by harvest activities after 2014. The March 2006 Settlement Agreement does not allow any harvest of old growth during the term of the Agreement. Using the WOGHI method, 97 acres of old growth in stands smaller than 80 acres exist in the Columbia HCP planning unit, 21 acres in the North Puget planning unit and 28 acres in the South Coast planning unit. All of these stands are located outside of areas designated to provide nesting, roosting and foraging and dispersal habitat in support of owls on federal lands. All of these stands are also found outside of riparian management areas.

As a result, due to the location and site of these stands, they do not provide the necessary habitat requirements or play a role in supporting reproducing northern spotted owls, or other species associated with old growth that require large, contiguous blocks of habitat. However, by making these small stands available for harvest after 2014, Alternative 3 would most likely increase the level of fragmentation of older forest on DNR-managed lands across the landscape which could result in further isolation of sub-populations of spotted owls, reduce territory occupancy and nest success, or prevent the future colonization of suitable northern spotted owl habitat that is not currently occupied (Blakesley, 2004). All of these factors could accelerate the decline of northern spotted owl populations.

In addition, harvest of these smaller old growth stands under Alternative 3 would carry the risk of reducing or effectively eliminating the ecological benefits of the old growth habitat condition in those locations. For example, removal of large trees and snags may eliminate nest sites for cavity-dependent birds, roost sites for bats or den sites for Pacific fishers. Reduction of canopy cover would result in changed microclimatic conditions and reduced interior forest habitat. This “edge effect” may create habitat conditions that favor edge-associated species and species that are habitat generalists.

However, compliance with the HCP conservation strategy for retention of very large structurally unique trees in these stands would mitigate for some of these impacts.

Under the Board’s Preferred Alternative, all existing old growth outside of the Olympic Experimental State Forest is permanently deferred from harvest. Old-growth stands in the Olympic Experimental State Forest may be subject to harvest operations consistent with the HCP to meet the research objectives of the Olympic Experimental State Forest. However, the March 2006 Settlement Agreement does not allow any harvest of old growth during the term of the Agreement. This Agreement provides mitigation for impacts to owls in the short-term by not allowing any harvest in old growth for research purposes until 2014 or until the calculation of a new sustainable harvest level, whichever is later. All impacts as a result of any harvest of old growth in the Olympic Experimental State Forest related to research after 2014 cannot be identified or analyzed at this time.

Any proposal to harvest old growth for research purposes in the Olympic Experimental State Forest would be subject to SEPA analysis at that time. Single very large diameter, structurally unique trees, often referred to as old-growth remnants, are the focus for retention to meet HCP requirements for very large structurally unique trees. Impacts to northern spotted owls, and other old growth associates, under the Board's Preferred Alternative would be similar to those described for Alternative 2, with the exception that stands would be classified as old growth based on stand age, as well as specific structural characteristics. For this reason, this alternative would not protect older stands that originated after 1850, but may still have some structural complexity. These stands could meet habitat requirements for northern spotted owls and other old-growth associates, which include biological legacies such as large diameter snags, multiple canopy layers, and large downed logs. However, these older stands, while not protected under this policy, would be considered for and in many cases retained, to help meet other HCP commitments and the older forest targets discussed under the General Silvicultural Strategy policy.

CUMULATIVE IMPACTS

DNR recognizes that cumulative impacts have the potential to occur with relation to old growth forest habitats. The loss of old growth forests in the Pacific Northwest has resulted in cumulative adverse impacts in the loss and endangerment of wildlife and plant species. The listing of the northern spotted owl, marbled murrelet and various salmonid species are responses to these adverse cumulative impacts.

Old growth forests on forested state trust lands represent a small percentage of the remaining old growth in Western Washington. Timber harvest and development have reduced the amount of old-growth forests in Western Washington and Oregon from a range of approximately 54-70 percent to 13-18 percent of the forests (National Research Council, 2000). Using the WOGHI method for determining forest stands with a high probability of old-growth forests the amount represented on forested state trust lands in Western Washington ranges from 1.8 (52,666 acres) to 2.6 percent (88,435 acres) of the entire old-growth forests in Western Washington. Using the HCP definition for old growth, the amount represented on forested state trust lands in Western Washington (75,640 acres) ranges from 2.7 to 3.7 percent of the entire old-growth forests in Western Washington.

Using the WOGHI method, old growth represented on forested state trust lands represents from 1.8 to 3.0 percent of all suitable spotted owl habitat in Western Washington (2,916,666 acres). Under the HCP definition it is approximately 2.6 percent of the entire suitable spotted owl habitat in Western Washington.

However, the existing old growth forests on forested state trust lands play an important role in DNR's HCP conservation strategies. The potential for harvest of old growth under all of the alternatives on forested state trust lands is 0 under the terms of the March 2006 Settlement Agreement until at least 2014. After 2014, the potential for harvest of old growth on forested state trust lands outside of the Olympic Experimental State Forest, ranges from 0 to 147 acres (contiguous stands of < 80 acres) under the WOGHI method and from 0 to 2,770 acres (contiguous stands of < 80 acres) under the HCP definition.

Thus, the maximum acres available for harvest under the two definitions, after 2014, ranges from less than 1/100 percent to approximately 1/10 percent of the entire suitable spotted owl habitat in Western Washington under Alternative 3. Although significant impacts to the natural environment after 2014, such as to populations of old-growth dependent species are unlikely under this alternative due to the size of the stands that may become available for harvest (under 80 acres) and the low percentage of existing old growth in Western Washington they represent, some of these stands may act as corridors or islands for dispersal between habitat patches and their removal could result in increasing the level of habitat fragmentation and impacts to old-growth dependent species populations, e.g., northern spotted owls. However, the potential for significant impacts from the harvest of any of these stands under Alternative 3 would be evaluated through a separate SEPA process in the event that these stands were proposed for harvest.

Under the Board's Preferred Alternative, the amount available for harvest is limited to stands under 5 acres that may exhibit some of the other characteristics of old growth, but are not defined as old growth in the Board's Preferred Alternative. It is highly unlikely that stands of this size represent a normally functioning old growth stand (Old Growth Definition Task Group, 1986). In addition, these small patches will be the focus for rotation to meet the HCP Conservation Strategy for very large structurally unique trees. Therefore, there are no significant impacts related to exclusion of these small patches from the definition of old growth.

Under Alternatives 1, 2 and the Board's Preferred Alternative there are no significant adverse cumulative impacts to the natural environment related to the harvest of old growth. It is also unlikely that potential harvest under Alternative 3 would result in significant adverse impacts to the natural environment although there may be greater impacts to old growth dependant species as discussed in the Significant Impacts and Mitigation Measures discussion. Significant impacts are avoided because mitigation currently provided by existing Board of Natural Resources policy already sets aside most of the DNR's old growth. These policies include the non-harvest of old growth stands to help meet a target of 10-15 percent of older forest structure (high quality spotted owl habitat) in each Western Washington HCP planning unit over time; DNR's HCP conservation strategies; the March 2006 Settlement Agreement; state forest practices rules; the *Northwest Forest Plan* and other regional programs, such as the salmon recovery efforts (Salmon Recovery Funding Board); and a number of habitat conservation plans developed by other forest landowners and local government utilities (e.g., Seattle City Light and Tacoma Water). The requirement to conduct SEPA review on state timber sales also provides a safety net for identifying, mitigating, and avoiding any potentially significant impacts of harvest proposals that could occur under Alternative 3. The Board's Preferred Alternative, by prohibiting harvest of any contiguous stands of old growth (greater than 5 acres), further avoids any potentially significant impacts related to the natural function of old growth stands.

3.2.6 Wildlife Habitat

INTRODUCTION

For the purposes of this Final EIS, "wildlife" is defined as all native, non-domesticated vertebrate and invertebrate members of the animal kingdom, including fish species that are indigenous to the state of Washington. "Wildlife habitat" is defined as "an area with the combination of resources (such as food, cover and water) and environmental conditions (such as temperature, precipitation, presence or absence of predators and competitors) that promotes occupancy by individuals of a given species (or population) and allows those individuals to survive and reproduce" (Morrison et al., 1992). For the purposes of this Final EIS, the analysis is focused on forested wildlife habitat.

These definitions of wildlife and wildlife habitat recognize the full spectrum of biodiversity and that the full spectrum is vital for ecosystem integrity. Within the context of DNR's legal, regulatory and policy framework, DNR has adopted a number of strategies over the past sixteen years that incorporate the importance of biodiversity to ecosystem integrity. DNR's Old Growth Commission Report (1989) stated that DNR intended to avoid management disruptions from future listings by learning to manage for healthy ecosystems that include older forest features. DNR made specific policy commitments to meet legal requirements that protect endangered and threatened species and their habitats in the *Forest Resource Plan*: "the department will place more emphasis on protecting ecosystem diversity and providing habitat for endangered and threatened wildlife and plants." During that time, there was an emerging awareness that protecting ecosystem integrity was the key to protecting wildlife and thus, to prevent future listings. DNR's HCP provides habitat conditions across landscapes to support viable wildlife populations of a number of species and, at the same time, allow stability and predictability in DNR's land management activities.

Although the Wildlife Habitat policy subject primarily meets the following Policy Objective:

- Balance trust income, environmental protection, and other social benefits from four perspectives: the prudent person doctrine; undivided loyalty to and impartiality among the trust beneficiaries; intergenerational equity; and not foreclosing future options (Policy Objective 2);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

DNR manages 2.1 million acres of forested state trust lands. These lands provide a rich diversity of habitats, from the low elevation temperate rain forests of the Olympic Peninsula, to the dry, open ponderosa pine forests of Eastern Washington.

Like the species that occupy them, wildlife habitats occur within multiple levels of ecosystem organization. Wildlife habitats are described in this subsection in a descending hierarchical order of spatial scale: ecoregions – landscapes – local habitats – microhabitats.

Ecoregions are large areas within which local ecosystems reoccur more or less throughout the region in a predictable pattern (Omernick and Bailey, 1997). A defining feature of these ecoregions is their characteristic dominant vegetation. A description of each of the ecoregions of the state can be found in Appendix B.

Landscapes are defined in various ways, depending on the research or management context. From a wildlife perspective, the landscape can be defined as an area of land containing a mosaic of habitat patches. The size of a landscape varies depending on what constitutes a mosaic of habitat or resource patches meaningful to the particular organism. Fragmentation is one of the key processes affecting the wildlife habitat at this scale (Debinski and Holt, 2000).

Habitat at the stand level (local habitat, patch) is defined by the vegetation species composition, vertical and horizontal structure, spatial heterogeneity, etc. Microhabitats (microsites) are determined by certain microhabitat features, such as plant species, canopy coverage, soil moisture, site temperature, structure of the substrate, etc. In this subsection, three different approaches are used to typify the wildlife habitat on forested state trust lands managed by DNR.

In recent years, DNR has increasingly emphasized forest structure when trying to characterize and assess wildlife habitat effectiveness, i.e., habitat suitability and capability. For the multi-species strategy developed for the HCP, the stand structural conditions from Brown (1985) were modeled using forest age. Analyses for the *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington* used stand development stages to represent structural diversity and habitat values. The forest stand development classification was adapted from three principle sources: Brown, 1985; Carey et al., 1996; and Johnson and O'Neil, 2001. The three broad forest stand classes are Ecosystem Initiation, Competitive Exclusion and Structurally Complex. DNR's analysis for the *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington* indicated that 68 percent of Western Washington forests are in the Competitive Exclusion category and 25 percent can be categorized as Structurally Complex. The Competitive Exclusion category, which dominates DNR's forested lands in Western Washington and contributes to a major forest health issue in Eastern Washington (see discussions in the Forest Health policy subject area and the Catastrophic Loss Prevention policy subject area), is the least productive phase for wildlife and biodiversity in general (Carey et al., 1996) and is more vulnerable to catastrophic disease and fire events than any other forest stand development class.

Very often the habitats are characterized by one or a number of occupying wildlife species. Species-specific strategies are generally applied to endangered or threatened populations and are built to meet species needs, such as reproduction, foraging,

dispersion, etc. Examples of addressing a species-specific habitat are the northern spotted owl conservation strategy in the HCP that directs management of spotted owl habitat at stand and landscape levels on 1.6 million acres of DNR-managed forest land; the interim marbled murrelet HCP strategy addressing the protection of marbled murrelet habitat and occupied sites; and the *Lynx Habitat Management Plan* for Canada lynx, which covers about 126,200 acres of DNR-managed land in Eastern Washington.

Multi-species strategies, such as those embodied in DNR's HCP, address the habitat for a number of ecologically similar species. Examples are the riparian conservation strategy of the HCP for Western Washington that identifies habitat for salmonid species and riparian obligate species, and the uncommon habitats (talus fields, caves, cliffs, oak woodlands, balds, mineral springs and wetlands) that support a broad variety of potentially vulnerable species.

Wildlife habitats can be differentiated by the specific land management objective. Three classes of forested state trust lands have been distinguished in the *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington* according to their management objectives: 1) riparian areas and wetlands; 2) uplands with specific objectives (species-specific habitat areas, unstable slopes, rain-on-snow areas and uncommon habitats); and 3) uplands with general objectives, i.e., habitats not included in the above categories. The proportion of these categories on DNR-managed land in Western Washington is as follows: riparian areas are 31 percent, upland areas with specific conservation objectives are 43 percent and upland areas with general management objectives are 26 percent (*Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*, page 4-53). Generally speaking, management of riparian areas, wetlands, or uplands with specific objectives is much less intense than management in uplands with general management objectives.

Any of the following forest management activities have the potential to impact wildlife habitat on at least one of its spatial scales:

Timber Management Activities:

- Forest harvest;
- Forest regeneration (planting, natural regeneration);
- Forest site preparation; and
- Intermediate stand treatments (vegetation and pest control).

Non-timber Management Activities:

- Road management;
- Recreation activities; and
- Removal of specialized forest products (decorative greens, medical plants, etc.) and valuable materials (gravel, rock and sand).

The impact of the activities depends on the degree of habitat modification and the spatial extent of habitat modification. At the stand-level scale, these activities can lead to direct loss of wildlife habitat, decrease or increase of habitat suitability and change in the abundance and distribution of invasive species. At the landscape scale, potential results include an increase or decrease in the degree of fragmentation, change in habitat connectivity and habitat availability to support the local populations.

DNR has explored forest management strategies that result in an increase in the rate of recovery of ecosystem and landscape functions, while at the same time maximize the economic and social benefits. DNR intends to utilize, where appropriate, the type of active management known as biodiversity pathways (Carey et al., 1996; Carey and Curtis, 1996; and Carey, 1998). The principle tool of biodiversity pathways creates diverse development of the forest stand through variable density thinning, retention of snags and down wood, and the creation of gaps in the forest stand. In 2004, the Board of Natural Resources directed DNR to "implement biodiversity pathways [to] simultaneously increase the production of trust revenue and complex forest habitat with a priority for habitat areas and across the landscape as appropriate." DNR proposes to focus implementation of this approach on riparian and wetland areas and upland areas designated for habitat management (Olympic Experimental State Forest; Nesting, Roosting, Foraging and Dispersal Management Areas) – approximately 74 percent of the total forestland base in Western Washington (*Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*). This tool will concentrate primarily in areas that require development of suitable wildlife habitat or riparian function. For example, many riparian areas currently contain moderate to high levels of forest stands in the early development stages, due to past harvest or other disturbance and are not likely to change in the near future. Utilizing a more active forest management approach (biodiversity pathways) in these areas can change species and stand composition and accelerate the development of more complex stand structures (Carey et al., 1996). Thinnings (depending on site-specific conditions, amount of trees removed and the particular wildlife habitat or riparian function being considered), can reduce the time necessary to increase stand complexity, e.g., produce decadent features, such as large trees and snags that are important to wildlife and other riparian-dependent species.

Some recent information has been published on the effects of harvest rates over several years on northern spotted owl habitat.

In 1997, there were approximately 350,000 acres of suitable spotted owl habitat on westside DNR-managed lands (Biological Opinion–USDI, 1997). This comprised approximately 12 percent of suitable spotted owl habitat in Washington State (Biological Opinion–USDI, 1997). In response to a request by the Forest Practices Board, the WDFW recently completed an analysis of harvest rates between 1996 and 2004 on private, state, and federal lands, as part of a review of the Forest Practices Board's rules regarding northern spotted owl habitat (Pierce et al., 2005). Overall results of the study indicate a decline in habitat in varying degrees depending on location within or outside of owl management circles, spotted owl special emphasis areas, or HCPs.

For a comprehensive discussion on the potential effects associated with forest management activities in riparian areas and wetlands, refer to the Riparian Management Zones and Wetlands policy subject areas in this Final EIS. Impacts of forest management activities to riparian areas and wetlands are also discussed in detail in the *Final EIS on Alternatives for Forest Practices Rules for Aquatic and Riparian Resources*, Forest Practices Board, April, 2001, Chapters 3.4 and 3.5. Discussion on the environmental effects of sustainable forest management in Western Washington is provided in the analyses for the *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington* (Chapter 4). Those analyses cover forest structure and vegetation, riparian areas, wildlife, fish, air quality, geomorphology, soils and sediment, hydrology, water quality and wetlands.

REGULATORY FRAMEWORK

This subsection presents a summary of the statutes, regulations, plans and programs related to this policy subject area. The primary federal law pertaining to listed endangered and threatened species and their habitats on DNR-managed lands is the Endangered Species Act (16 U.S.C. 1531 et seq.). Other federal laws pertaining to wildlife protection in Washington are the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) and the Migratory Birds Treaty Act (16 U.S.C. 701-718h).

The Endangered Species Act was passed in 1973 and is intended to protect and conserve species listed as endangered or threatened and conserve the habitats upon which they depend. Furthermore, the Endangered Species Act mandates that all federal agencies seek to conserve endangered and threatened species and use their resources and authorities to further such purposes. The 1982 and 1988 amendments to the Endangered Species Act require that recovery plans be developed and implemented to promote the conservation of listed species. Recovery plans have been developed for the marbled murrelet, and grizzly bear in Washington and are underway for the Canada Lynx and the northern spotted owl.

A draft recovery plan for the northern spotted owl was published by the USFWS in 1992. That plan was not completed due to the development of the federal *Northwest Forest Plan* in 1994 which became the cornerstone for conserving and recovering the northern spotted owl on 24.4 million acres of federal land in Washington, Oregon and California. A USFWS news release dated January 18, 2006 states, “The Northwest Forest Plan, however, only addresses northern spotted owl conservation on federal land and it does not establish criteria for measuring whether the species has recovered. The new recovery plan will address what is needed to recover the species throughout its range, including federal and non-federal land, and will set specific recovery criteria.” The USFWS published a request for proposals to lead the development of a new recovery plan for the northern spotted owl on January 18, 2006: “The Fish and Wildlife Service intends to complete the recovery plan in time for it to be available to inform the final designation of critical habitat for the northern spotted owl by December 15, 2007.” USFWS, January 2006.

The following federally-listed species are afforded Endangered Species Act protections under DNR’s HCP, which applies to lands within the range of the northern spotted owl including all west side trust lands and those east of the cascade crest within the range of

the northern spotted owl: northern spotted owl, marbled murrelet, Oregon silverspot butterfly, bald eagle, gray wolf and Columbian white-tailed deer. The following fish species were added to the Incidental Take Permits in the westside HCP planning units only: Columbia River Basin population segment of bull trout, Lower Columbia River steelhead, Lower Columbia River Chinook and Puget Sound Chinook, Hood Canal summer-run chum, Columbia River chum and Ozette Lake sockeye (United States Department of Agriculture, 1999; and United States Department of the Interior, 1999). In addition, a "new listings" clause in the HCP implementation agreement allows DNR to add species to their Incidental Take Permit during the term of the agreement.

The following state and/or federally listed species are afforded protections under the Forest Practices Act and state forest practices rules (WAC 222-16-080): bald eagle, gray wolf, grizzly bear, mountain caribou, Oregon silverspot butterfly, peregrine falcon, sandhill crane, northern spotted owl, western pond turtle and marbled murrelet. In addition, bull trout and other species of fish, as well as the species defined under the "aquatic resources" provisions of the Forest Practices Act and state forest practices rules are also protected. The Forest Practices Act and state forest practices rules (WAC 222) apply to both Eastern and Western Washington, and address species that occur outside of the range of the northern spotted owl (where DNR's HCP applies), as well as unlisted wildlife.

There are a number of state or federally-listed vertebrates and invertebrates, as well as numerous non-listed species, present on state trust lands but not specifically covered under either DNR's HCP, the Forest Practices HCP, or current Forest Practices Act and state forest practices rules. However, of these species, those associated with ecosystem elements protected under DNR's HCP and the Forest Practices HCP, riparian ecosystems, and wetlands, including late successional forest as well as riparian and wetland areas, will receive protection. Additional protection of these species is afforded through a combination of federal and state laws and voluntary agreements with other agencies directed towards issues of local concern. These include, but are not limited to, individual forest plans in Eastern Washington for national forests on which these species also occur, Bureau of Land Management policies, and HCPs entered into by private companies (see discussion below).

Implemented in 1994, the *Northwest Forest Plan*, an ecosystem approach to forest management, covers approximately 24 million acres of federal forestland in Western Washington, Western Oregon and Northern California (United States Department of Agriculture Forest Service and United States Department of the Interior Bureau of Land Management, 1994). The United States Forest Service and the Bureau of Land Management jointly manage the *Northwest Forest Plan*. The lands under the plan are divided into seven different areas that encompass approximately 24 million acres. They include Congressional Reserves; Late-Successional Reserves; Adaptive Management Areas; Managed Late-Successional Areas; Administratively Withdrawn Areas; Riparian Reserves; and Matrix Lands.

The *Northwest Forest Plan* also includes an Aquatic Conservation Strategy developed to restore and maintain the ecological health of aquatic ecosystems in the *Northwest Forest Plan* area.

The standards and guidelines in the *Northwest Forest Plan*, which include riparian buffers and other protective measures, are designed to meet the Aquatic Conservation Strategy objectives over time. The Aquatic Conservation Strategy clarification allows projects that may have short-term adverse effects, such as watershed restoration projects, to move forward as long as they comply with all of the protective measures specified in the *Northwest Forest Plan's* standards and guidelines.

The combined effects of the Aquatic Conservation Strategy and allowable uses of the *Northwest Forest Plan* work together to maintain and improve habitats for wildlife species on federal forestland. Over time, the *Northwest Forest Plan* will create millions of acres of late successional forest on federal lands, as younger stands are preserved and silvicultural treatments are limited to helping accelerate the development of older forest stand conditions.

The State Environmental Policy Act (chapter 43.21 RCW) and rules (chapter 197-11 WAC) establish an environmental review standard that overlays all other state environmental policies. The state Forest Practices Act (chapter 76.09 RCW), the Wildlife Code of Washington (Title 77 RCW), the Shoreline Management Act (chapter 90.58 RCW), the Water Resources Act (chapter 90.54 RCW), the Hydraulics Code (chapter 77.55 RCW) and the Growth Management Act (RCW 36.70A.050-.060) are important state statutes that have provisions to protect wildlife and other components of the environment. These statutes are also accompanied by respective implementing regulations that apply standards for assessing environmental impacts and providing mitigative measures directed toward protecting the environment.

The Washington State Department of Fish and Wildlife maintains a list of state endangered, threatened and sensitive species (WAC 232-12-014 and 232-12-011), as well as priority habitats information. In 1990, the Washington State Fish and Wildlife Commission adopted procedures that identify how species are listed, criteria for listing and de-listing, and requirements for management and recovery plans (WAC 232-12-297). These lists are separate from the federal Endangered Species Act lists, because they focus on a species' status exclusive to Washington State. The Washington Department of Fish and Wildlife also manages over 800,000 acres of state owned and managed wildlife areas within their mandate to "preserve, protect, perpetuate and manage" the fish and wildlife species of the state.

The Forest Practices Act and state forest practices rules define critical wildlife habitats associated with state or federally listed species and are identified in WAC 222-16-080. Specific forest practices conducted on or near critical habitat of state-designated threatened and endangered species are considered Class IV-Special activities under WAC 222-16-050(1) and must comply with SEPA, as well as other species-specific protection measures listed in WAC 222-16-080. The Forest Practices Act and state forest practices rules establish minimum standards for forest practices, e.g., timber harvest, road construction, application of chemicals, etc., on all state and private forestlands in

Washington. In addition, spotted owl and marbled murrelet habitats are defined in WAC 222-16-085-087. Measures to protect "aquatic resources" are addressed in each of the sections that deal with timber harvest (chapter 222-30 WAC), road construction (chapter 222-24 WAC), reforestation (chapter 222-34 WAC) and forest chemicals (chapter 222-38 WAC). The primary protection requirements are riparian and wetland buffers and protections of unstable slopes and landforms. "Aquatic resources" are defined in WAC 222-16-010 as "…water quality, fish, the Columbia torrent salamander, the Cascade torrent salamander, the Olympic torrent salamander, the Dunn's salamander, the Van Dyke's salamander, the tailed frog and their respective habitats." DNR is also required to consult with the Washington State Department of Fish and Wildlife regarding the protection of listed species' habitats when reviewing forest practices applications.

DNR's Natural Area Preserves and Natural Resources Conservation Areas include lands managed by the state to conserve important native ecosystems, rare plant and animal species and unique natural features.

Natural Area Preserves protect examples of many ecological communities, including rare plant and animal habitat. In Eastern Washington, habitats protected on preserves include arid land shrub-steppe, grasslands, vernal ponds, oak woodlands, subalpine meadows and forest, ponderosa pine forests and rare plant habitats. Western Washington preserves include five large coastal preserves supporting high quality wetlands, salt marshes and forested buffers. Other habitats include mounded prairies, sphagnum bogs, natural forest remnants and grassland.

Twenty-five Natural Resources Conservation Areas, totaling more than 80,500 acres in Washington, protect examples of native ecosystems, habitat for endangered, threatened and sensitive plants and animals, and scenic landscapes. Habitats protected in Natural Resources Conservation Areas include coastal and high elevation forests, alpine lakes, wetlands, scenic vistas, nesting birds of prey, rocky headlands and unique plant communities. Critical habitat is provided for many plant and animal species, including rare species.

As previously stated, DNR's Natural Area Preserves and Natural Resources Conservation Areas serve to conserve important native ecosystems, rare plant and animal species and unique natural features. These state conservation areas contribute toward meeting DNR's conservation objectives, including those related to wildlife, as discussed in the Special Ecological Features policy subject area in this Final EIS.

Other conserved and protected state lands in Washington include lands managed by the Washington State Parks and Recreation Commission. The Washington State Parks and Recreation Commission enhances and protects a diverse system of recreational, cultural, historical and natural sites located in 120 state parks, encompassing over 250,000 acres.

The largest habitat conservation plan in Washington (and one of the largest in the nation) is DNR's HCP. The term of the agreement is 70 years from the effective date in January 1997, with the provision for renewal three times, for a period of up to ten years per renewal. The multi-species HCP covers approximately 1.6 million acres of forested state trust land within the range of the northern spotted owl. This includes a multi-species

strategy for all of the western part of the state, as well as lands on the east slopes of the Cascade Range for northern spotted owls only, covering approximately 7 percent of all forestlands in Washington State. The HCP is designed to complement the recovery activities outlined in the federal *Northwest Forest Plan*.

In Western Washington, the HCP minimizes and mitigates for the incidental take of all federally-listed species within the range of the northern spotted owl. In addition to the federally-listed species, DNR acquired unlisted species agreements for 43 species of concern through provision of a multi-species conservation strategy for Western Washington. This strategy is built upon a combination of the owl and murrelet strategies, a riparian management strategy, protection standards for eight types of uncommon habitats and mitigation measures for several of the listed and unlisted species. The HCP also includes measures that address wetlands, unstable slopes, roads and rain-on-snow hydrology and provides DNR with incidental take permit coverage for species that may be listed in the future. These protection measures are directed toward minimizing cumulative impacts on terrestrial and aquatic wildlife and their habitats and to help prevent the need for future listings of additional species.

Conservation strategies that are described in the HCP for the northern spotted owl, marbled murrelet and salmonids also protect habitat for many unlisted species, particularly those associated with late successional forests or riparian ecosystems and wetlands. For species that rely on uncommon habitats or habitat elements, additional measures were incorporated into the conservation objectives of the HCP for Western Washington only. Specifically, measures that address talus, caves, cliffs, oak woodlands, large snags and large, structurally unique trees. The HCP minimizes and mitigates for the incidental take of all federally-listed species in Western Washington and for the northern spotted owl on the east slopes of the Cascades.

The *Lynx Habitat Management Plan* covers approximately 126,200 acres of DNR-managed land in northeastern Washington. Seventy-five percent of this land is in the Okanogan Lynx Management Zone located within the Loomis State Forest. Most of the remainder falls within the Little Pend Oreille State Forest adjacent to the Little Pend Oreille National Wildlife Refuge. The plan was developed pursuant to WAC 222-16-080(2), which provides landowners the opportunity to develop a special wildlife management plan in lieu of the state Forest Practices Board developing rules to protect lynx habitat under the critical wildlife habitat designation. The plan outlines DNR's commitment to incorporate lynx habitat associations into its timber management plans, within DNR's legal mandate to provide revenue for each trust beneficiary. DNR has recently modified the *Lynx Habitat Management Plan* to incorporate protection strategies listed in a no-take letter with the Federal Services. DNR is currently updating the *Lynx Habitat Management Plan* to meet the new federal requirements after the Canada lynx was listed as a federally threatened species in 2000. The new plan is expected to be completed and effective in 2006.

Several private timber companies and local government entities have completed habitat conservation plans. Most of the habitat conservation plans prepared in Washington address issues concerning multiple listed terrestrial and/or aquatic wildlife species. Through cooperation with the United States Fish and Wildlife Service and the National

Oceanographic Atmospheric Administration-Fisheries Service, the plans allow for management of lands for various uses, while ensuring the conservation and protection of threatened and endangered species. Forest landowner habitat conservation plans represent efforts on approximately 450,000 acres of land to maintain compliance with the Endangered Species Act, while continuing land management activities.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 commits DNR to provide wildlife habitat conditions that have the capacity to sustain native wildlife populations or communities. Where insufficient forested state trust lands exist, Alternative 1 anticipated the development of agreements with adjoining landowners to meet this commitment. The HCP and the use of voluntary agreements, both within and outside HCP planning units, have set wildlife objectives to help meet this commitment. Under Alternative 1, no changes to *Forest Resource Plan* Policy Nos. 22 or No. 23 would occur. Alternative 1 does not meet Policy Objective 2 as well as Alternative 3.

POLICY STATEMENTS

***Forest Resource Plan* Policy No. 22, Wildlife Habitat: "The department will provide wildlife habitat conditions which have the capacity to sustain native wildlife populations or communities. The department will develop wildlife habitat objectives based upon habitat availability and function, species status and species vulnerability and trust obligations. Where there are apparent conflicts between meeting the wildlife habitat and trust management objectives, the department will seek balanced solutions and policies."**

***Forest Resource Plan* Policy No. 23, Endangered Species: "The department will meet the requirements of federal and state laws and other legal requirements that protect endangered, threatened and sensitive species and their habitats. In addition, the department will voluntarily participate in efforts to recover and restore endangered and threatened species to the extent that such participation is consistent with trust obligations."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 recognizes that DNR will, in addition to meeting state and federal requirements for wildlife habitat conservation and compliance with the HCP, continue to voluntarily participate in efforts to recover and restore endangered and threatened species to the extent such participation is consistent with trust objectives. Alternative 2 goes beyond Alternative 1 by also directing DNR to participate with other agencies and

organizations on issues related to non-listed species and habitats, when consistent with trust objectives. Under Alternative 2, Policy No. 22 would be modified and Policy No. 23 would continue. Alternative 2 does not meet Policy Objective 2 as well as Alternative 3.

POLICY STATEMENTS

The department will meet the requirements of federal and state laws and other legal requirements that protect endangered, threatened and sensitive species and their habitats. In addition, the department will voluntarily participate in efforts to recover and restore endangered and threatened species to the extent that such participation is consistent with trust obligations.

The department will voluntarily participate with federal and state agencies and other organizations or governments on initiatives related to non-listed species and habitats, when consistent with trust objectives.

When compatible with trust objectives, the department will provide wildlife habitat conditions that contribute to sustaining native wildlife populations or communities.

■ ALTERNATIVE 3

Alternative 3 states that management of forested state trust lands will meet the requirements of federal and state laws, including compliance with the HCP. DNR will also voluntarily participate with other organizations or governments in efforts to recover and restore listed threatened and endangered species and on initiatives related to non-listed species and habitats, when consistent with trust objectives. Alternative 3 emphasizes management on a landscape scale with a broader focus on ecosystem sustainability and the conservation of biodiversity, while continuing efforts focused on the protection of individual species as needed. DNR's voluntary conservation efforts will involve the conservation of biodiversity, which is recognized as the fundamental guiding principle for ecologically sustainable forest management (Carey, 2003). Under Alternative 3, Policy No. 22 would be eliminated and Policy No. 23 would be modified. Alternative 3 meets policy objective 5 by applying a biodiversity approach to promote wildlife diversity on forested state trust lands. It also emphasizes policy objectives 6 and 7 by emphasizing biodiversity on a landscape scale.

POLICY STATEMENTS

The department will meet the requirements of federal and state laws and contractual requirements that protect endangered, threatened and sensitive species and their habitats.

The department will voluntarily participate with federal and state agencies and other organizations or governments, in efforts to recover and restore state and federal listed threatened and endangered species and on initiatives related to non-listed species and habitats, when consistent with trust objectives.

The department's voluntary conservation efforts will focus on the conservation of biodiversity, which is recognized as the fundamental guiding principle for ecologically sustainable forest management.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative is the same as Alternative 3, with some minor edits to ensure the policy is clear and succinct (Policy Objective 3). The Board's Preferred Alternative best meets both policy objective 2 and policy objective 3. A subtle difference in the language of the Board's Preferred Alternative emphasizes and strengthens the commitment to recover and restore habitats of state and federal listed threatened and endangered species. The Preferred Alternative recognizes that to do so is consistent with achieving trust objectives. Although the ability of DNR to voluntarily participate in efforts to recover and restore habitat of threatened and endangered species is equally provided for in all the alternatives, the Board's Preferred Alternative states this with additional clarity.

POLICY STATEMENTS

The department's conservation efforts will focus on biodiversity, which is recognized as the fundamental guiding principle for sustainable forest management.

The department will meet the requirements of federal and state laws and contractual requirements that protect endangered, threatened and sensitive species and their habitats.

When consistent with trust objectives, the department intends to voluntarily participate with federal and state agencies and other organizations or governments, in additional efforts to protect state and federal listed threatened and endangered species, and recover and restore their habitat, and participate in initiatives related to non-listed species and habitats.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

A comment was made that "if DNR believes that managing for biodiversity is the underpinning for sustainable forestry, what justification does it have for not employing these techniques on some portion of trust lands?" Biodiversity may be applied at both the landscape and stand levels and at various intensities. DNR will deliberately manage for various levels of biodiversity on all of our harvestable lands. To that end, DNR utilizes "cohort management" where multi-rotational, or legacy cohorts co-exist with one or more rotational, commercial cohorts within the same forest management unit. While legacy cohorts are managed to achieve environmental forest management unit (FMU) objectives (such as wildlife and mycorrihizal habitats), one or more commercial cohorts within the same FMU are managed to achieve the economic FMU objective.

DNR's objective of a "biodiversity pathways" approach to silviculture is for simultaneous increases in both habitat and income (Board of Natural Resources Resolution No. 1134) through the creation of more structural diversity across the landscape. The use of biodiversity pathways to accomplish habitat objectives will be done in a manner that fulfills trust objectives, e.g. under HCP obligations that require certain types of habitat, in exchange for benefits to the trusts.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

This analysis is introduced by a discussion describing the three general evaluation criteria that were chosen to evaluate how the proposed alternatives would impact various wildlife species and their habitats. It is assumed that all the alternatives are equal in terms of voluntary measures to avoid or minimize adverse impacts to threatened and endangered species. The analysis follows this evaluation criteria discussion. The criteria are:

The degree of protection afforded to both listed (state and federal) and non-listed species and their habitat.

The Forest Practices Act and state forest practices rules require SEPA review for a variety of wildlife species and habitats, particularly for species that are state or federally listed as threatened or endangered, on state and private forestlands in Washington not currently covered under a habitat conservation plan. The SEPA process, in combination with the mitigation requirement of WAC 222-10-010(4) addresses the protection of species.

Similarly, DNR's HCP outlines a multi-species conservation strategy that includes protection of riparian resources, uncommon habitat types and conservation measures for several listed and unlisted species in Western Washington and a northern spotted owl conservation strategy only in Eastern Washington. However, the HCP pertains to trust lands within the range of the northern spotted owl, which are limited to Western Washington and the eastern slope of the Cascade Mountains.

The criteria selected to evaluate the effects of the proposed alternatives on wildlife species and their habitats on forested state trust lands in Washington are based on potential gaps in protection provided under this current regulatory environment. These criteria are intended to address the hierarchical nature of wildlife habitat requirements.

A number of wildlife species are covered by both sets of regulations, which primarily include state and federally listed species. Specific prescriptions in the state's Forest Practices Rules (WAC 222-16-080) and HCP for species, such as the bald eagle, marbled murrelet, northern spotted owl, peregrine falcon, sandhill crane, mountain caribou, gray wolf, Columbian white-tailed deer and Oregon silverspot butterfly would not change under any of the proposed alternatives. However, a number of additional species are indirectly protected under the HCP (primarily Western Washington) through the protection of uncommon habitats and the northern spotted owl, marbled murrelet and riparian conservation strategies. These species include the harlequin duck, northern goshawk, pileated woodpecker, common loon, Vaux's swift, Myotis bats, California wolverine, several amphibians and fisher.

There are a number of species, including some listed above, with special status or high profile that occur on trust lands in Eastern Washington that are not specifically protected under federal statute, a habitat conservation plan or the state forest practices rules. These include the western toad, Dunn's salamander, Rocky mountain tailed frog (extreme Southeast Washington), Northern red-legged frog, Northern leopard frog, Cascades frog, Oregon spotted frog, Columbia spotted frog, sharptail snake, wood duck, great blue heron, northern goshawk, willow flycatcher, mardon skipper, beaver, river otter, mink, muskrat and western gray squirrel. Species in this category, many of which are associated with riparian ecosystems and wetlands, may be protected to some degree by forest practices rules that were designed to protect those ecosystem elements, e.g., riparian management zone buffer requirements.

Therefore, the first criterion used to evaluate the effects of the alternatives on wildlife is the degree of protection afforded to both listed and non-listed species.

The degree of protection of unique habitat types, such as talus slopes, caves, cliffs, oak woodlands, structurally unique trees, snags, live trees and mineral springs.

Unique habitat types defined under DNR's HCP include talus slopes, caves, cliffs, oak woodlands, structurally unique trees, snags and live trees and mineral springs. These features provide nesting, denning, foraging, perching and security habitat for numerous amphibians, birds and mammals. Under the HCP, protection would be provided for these habitat types on all westside HCP planning units, but would not be applied to any eastside planning units. There is no specific guidance for protection of these unique habitat types provided under the forest practices rules.

Consequently, the second criterion used to evaluate the effects of the alternatives is the degree of protection afforded to unique habitat types. This criterion addresses stand level habitat requirements.

Additional protection of unique habitat types is provided through the establishment of Natural Area Preserves and Natural Resources Conservation Areas that are discussed under the Special Ecological Features policy subject area.

The ability to provide a full range of stand structural development stages across the landscape.

This criterion relates to the ability of DNR to proactively manage trust lands to potentially benefit a greater diversity of wildlife across the landscape. Natural and managed forests in the Pacific Northwest possess marked differences in structural characteristics, composition and function (Carey, 2003). Natural forests are spatially heterogeneous and diverse in composition. They are characterized by a mosaic of distinct forest patches of varying structural stages that provide a complex array of structural elements, e.g., snags, large live trees, coarse woody debris, soil organic matter, and vegetation communities that support a rich array of wildlife species. In contrast, managed forest, especially under short rotation schedules, where regenerating stands are typically characterized by a single tree species of one age class, lack structural and compositional heterogeneity. These biologically simplified forests often do not possess the same

structural elements or the varied vegetation communities found in natural forests and, therefore, are not capable of supporting the same diversity or abundance of wildlife.

Recent advances in forest management involve the use of biodiversity pathways to manage forests to provide economic commodities, while conserving wildlife and their associated habitats. Consequently, a foreseeable gap in protection relates to the ability of current regulations to provide a landscape level mosaic of varying structural stages on DNR-managed trust lands that are capable of providing the habitat needs of both listed and non-listed species. Accordingly, the third criterion used to evaluate the effects of the alternatives on wildlife is the provision of a full range of stand structural stages. This criterion addresses the landscape and ecoregional context in which wildlife habitats occur. Riparian and wetland habitats and associated microhabitat characteristics are important to many of the species not specifically covered under the HCP or the Forest Practices Act and state forest practices rules. DNR and the Federal Services have developed an *Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy For Westside Planning Units excluding the Olympic Experimental State Forest* (April 2006) to support the riparian conservation strategy outlined in the HCP for Western Washington. The degree of protection afforded to these features was not considered as a criterion for evaluating the effects of the alternatives, because the level of protection provided by this aspect of the HCP will remain constant under all alternatives.

The following analysis is based on these criteria and a comparison of the alternatives is broken down by three criteria: degree of species protection, protection of unique and uncommon habitats, and landscape diversity. The alternatives vary in their degree of risk to species and habitat.

Degree of Species Protection

All alternatives will continue to meet the requirements of state and federal law, as well as the ability to enter into and meet the requirements of other voluntary agreements, e.g., the *Lynx Habitat Management Plan* and HCP that protect endangered, threatened and sensitive species and their habitats. However they differ in terms of the range of species afforded protection.

Under Alternative 1, there is an increased risk of adverse impacts to species not already at risk. Alternative 1 limits protection to species with special status or vulnerability, focusing DNR's conservation efforts on species, habitats and locations where they are needed most. Under Alternative 1, *Forest Resource Plan* Policy No. 22 directs DNR to “develop habitat objectives based on habitat availability and function, species status and species vulnerability and trust obligations.” Similarly, *Forest Resource Plan* Policy No. 23 focuses volunteer efforts on “endangered and threatened species to the extent that such participation is consistent with trust obligations.” As such, the approach taken under Alternative 1 is reactionary in the sense that it directs protective measures toward species that are already at risk.

Under Alternative 2, the potential for adverse impacts to species not currently identified as at risk is lower than that of Alternative 1. Alternative 2 contains the additional requirement for DNR to participate with other agencies and organizations to recover and

restore endangered and threatened species. However, the focus of these efforts is extended to include non-listed species and habitats. The approach taken by Alternative 2 is proactive in that it addresses species and habitats that are not currently given status, but could be at risk if they experience further habitat loss, e.g., amphibians. Consequently, Alternative 2 is more protective of a greater number of species than Alternative 1. Under Alternative 2, specific habitat targets for individual species or species assemblages may benefit small, less mobile native species, with small home ranges outside of spotted owl, marbled murrelet and riparian management areas because of the greater emphasis of a single species approach independent of a broader scale approach discussed below which is representative of Alternative 3 and the Board's Preferred Alternative.

Under Alternative 3 and the Board's Preferred Alternative, the potential for adverse impacts to species not currently identified as at risk is lower than that of Alternatives 1 and 2. In Alternative 3, as under Alternative 2, DNR would "voluntarily participate with state and federal agencies and other organizations and governments in efforts to recover and restore state and federal listed threatened and endangered species and on initiatives related to non-listed species and habitats when consistent with trust objectives." However, voluntary efforts under Alternative 3 and the Board's Preferred Alternative would involve a broad scale approach focusing on ecosystem sustainability and the conservation of biodiversity, rather than strictly a single-species approach under Alternatives 1 and 2. Whereas Alternatives 1 and 2 are limited in the protection they provide by the existing amount of available wildlife habitat, the use of sustainable forest management practices, e.g., variable density thinning and application of biodiversity pathways in designated habitat areas in Western Washington, under Alternative 3 and the Board's Preferred Alternative would increase the amount of structurally complex forest across the landscape, creating additional habitat. Therefore, it is foreseeable that by promoting habitat diversity across the landscape, Alternative 3 and the Board's Preferred Alternative would provide protection to the greatest number of wildlife species and are also expected to result in the greatest amount of additional suitable spotted owl habitat in strategic locations that provide the most benefit to the species, i.e. spotted owl conservation areas, the Olympic Experimental State Forest, and owl areas as described in the March 2006 Settlement Agreement. However, Alternative 3 and the Board's Preferred Alternative may not provide the amount and suitability of wildlife habitat associated with small, less mobile native species or species assemblages because it may lack the degree of attention given to localized issues, i.e., providing habitat conditions that contribute to sustaining native wildlife populations or communities.

Under all alternatives, it is important to note that the Riparian Management Zones policy subject area provides additional protection to riparian obligate wildlife species, particularly for species associated with perennial and seasonal non-fish bearing streams in Eastern Washington.

Protection of Unique and Uncommon Habitats

The risk of adverse impacts to species that rely on unique or uncommon habitat features is lower under Alternatives 2, 3 and the Board's Preferred Alternative than Alternative 1, because of DNR's intention to participate in voluntary initiatives to protect non-listed species, under Alternatives 2, 3 and the Board's Preferred Alternative, and the added

emphasis on landscaped-based ecosystem management approach, (e.g., biodiversity pathways) under Alternative 3 and the Board's Preferred Alternative.

The gap in protection of uncommon and unique habitats, such as talus slopes, caves, cliffs, oak woodlands, structurally unique trees, snags and mineral springs is assumed to remain consistent under all alternatives. The aforementioned habitats are specifically protected only in Western Washington under DNR's HCP. Timber harvest activities may impact these unique habitats under existing forest practices rules in Eastern Washington. All alternatives require DNR to protect listed species and their habitat. However, under Alternatives 2, 3 and the Board's Preferred Alternative, DNR would also voluntarily participate with state and federal agencies and other organizations or governments on initiatives related to non-listed species and their habitats when consistent with trust objectives.

Additional protection common to all alternatives is provided through the establishment of Natural Area Preserves and Natural Resources Conservation Areas, which are described in the Special Ecological Features policy subject area.

Landscape Diversity

The risk of adverse impacts to species and habitats related to landscape diversity is increased under Alternatives 1 and 2. Alternatives 1 and 2 respond to the need to protect microhabitat and stand level resources, but do not address the functionality of wildlife habitats on a landscape or ecoregional scale. However, additional mitigation would be provided under all of the alternatives through the Board's Preferred Alternative for the Special Ecological Features policy subject area.

Alternatives 1 and 2 both focus primarily on habitat management for individual species or groups of species. These alternatives take a passive approach to habitat management by implementing appropriate mitigation measures in response to specific timber harvest activities, but offer no improvement to forest structure over the long-term. For example, under passive management, riparian buffers are maintained as required by Board of Natural Resources policy and DNR's HCP. This approach provides some protection to existing riparian habitats, but does nothing to improve riparian areas that were clearcut prior to current policies and are now reaching the competitive exclusion stage (mid-seral), providing little value to wildlife. Based on modeling results incorporated by reference from DNR's *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington* (Appendix D – Table D-14, also see Sections 4.2 – Forest Structure and Vegetation, 4.3 – Riparian Areas, and 4.4 – Wildlife), passive management approaches are not likely to offer substantial improvements in the structural complexity of forests over the life of the existing HCP (through 2067).

The risk of adverse impacts to species and habitats related to landscape diversity is decreased under Alternative 3 and the Board's Preferred Alternative in both Eastern and Western Washington. In contrast to both Alternatives 1 and 2, the approach proposed under Alternative 3 and the Board's Preferred Alternative shifts from a species-by-species approach to focus on an ecologically sustainable forest management, utilizing tools such as biodiversity pathways, although species-by-species approaches will still be

appropriate in some circumstances and will continue to be utilized, especially where species based requirements of state and federal laws must be met. In contrast to the management approach described above under Alternatives 1 and 2, biodiversity pathways management would involve thinning riparian stands that were previously harvested to improve their function and thus, their value as wildlife habitat. The intent is to allow DNR to take full advantage of the ecosystem management direction it has set under the 2004 Sustainable Harvest Calculation and allow proactive changes to occur as the monitoring, research and adaptive management protocols set by the HCP, *Forests and Fish Report* and the Board's Preferred Alternative for Implementation, Reporting and Modification of the Policy for Sustainable Forests provide credible evidence of the potential effectiveness of such changes. Based on the modeling results associated with the adopted sustainable harvest alternative for Western Washington, Alternative 3 and the Board's Preferred Alternative have the greatest potential to increase the amount of structurally complex forest, create a greater diversity of stand structural stages across the landscape and provide the most fully functional forest over the long-term (*Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*). This will increase the amount of habitat suitable for northern spotted owls and other species that are dependent upon structurally complex and fully functional forests while maintaining diversity across the landscape.

In Eastern Washington, it is anticipated that biodiversity approaches that are ecologically appropriate for Eastern Washington ecoregions, will be modeled during the Eastern Washington sustainable harvest calculation, to determine the best way to achieve the intent of the Board's Preferred Alternative for wildlife habitat.

CUMULATIVE IMPACTS

The following discussion analyzes the potential cumulative impacts of the alternatives within the larger context of past, present and reasonably foreseeable actions on wildlife resources.

In general, protection of wildlife habitat is greater on federal forested lands than that afforded on forested state trust lands and private lands due to the predominantly passive management approach taken on federal lands and considering that the current forest structures represented on those lands are largely in the late successional stage of development. Of the approximately 12.7 million acres of federal land in Washington (34 percent of Western Washington; 27 percent of Eastern Washington), approximately 30 percent are designated as a highly protected management status (e.g., wilderness, national parks, and national wildlife refuges). These designations comprise approximately 50 percent and 25 percent of federal lands in Western and Eastern Washington, respectively. Of the remaining federal land statewide, a majority is national forest given protected status under the *Northwest Forest Plan*. This includes Congressional Reserves (4.2 million acres), Managed and Late-Successional Reserves (1.5 million acres), Administratively Withdrawn Areas (250,100 acres), and Riparian Reserves (232,300 acres) that are not available for commercial timber harvest (DNR, 2004). These protected areas are less fragmented and more structurally diverse than forested state trust lands and private lands that are actively managed for timber production and will support greater amounts of late seral forests over the long-term. Cumulatively, watersheds with large

amounts of federally protected forests (e.g., containing smaller amounts of state trust lands and private lands that are actively managed) are less likely to experience cumulative impacts to wildlife as a result of forest management activities that occur on state trust lands.

Mitigation measures described under the Affected Environment and Regulatory Framework, as a result of DNR's HCP, State Forest Practices Rules, DNR's *Lynx Habitat Management Plan*, the Klickitat HCP amendment, and DNR Natural Area Preserves and Natural Resource Conservation Areas, which include management strategies and mitigation measures such as riparian management zones, leave tree requirements, potential slope instability requirements, protection of uncommon habitats and northern spotted owl and marbled murrelet habitat in key areas would apply consistently under all alternatives. These protection measures are directed toward minimizing cumulative impacts on terrestrial and aquatic wildlife and their habitats and would maintain the same level of protection under all alternatives.

The alternatives differ in terms of their potential to impact landscape level trends in wildlife habitat over the short and long-term. Alternatives 1 and 2 both focus primarily on habitat management for individual species or groups of species. These alternatives take a passive approach to habitat management by implementing appropriate mitigation measures in response to specific timber harvest activities. This regime is consistent with much of the federal management of forestlands in Washington State, which involves little use of silvicultural treatment to improve forest structure. However, as opposed to the majority of forested state trust lands in Western Washington which are in a competitive exclusion stage of stand development, the federal forest lands are largely occupied by late successional forests which are not expected to respond as well to habitat enhancing silvicultural treatments. Similarly, most large private industrial forest land ownership is focused on timber production or value extraction and can lead to fragmentation sometimes conditioned by a habitat conservation plan with the Federal Services, and non-industrial land ownership consists of a mixture of passive and commercial timber harvest and forest conversion activities (*Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*).

However, through the application of a biodiversity approach to forest management, Alternative 3 and the Board's Preferred Alternative will actually increase habitat diversity on a landscape scale in strategic locations that provide the most benefit to the species, i.e. spotted owl conservation areas, the Olympic Experimental State Forest, and owl areas as described in the March 2006 Settlement Agreement. This will provide greater demographic support for old-growth associated species in areas adjacent to large, less fragmented tracts of federal lands. The potential for adverse cumulative impacts from activities on forested state trust lands is minimized under Alternative 3 and the Board's Preferred Alternative, compared to the other alternatives. The probability for adverse cumulative impacts associated with having less-than-fully functioning forest stands, e.g., previously harvested stands in the competitive exclusion stage, is higher under Alternatives 1 and 2. Alternatives 3 and the Board's Preferred Alternative would allow DNR to move from a species-by-species management approach, to a more proactive ecologically-based landscape approach, focusing on ecosystem sustainability and the

conservation of biodiversity, rather than the single-species approach employed under Alternatives 1 and 2. This is especially true in Eastern Washington with the Board's Preferred Alternative for Forest Health, which is based on treating overstocked stands to move them to more historic healthy, sustainable forest condition. This approach is expected to provide the most benefit to the most species, both listed and unlisted, over time than Alternatives 1 and 2.

Under all alternatives, other management actions would continue to occur on and adjacent to DNR-managed trust lands that could add to cumulative impacts on wildlife and wildlife habitats. Through direct removal of habitat and disturbance, activities such as road building, logging, recreation, urban development and the removal of other natural resources, e.g., mineral products, will continue to contribute to habitat degradation, habitat loss and displacement of individuals. These impacts reach multiple spatial scales ranging from altering microhabitat characteristics, e.g., increasing stream temperature through the removal of shade-providing riparian vegetation, to contributing to habitat fragmentation at the landscape and ecoregional scales. However, measures to reduce impacts, including cumulative impacts are addressed through many of the aforementioned regulations, plans, policies and programs and would not likely differ under any of the alternatives. In addition many of these actions would be subject to review under SEPA at the time they are proposed.

Comments on the Draft EIS suggested that DNR address climate change in this Final EIS. Over time, global climate change can impact the success of current natural resource policies and direct the development of new ones. Climate is the most important factor in the geographic distribution of species and major vegetative types (Malcolm and Pitalko, 2000). Climate change due to increased greenhouse gas concentrations in the atmosphere is expected to result in a significant and rapid increase in global temperatures that will cause major changes in the distribution and composition of ecosystems over the next century. Climate change is expected to drive the migration of trees, with species expected to shift to higher latitudes, alter forest composition and productivity, and change disturbance regimes, ultimately affecting the market for forest products (Shugart et al., 2003). Major shifts in vegetation types are paralleled by changes in the distribution of associated wildlife species. Although historically, species have shifted their distributions in relation to climate changes, the rate of warming predicted from human-induced causes over the next century may be as great as 10 times faster, with some species being unable to maintain pace with rapidly changing climactic zones (Malcolm and Pitelko, 2000). Despite the implications of global climate change on wildlife species, habitats, and thus forest policy, the changes described above are expected to occur over the course of a century or more. Consequently, changes to wildlife habitats and associated conservation efforts due to global climate change are not reasonably foreseeable enough to allow for meaningful analysis of the relationship of changes in climate to these policy alternatives.

Other policies within the *Policy for Sustainable Forests* proposed policies that may directly or indirectly conserve and protect listed/non-listed species and their habitat are also being analyzed in this Final EIS. They include: Forest Health; Catastrophic Loss Prevention; Special Ecological Features; Old-Growth Stands in Western Washington;

Genetic Resource; Watershed Systems; Riparian Conservation; and General Silvicultural Strategy.

3.2.7 Watershed Systems

INTRODUCTION

DNR manages forested watersheds, which are an important resource for the state of Washington. Forested watersheds are drainage basins that contribute water, organic matter, dissolved nutrients and sediments to streams, rivers, lakes or the ocean. These watersheds vary in size from small (less than 1,000 acres) stream subbasins, to Water Resource Inventory Areas that are of hundreds of thousands of acres in size. HCP planning units contain multiple Water Resource Inventory Areas.

Forested watersheds are water sources for municipal water supplies, irrigation, stream and subsurface flows throughout the state. They also provide quality habitat for aquatic organisms, as well as recreational opportunities. The condition of the forest in these watersheds has a significant influence on the quality and quantity of the resource. The nature of the forest cover can also influence the timing and magnitude of peak water flows. Therefore, how the forest is managed is important to controlling and mitigating probable significant adverse direct, indirect and cumulative impacts related to water quality and quantity.

Although the Watershed Systems policy subject primarily meets the following Policy Objectives:

- Ensure policies are succinct, relevant and easily understood by the public and department employees (Policy Objective 3);
- Use professional judgment, best available science and sound field forestry to achieve excellence in public stewardship (Policy Objective 5); and
- Pursue outcome-based management within a flexible framework (Policy Objective 6);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

The primary elements of the environment affected by the Watershed Systems policy subject area are water quantity and water quality. The following discussions of these two primary elements incorporate other elements of the natural and built environment: surface water, runoff, absorption, ground water, aquatic habitat, floods, public water supplies, recreation, environmental health, earth, soils, topography, erosion and landslides.

The quantity of both surface and groundwater produced by forested watersheds is controlled, for the most part, by the local climate. Climate varies considerably over the state of Washington. Annual precipitation ranges from about 80 inches to 200 inches in the Northwest Coast ecoregion. In the Puget Trough ecoregion, annual precipitation

ranges from below 30 inches to about 65 inches. As elevations increase in the North Cascades and West Cascades ecoregions, annual precipitation increases to a little more than 100 inches. The climate changes dramatically east of the Cascade Mountains. Some high elevation sites in the Canadian Rocky Mountains and Blue Mountains ecoregions receive as much as 70 inches per year. However, most of the forested watersheds managed by DNR in these ecoregions and in the East Cascades and Okanogan ecoregions receive between 15 inches and 40 inches annually (see Appendix B).

The proportion of precipitation that becomes surface water or groundwater is strongly influenced by the forest. Forest vegetation intercepts and stores some of the incoming precipitation. Most of this water is lost to the atmosphere. Because undisturbed forest soils are covered by an organic layer and have high rates of absorption, or what is called infiltration, most of the precipitation or snowmelt that reaches the forest floor is either held in storage near the surface or infiltrated into the soil. When the quantity of water infiltrating into the soil exceeds the soil's capacity to hold water against gravity, free water is available to percolate down to groundwater aquifers or move laterally to a stream, lake or pond. The roots of forest plants extract water held in the soil for transpiration processes. Extracted water is either stored in the plants or lost to the atmosphere. Therefore, the quantity of free water is a function of the balance between the amount of infiltration, soil water-holding capacity and the rate of transpiration by forest plants.

The forest also influences stream discharges over time. At the lower elevations, below approximately 1,500 feet of the Pacific Coast, Puget Trough, North Cascades and West Cascades ecoregions, the forest influences on the quantity of free water have the greatest effect on stream flows or discharges. This is because rain is the dominant form of precipitation. Snow occurs more frequently, but temporarily at the mid elevations, between approximately 1,500 and 2,500 feet. Warm air masses associated with winter storms can rapidly melt the snow at these elevations. The forest canopy influences snow accumulation and the rate of melt. Interception by the canopy reduces the amount of snow that accumulates on the ground. The forest vegetation also slows down the movement of the warm air across the snow surface and moderates the rate of melt. For the high elevation areas on the Olympic Peninsula, the North Cascades and West Cascades ecoregions and all the ecoregions on the eastside of the Cascades, the forest influences on snow accumulation and melt are dominant in affecting the magnitude and timing of stream discharges. In addition to modifying air movement, the canopy shading the snow pack from solar radiation is also important in slowing the melt rate.

Forested watersheds are generally a source of high quality water. The fact that most undisturbed forest soils are quite porous and most of the water is filtered by the soil column before reaching a surface water body minimizes sedimentation from surface erosion. The principal means of transporting sediment to water bodies is landslides. While landslides occur in the undisturbed forest, the forest vegetation can have a stabilizing influence that minimizes the frequency of these events. The high adsorption capability of forest soils, combined with the nutrient uptake by vegetation, minimizes the leaching of dissolved solids and their delivery to surface and groundwater. The forest canopy also provides shade to surface water bodies to moderate solar heating.

Forest management can change the quantity of water produced and the timing of delivery to water bodies and aquifers. Timber harvest almost always increases water production, except in areas where fog drip caused by condensation on the forest canopy is a significant contribution. In these areas, timber harvest may not substantially increase water production. Water increases are the result of decreasing interception losses and decreasing transpiration. Timber harvest can also change the timing of delivery to surface waters in snow-dominated areas by advancing the start of the melt season and increasing the rate of melt. Road construction and other activities that compact soil reduce infiltration and produce surface runoff. Surface runoff delivers water more quickly to water bodies. In some cases, the quantity delivered will also be greater, because losses such as transpiration are avoided. All these effects require a significant amount of time before a site recovers to pre-disturbance conditions. The influences of current activities added to those of previous activities are commonly called cumulative impacts.

Water quality can be influenced by forest management activities in several ways. Timber harvest will reduce nutrient uptake and increase the amount of water moving through the soil column. These effects increase the quantity of dissolved solids delivered to surface and groundwater, changing water chemistry. However, these changes are relatively minor compared to the influences of activities, such as fertilization and vegetation management, which, by adding chemicals to the watershed system, can cause adverse conditions for aquatic life. If removal of timber that is shading surface waters is allowed, water temperatures can increase. Increased temperatures may create less than optimal conditions for certain fish species and lower dissolved oxygen levels. However, the greatest potential for forest management to influence water quality is when activities create conditions that would increase the quantity of sediment delivered to surface waters. Those activities that increase surface runoff provide both an erosion and transport mechanism for sediment delivery. The influences of timber harvest on the quantity of subsurface water can, in some cases, increase the frequency of landslides. On certain landforms, timber removal and road construction can weaken the stability of a slope and increase landslide frequency.

REGULATORY FRAMEWORK

DNR addresses the potential impacts from forest management influences on forested watersheds by adhering to current laws, rules and contractual obligations. Almost all project level DNR forest management activities are subject to an assessment by SEPA. These assessments consider the influences on water quantity and quality, including their potential cumulative impacts. Project level forest practices activities are subject to the Forest Practices Act and state forest practices rules (WAC 222). One of the goals of the Forest Practices Act and state forest practices rules is to meet the requirements of the federal Clean Water Act in the state of Washington, and ensure best management practices are prescribed to protect water quality. Water quantity is also addressed to some extent. The Forest Practices Act and state forest practices rules also provide methods for addressing cumulative effects through watershed analysis. While this is not mandatory, DNR’s proprietary program has participated in several watershed analyses.

DNR generally limits the size of even-aged harvest units to 100 acres. Even-aged harvest systems are those harvests that produce stands that are of the same relative age and

usually involve retention of eight to 20 trees per acre, e.g., regeneration harvest, seed tree and final shelterwood removals. Limiting the acreage of these harvest areas helps moderate the impacts to watershed systems (*Final Environmental Impact Statement for the Proposed Forest Practices Rules and Regulations*, pages 4 and 91; and the *Final Environmental Impact Statement for the Forest Resource Plan*, page 104).

Additionally, DNR's HCP includes a riparian management strategy that prescribes methods to protect water quality and to moderate influences on stream discharges and the resulting cumulative impacts in five westside HCP planning units (DNR's *Final Habitat Conservation Plan*, 1997, pp. 55-80 and pp. 106-145*)*. In many cases, the HCP prescribes more protective methods than forest practices rules. The HCP also states that DNR will participate in regulatory watershed analyses. DNR interprets this to mean when initiated by other landowners or the state Forest Practices Program and when forested state trust lands would be included.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Forest Resource Plan Policy No. 19 was adopted prior to development of the HCP and additional forest practices rules that have substantially increased protection of watershed systems. Forest practices riparian rules have evolved to the point that regulatory watershed analysis cannot alter the default protections in the rules. Alternative 1 does not recognize that DNR seeks to address the impacts of activities in multiple ways. Although unintended, Alternative 1 has been interpreted as a commitment to rely on the regulatory watershed analysis process to analyze and control cumulative impacts. In addition, DNR uses an expanded SEPA checklist for each timber harvest that provides information related to the potential for cumulative impacts in the subbasin where the harvest is located. DNR also engages in forest land planning. Those plans are usually subject to review under SEPA and include assessing the potential for significant cumulative impacts. All of these processes have reduced the need to carry out regulatory watershed analysis for the purposes of forested state trust land management and environmental protection. Alternative 1 does not appear to meet Policy Objectives 3, 5 and 6 as well as other alternatives.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 19, Watershed Analysis: "The department will analyze by watershed the effects of past, present and reasonably foreseeable future activities on water quality and quantity and it will modify operations to control risks to public resources and trust interests."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 suggests DNR's HCP and existing laws governing cumulative impacts analysis and watershed protection (such as SEPA, the state Forest Practices Act, the forest practices rules, the state Hydraulics Act and the federal Clean Water Act), will appropriately protect key watershed resources and systems. Alternative 2 appears to better meet Policy Objectives 3, 5 and 6 than Alternative 1, but not as well as Alternative 3.

POLICY STATEMENT

The *Habitat Conservation Plan* and existing laws governing cumulative effects analysis and watershed protection, such as the State Environmental Policy Act, the Forest Practices Act, the forest practices rules and the Hydraulics Act, will appropriately protect key watershed resources and systems.

■ ALTERNATIVE 3

DISCUSSION

Alternative 3 recognizes that there are multiple ways to assess potential impacts of DNR activities on watershed systems, including participation in voluntary regulatory watershed analyses when initiated by other landowners or the state's Forest Practices Program. However, DNR, acting in its proprietary landowner capacity, does not anticipate initiating the regulatory watershed analysis process to assess cumulative impacts due to the high cost, length of time and marginal results of this process. As discussed earlier, current forest practice requirements generally meet or exceed any requirements that would result from regulatory watershed analysis. In addition to meeting all legal requirements, Alternative 3 directs DNR to focus the analysis of cumulative impacts within the full range of forest land planning processes and consider the development of mitigation strategies as needed. Alternative 3 continues the limiting of even-aged harvest units to 100 acres in most cases. Alternative 3 meets the applicable policy objectives, as it allows DNR to use professional judgment and best available science to analyze and mitigate the effects of its activities where there are risks to watershed systems (Policy Objectives 5 and 6). In addition, Alternative 3 clarifies there are multiple ways that DNR already uses to analyze the impacts to watershed systems and that DNR will not solely rely on regulatory processes to protect watershed resources (Policy Objective 3).

POLICY STATEMENTS

The department will participate in watershed analysis as defined by forest practices rules when initiated by other landowners or by the state's Forest Practices Program, in watersheds containing forested state trust lands.

To moderate the impacts of department activities on watershed systems, the department will generally limit the size of even-aged harvest units to 100 acres.

The department will analyze cumulative effects of department activities on watershed systems as part of its forest land planning process and, when necessary, develop mitigation strategies.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative is generally the same as Alternative 3, with one change and some minor edits to ensure the policy is clear and succinct (Policy Objective 3). DNR is required by law (SEPA) to assess the potential for significant environmental impacts when it develops a forest land plan. However, prior to development of forest land plans, DNR may assess the potential for significant impacts through other means, such as localized watershed assessments, including use of the expanded SEPA checklist on site-specific project proposals. The Board's Preferred Alternative commits DNR to simply assess the potential for significant cumulative impacts, recognizing it will use different approaches based on what's most appropriate.

The addition of the SEPA threshold of significance for determining the need for developing mitigation strategies has been incorporated to provide additional clarity in the policy.

POLICY STATEMENTS

The department will assess the potential for significant cumulative impacts of department activities on watershed systems, and develop mitigation strategies as needed.

To moderate the impacts of department activities on watershed systems, the department will generally limit the size of even-aged harvest units to 100 acres.

The department will participate in watershed analysis as defined by state forest practices rules, when initiated by other landowners or by the state's Forest Practices program, in watersheds containing forested state trust lands.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

Comments were submitted that the HCP planning unit scale is not adequate to address cumulative effects and also that landscape planning should include the watershed scale analysis to address cumulative effects. The Board's Preferred Alternative for Watershed Systems provides for cumulative impacts analyses to be conducted at different scales, including the watershed scale.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Although this policy will have no direct impact on the environment, it provides the framework within which DNR can consider cumulative adverse significant impacts that may result from management activities on forested state trust lands. The indirect impact

of this policy, both in the short and long-term, is not quantifiable at this time, but will be determined as a result of implementation. The intent of the policy is to provide adequate assurance that will ensure DNR will consider cumulative impacts related to water quality and quantity at the appropriate time and within the appropriate process.

Alternative 1 is Policy No. 19 in the *Forest Resource Plan*. DNR has been assessing the condition of watershed systems using additional methods to those required by laws, rules and agreements. Risk assessment and prescriptions for mitigating cumulative impacts are included as part of its process.

Alternative 1 directly addresses cumulative impacts within watershed systems by requiring risk assessment and modifying proposed activities when necessary. It is as effective in protecting water resources and aquatic habitat as Alternative 2. However, it was formulated prior to both the adoption of forest practices rules for watershed analysis and the approval of the HCP. The utility of the regulatory watershed analysis process was superseded in part by the 2001 Forest and Fish rules. Because these rules were developed in part on what was learned from early regulatory watershed analysis, the new Forest and Fish rules "froze" the prescription process for riparian buffers. Implementation of the policy was strongly linked to a landscape planning process (see the Forest Land Planning policy subject area discussion).

Alternative 2 relies on the State Environmental Policy Act and Rules, the state Forest Practices Act and state forest practices rules, the HCP and other laws and agreements for addressing cumulative impacts on watershed systems. The potential for cumulative impacts would be analyzed; during forest land planning or during environmental analysis for site specific proposals utilizing the expanded SEPA checklist or in other situations when SEPA documents are prepared on any other plan or proposal. However, it does not provide the broad flexibility to analyze the potential for significant adverse cumulative impacts and develop mitigation strategies at additional scales of planning where it may be necessary to address unique circumstances apart from a proposal that triggers SEPA. Therefore, there is a higher risk of cumulative adverse impacts related to changes in water quantity and quality, such as increased peak flows leading to stream scouring, bank instability, mass wasting, other sedimentation processes, impacts to fish and their habitat, flooding and other related impacts. The impacts may go undetected in a watershed until a proposal triggers cumulative impacts review under one of these existing mechanisms. This could compound the impacts and increase the need for mitigation at the time a proposal would trigger analysis under one of these existing requirements.

Alternative 3 and the Board's Preferred Alternative provide DNR with increased opportunity to address cumulative impacts. Analyses can be done at multiple scales to address varying circumstances and can also be done independent of a proposal that triggers one of the existing requirements. It also requires that DNR participate in a forest practice watershed analysis initiated by another landowner or the Forest Practices program in a WAU where forested state trust lands are present. This broad flexibility in Alternative 3 and the Board's Preferred Alternative to address cumulative impacts related to water quality and quantity, provides the greatest opportunity among the alternatives to identify and mitigate cumulative impacts related to watershed systems.

CUMULATIVE IMPACTS

All the alternatives directly address how DNR would approach cumulative impacts assessments of DNR's forest management on forested watersheds for impacts related to water quantity and water quality. These assessments are not limited to forested state trust lands, but they consider the proposed management strategies or practices on forested state trust lands and the potential of those strategies and practices in combination with practices on other ownerships to contribute to or cause adverse significant cumulative impacts to watershed systems.

The degree to which DNR is limited to one particular approach in Alternatives 1 and 2 will negatively affect DNR's ability to address and mitigate adverse cumulative impacts that occur from changes to water quality and quantity, as discussed in the Affected Environment and Significant Impacts and Mitigation Measures subsections. Under Alternative 3 and the Board's Preferred Alternative, flexibility is maintained to address the potential for significant adverse cumulative impacts through maintaining the option to integrate cumulative impact analysis over the broader spectrum of SEPA analysis ranging from the landscape scale to site-specific planning, as well as other assessments that are not tied to a proposed action and, thus, do not trigger SEPA.

3.2.8 Riparian Management Zones (integrated with "Wetlands" and retitled "Riparian Conservation" – see 3.2.10)

INTRODUCTION

Riparian areas are areas where land and water meet along stream and lake margins. These water bodies could include ephemeral ponds and streams. Riparian areas include stream banks, adjacent floodplains, wetlands and associated riparian plant communities. Riparian areas are important for wildlife and for protecting water quality. The interaction between aquatic and terrestrial ecosystems and the extensive edges where riparian areas adjoin upland habitats promote high riparian and aquatic wildlife diversity and are a critical source of biodiversity.

Although the Riparian Management Zones policy emphasizes the following Policy Objectives:

- Ensure policies are succinct, relevant and easily understood by the public and department employees (Policy Objective 3); and
- Use professional judgment, best available science and sound field forestry to achieve excellence in public stewardship (Policy Objective 5);

it works in conjunction with several other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

Riparian areas are shaped by a wide variety of hydrologic, geomorphic and biotic processes and they are distinctly different from the surrounding lands, because of unique soil and vegetation characteristics that are strongly influenced by the presence of water. Disturbance processes from upland areas, such as windthrow or fire, as well as from processes unique to riparian areas, such as floods, affect the riparian ecosystem *(Final Environmental Impact Statement on Alternatives for Forest Practices Rules*). Natural disturbance and fluvial processes continually work together in these areas to create distinctive ecosystems supporting diverse vegetation communities and, consequently, diverse animal communities. The interaction between aquatic and terrestrial ecosystems and the extensive edges where riparian areas adjoin upland habitats further promote high wildlife diversity (Thomas et al., in Bunnell et al., 1995) and are a critical source of biodiversity (Stevens et al., 1995). A number of plant species considered rare in Washington are associated with forested riparian areas in both Eastern and Western Washington.

Vegetative productivity is frequently high due to high soil moisture and abundant nutrient availability. "Because of their high productivity and their inherent connections with the rest of the watershed, riparian areas provide a crucial source of habitat diversity at the

landscape level" (Banner and MacKenzie, 1998). Climate, soils and topography influence the extent, composition and functions of riparian areas. Within ecoregions, the riparian ecosystem changes with its topographic position within the landscape as it traverses broad vegetation belts from small headwater streams to the floodplains of large rivers.

A pronounced difference occurs between the arid ecoregions of Eastern Washington and the ecoregions of high rainfall near the crest and west of the Cascade Range (Wissmar et al., 1994). The arid ecoregions, in particular, have marked contrasts in species composition and physiognomic structure between riparian areas and uplands (National Academy of Sciences, 2002).

Riparian areas west of the Cascade Range, with the exception of the Puget Trough ecoregion, are influenced by high annual precipitation. The coastal zone and areas below 2,000 feet in elevation usually receive all precipitation as rain and show rapid response to rainfall. At higher elevations, snow cover can occur from October to March. Significant flooding events can take place during periods of warm air mass movement (rain-on-snow events). Drainages in the Northwest Coast, West Cascades and North Cascades and Puget Trough ecoregions commonly have significant contributions of discharge, both in headwater and downstream portions of a river basin.

Disturbance from natural events, such as flooding and from human activities, has shaped the riparian areas. In general, the riparian areas of the westside ecoregions are composed of a mix of hardwood and conifer species. In headwater streams with typically narrow riparian areas, upland species tend to dominate. Lowland rivers and areas with frequent flooding are dominated by tree species adapted to high water tables and frequent inundation, such as black cottonwood, willow and red alder. Westside rare plant species associated with riparian areas are usually perennial forbs or sedge species (*Natural Heritage Plan*).

The ecoregions of Eastern Washington: the East Cascades, Okanogan, Canadian Rocky Mountains and Blue Mountains, are generally characterized by a more continental climate. Most precipitation occurs as snow and accumulates as a cold snow pack. Most of the stream flow occurs during the annual melt of May, June and July from the headwaters, with minimal contributions from downstream water sources resulting in snow-melt-induced flood regimes. Precipitation in the Eastern Washington ecoregions varies with elevation, ranging from 50 inches per year above 5,000 feet in elevation to 10 to 15 inches per year at lower elevations (Wissmar et al., 1994). Riparian areas are strongly influenced by elevation with most forested riparian areas occurring in steep, mountainous terrains that are dominated by conifers. At lower elevations, a mix of conifers and hardwoods can be found in moist riparian areas. Although riparian ecosystems are only a small portion of the Eastern Washington landscape, they are disproportionately important as habitat (Kovalchik and Clausnitzer, 2004). However, riparian ecosystems in these ecoregions face special challenges, as they have been and are being continually degraded by a combination of agriculture and irrigation, livestock grazing, forest management and mining (Wissmar et al., 1994). Rare plants associated with Eastern Washington riparian areas include shrubs, forbs, sedges and annual species (*Natural Heritage Plan*). Riparian areas in Eastern Washington are more strongly differentiated from surrounding uplands than riparian areas in Western Washington, and

therefore provide a more specialized habitat for rare plant species. As a result, Eastern Washington habitats for rare riparian plant species may be more susceptible to impacts associated with management activities.

Riparian vegetation is the result of physical conditions created by the geomorphic and hydrologic processes in the stream channel, hydrologic conditions in adjacent uplands and the responses by plants (Kattelmann and Embury, 1996). In turn, the riparian area provides critical functions for the adjacent stream. Impacts to riparian functions affect several elements of the environment: earth, geology, soils, topography, erosion, climate, water quality and quantity, flooding, plants, animals, habitat, fish and wildlife.

Root systems of trees, shrubs and other low growing woody vegetation along streambanks contribute to slope stability. Root systems in streambanks of active channels stabilize banks, allow development and maintenance of undercut banks and protect banks during large storm flows (Forest Ecosystem Management Assessment Team, 1993). Streamside vegetation also plays an important role in reducing the amount of sediment reaching the stream by physically obstructing the movement of sediment into the water.

Direct solar radiation can affect stream temperature. Numerous factors affect how much solar radiation reaches the stream, including stream size, orientation, topography and the characteristics of the riparian vegetation, such as tree species composition, tree height and stand density. Increases in direct solar radiation due to reduction of riparian vegetation is most responsible for high stream temperatures. Forest management can exert influence on stream temperature only by preventing further solar heating through shade management.

In general, due to their low-lying position on the landscape, riparian areas tend to be cooler than the surrounding upslope areas. Since riparian areas are adjacent to water bodies, they also have higher relative humidity levels. A discussion of this is incorporated by reference from the *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*, Chapter 4, pages 4-38 to 4-39. Air temperature and humidity in turn are important variables influencing water temperature, an important component of fish habitat. For other riparian obligate species, such as many amphibians, the microclimate provided by riparian areas also plays an important role.

Organic debris such as leaves, conifer needles, cones and wood falling into the water are part of the food chain, providing nutrients to aquatic invertebrates, which in turn are an important food source for fish. The abundance and diversity of aquatic species can vary significantly, depending upon the total and relative amounts of algae and leaf litter inputs to a stream (Independent Multidisciplinary Science Team, 1999). In general, the forest influence on providing organic input diminishes as streams become progressively larger with higher order streams, relying more on in-stream processes, such as algae production for organic material input (Sedell et al., in Maser et al., 1988).

An important factor in determining the quantity of exported invertebrates and detritus from smaller headwater streams appears to be the type of riparian vegetation. Young-growth alder canopies provide more invertebrates and detritus for the benefit of downstream communities than conifer-dominated forests. The forest type and its

associated understory in general plays a major role in the amount and quality of food entering streams and ultimately affecting fish populations (Wipfli, 2001).

Riparian areas are an important source for providing large woody debris to stream channels. Large woody debris is defined as a log with a mid-point diameter of at least 10 centimeters, a length of two meters and protruding into the bankfull channel (Center for Water and Watershed Studies, 2004). Recruitment to stream channels occurs through various processes' such as tree mortality, wind-throw, bank erosion, channel migration, landslides and debris avalanches. Large quantities of downed trees are a functionally important component of many streams (Forest Ecosystem Management Assessment Team, 1993). Large woody debris can trap fine sediments; retain spawning gravel; provide structural diversity, such as pools; provide nutrients and protective cover from predators; and fulfill other functions that promote fish habitat (Center for Water and Watershed Studies, 2004).

Riparian areas provide a specialized habitat for rare plant species by providing greater moisture, more consistent moisture through the growing season and often greater shading than surrounding uplands. Species that are adapted to these conditions depend on the maintenance of undisturbed riparian areas for population persistence.

Any forest management activity in or near riparian areas has the potential to negatively impact water quality, terrestrial and aquatic habitat, rare plant habitat and other riparian functions and values (Phillips et al., 2000). However, because many riparian ecosystems have been degraded due to past management practices, active restoration through silvicultural treatments applied to riparian areas may be desirable. For example, many streams and riparian areas are deficient in large woody debris and large woody debris recruits because of past stream cleaning practices and the lack of regulations governing timber harvest in riparian areas. Of all the ecological functions of riparian areas, the process of large woody debris loading into channels, lakes and floodplains requires the longest time for recovery after logging. Active forest management, such as thinning, can accelerate the development of large woody debris recruits and augment existing large woody debris levels through directional falling of trees. Thinning activities in riparian areas may cause short-term impacts, such as may result from the obstruction of sediment to streams and the amount and quality of food entering streams, but have longer term (within two to four decades) benefits in allowing those riparian areas to reach a stage of forest maturity and full functionality more rapidly than they otherwise would.

Riparian ecosystems are protected through management restrictions in areas adjacent to water bodies referred to as the riparian management zone. Nevertheless, some riparian functions can potentially be reduced by forest management activities and associated road building activities in or near riparian areas.

Sediment is the primary pollutant associated with forest management activities (Phillips et al., 2000). Fine sediment can be delivered through surface erosion from skid trails, stream crossings and roads in riparian areas. Rutting and soil compaction may lead to decreased infiltration and channelization, further increasing the risk of sediment delivery.

The amount of direct solar radiation can be impacted by forest management activities by reducing the amount of canopy cover and therefore, the amount of shade. This can result in elevated stream temperatures and negative impacts to aquatic species. A change in solar radiation levels can also negatively affect rare plant species in the riparian area that are adapted to the shaded, high moisture conditions of an intact riparian zone.

The loss of root strength through tree removal, soil compaction and disturbance of the understory vegetation may lead to increased incidence of debris slides and flows (Forest Ecosystem Management Assessment Team, 1993). Roads have the greatest effect of all forest management activities on slope stability (*Final Environmental Impact Statement on Alternatives for Forest Practices Rules for Aquatic and Riparian Resources,* 2001).

Litter inputs to maintain biotic community structures in the stream may be reduced as a result of thinning. The removal of vegetation may alter the microclimate and therefore, affect a variety of ecological processes and habitat conditions. The application of herbicides and pesticides within the riparian management zones can result in adverse impacts on water quality, rare plant populations, and fish and wildlife species.

Current conditions of riparian areas in Washington are mostly a function of past management practices. Most riparian areas have been logged at least once over the past 150 years (approximately) leading to a simplification of composition and structure of riparian vegetation. The impacts of past logging activity on rare plant species within riparian corridors is not very well understood, in part because little inventory for rare plants has occurred within these areas. However, most riparian rare plant species are associated with later seral stage conditions rather than those that follow disturbance (whether natural or human-induced).

A recent DNR assessment of stand structures associated with riparian areas in Western Washington found that many moderate to large streams on forested trust lands may currently have reduced levels of one or more riparian functions because of low to moderate levels of large, fully functioning stands. Overall, many riparian areas on DNR-managed lands in Western Washington were found to be in early or mid-developmental stages, with very few riparian forests containing a complex stand structure (*Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*).

The *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources,* Chapter 3, Section 3.4.2.3 Existing Conditions of Riparian Areas, pages 3-42 to 3-43, reports a similar pattern across forest ownerships in Eastern Washington. A combined analysis of private and forested state trust lands found that a large proportion of riparian areas were in early seral stages (61 percent of sampled private and state lands), while only 5 percent were found to be in late seral stages that would fully provide for riparian functions, including the presence and viability of rare plant populations in riparian areas.

Additionally, Eastern Washington riparian areas are threatened by more intense and destructive wildfires due to dense understories, natural regeneration and presence of fire intolerant species (Wissmar et al., 1994) (*Final Environmental Impact Statement on*

Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources, Chapter 3, Section 3.4.2.3 Existing Conditions of Riparian Areas, page 3-41).

REGULATORY FRAMEWORK

The Forest Practices Act and state forest practices rules regulate timber harvest and road construction in riparian areas across non-federal ownerships in Washington. Timber harvest in riparian areas is regulated through the establishment of riparian management zones that consist of a 50-foot core zone and variable width inner and outer zone, based on site class and stream size. These zones are managed to provide buffers and protection to the portion of the riparian area closest to the stream. In Western Washington, management of riparian management zones must be consistent with desired future condition basal area targets, which are set by site class. In Eastern Washington, riparian management zone rules for fish bearing streams vary by habitat types – ponderosa pine, mixed conifer and high elevation timber type. In addition, special shade requirements apply in Eastern and Western Washington.

The Hydraulics Project Approval Law (Chapter 77.55 RCW and WAC 232-14-010) require that a hydraulics project approval must be obtained from the Washington State Department of Fish and Wildlife prior to constructing any form of hydraulic project or other work that will use, divert, obstruct, or change the natural flow or bed of any river or stream or that will utilize any of the waters of the state or materials from the stream bed.

Western Washington

For riparian protection, DNR manages according to the HCP in Western Washington, rather than the forest practices rules. Riparian management zones are established equal to the site potential tree height at age 100 for Types 1-3 streams or at least 100 feet, and 100-foot riparian management zones for Type 4 streams. Type 5 streams are protected according to *Forest Resource Plan* Policy No. 20 which directs DNR to establish riparian management zones along Type 5 waters when necessary for water quality, fisheries habitat, stream banks, wildlife, and other important elements of the aquatic system. Like the forest practices rules, the HCP's and *Forest Resource Plan's* intent is to provide buffers of protection to the riparian areas closest to the stream.

DNR and the Federal Services have agreed upon a Western Washington riparian procedure to implement DNR's HCP Riparian Conservation Strategy. This procedure is called the *Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy For Westside Planning Units excluding the Olympic Experimental State Forest* (April 2006) and governs the very limited management of the riparian areas to achieve habitat objectives for salmonids and many other riparian obligate species. This riparian management strategy will primarily use stand thinnings to accelerate the development of riparian stands towards a mosaic of structurally complex riparian forests and restore riparian habitat functions, while not appreciably reducing riparian ecosystem benefits in the short-term. In particular, this restoration strategy focuses on growing large, site-adapted conifer trees, contributing down woody debris and instream large woody debris to the riparian habitat, initiating canopy layering where appropriate, and protecting existing structural components, such as snags.

The conservation objectives for Western Washington riparian areas under the HCP are to maintain or restore salmonid freshwater habitat and to contribute to the conservation of other aquatic and riparian obligate species. Outside a 25-foot inner zone, forest management activities are allowed within the riparian management zone when they maintain or restore the quality of salmonid habitat.

Eastern Washington

Riparian Management on approximately 700,000 acres of forested state trust land in Eastern Washington (the East Cascades, Okanogan, Columbia Plateau and Canadian Rocky Mountains ecoregions) is governed by the forest practices rules and policies of the Board of Natural Resources. The forest practices rules underwent a major revision in 2001 to further protect Endangered Species Act listed aquatic species, to restore and maintain riparian habitat, to meet the federal Clean Water Act and to keep the timber industry economically viable.

Although several revisions of the forest practices rules affecting riparian area management have taken place for the eastside, riparian management zones are currently not required for many Type 4 and Type 5 waters. Instead, Type 4 waters are afforded a 50-foot buffer in which the landowner must choose between a partial cut or clearcut strategy (see WAC 222-30-022). Under the clearcut option, up to 30 percent, or a maximum of 300 feet, of a stream reach within a harvest unit, can be removed. Nonfish-bearing perennial and seasonal streams are afforded a 30-foot equipment limitation zone to minimize ground disturbance to less than 10 percent. The *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources* concluded that large woody debris recruitment, stream shade and leaf and litter production would be at moderate risk for Type 4 streams due to loss of large woody debris recruitment, stream shade and leaf and litter and at high risk for Type 5 streams. The risk along perennial nonfish-bearing streams (Type 4) is reduced due to the requirements for some tree retention along 70 percent of the stream reach with clear cutting not to exceed 300 continuous feet in length within a harvest unit within the first 50 feet on either side of the stream. The adverse effects to the riparian microclimate along nonfish-bearing streams are considered high to very high, since the 50-foot width is at most one-third of the minimum recommended buffer for the various microclimate variables (*Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources*, Summary, Chapter 3, page 3-87). Particular concern exists over air temperatures and humidity, which affect amphibian habitats and stream temperatures that could be transferred to downstream fish bearing streams. A discussion of this analysis is hereby incorporated by reference: *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources*, Summary, pages S-9 to S-14, and Chapter 3, pages 3-50 to 3-88.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 was adopted to protect important environmental resources associated with streams and riparian areas, prior to the development of the HCP and existing forest practices rules. Alternative 1 currently provides a policy for riparian management zones along Type 1-4 waters and when necessary along Type 5 waters. Alternative 1 broadly expanded the protection of riparian areas from the pre-1992 requirements. It emphasized the protection of fish habitat and other non timber resources, such as water quality, wildlife habitat and sensitive plants and allowed DNR to prevent degradation of the riparian environment through forest management activities. Specifically, Alternative 1 expanded the protection to Type 4 and Type 5 waters, recognizing the value of nonfish-bearing streams to the aquatic ecosystem, and enabled the DNR to exceed forest practices rules at that time. With the signing of the HCP in 1996, DNR implemented the riparian conservation strategy that was consistent with this alternative. The riparian conservation strategy of the HCP established riparian management zones along Type 1-4 waters in Western Washington, and management within the zones is guided by restoration objectives for salmonid and other riparian obligate species. For Type 5 waters, information at the time of signing the HCP was insufficient to determine "when necessary." Therefore, a long-term strategy guiding Type 5 stream buffering would be developed within the first ten years of the HCP (i.e., before January 2007). Alternative 1 does not appear to meet Policy Objectives 3 and 5 as well as Alternative 3 because of the use of outdated language for forested state trust lands in Eastern Washington and lack of emphasis on the protection of sensitive "riparian" plant species.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 20, Riparian Management Zones: "The department will establish riparian management zones along Type 1-4 waters and when necessary along Type 5 waters. The department will focus its efforts on protecting key non timber resources, such as water quality, fish, wildlife habitat and sensitive plant species."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 assumes that compliance with state law, including forest practices rules and the HCP, meets or exceeds Alternative 1 and is adequate to address riparian management zones statewide. Alternative 2 does not appear to meet Policy Objectives 3 and 5 as well as Alternative 3 and the Board's Preferred Alternative because it does not provide protection to some non-fish perennial or type 4 and non-fish seasonal or type 5 streams in Eastern Washington when necessary to protect key non timber resources.

POLICY STATEMENT

The *Habitat Conservation Plan* and existing laws governing riparian protection, such as the Forest Practices Act, the forest practices rules and the Hydraulics Act, will appropriately protect key non-timber resources, such as water quality, fish, wildlife habitat and sensitive plant species.

■ ALTERNATIVE 3

DISCUSSION

Alternative 3 is very similar to Alternative 1 but contains updated terms for stream types, to be more consistent with the forest practices rules. Alternative 3 continues protection of key non-timber resources associated with riparian areas, including sensitive riparian plant species through use of riparian management zones along both fish-bearing and perennial non-fish bearing waters. Alternative 3 best meets the applicable policy objectives by directing DNR to provide riparian management zones when necessary to ensure ecological productivity of riparian areas (Policy Objective 5). Although Alternative 3 uses updated terms for stream types consistent with current forest practices language, i.e., fish/non-fish, to provide clarity and consistency (Policy Objective 3), it does not adequately distinguish between Eastern and Western Washington in terms of achieving resource protection through the DNR HCP in Western Washington.

POLICY STATEMENT

The department will establish riparian management zones along fish-bearing waters, perennial non-fish bearing waters, and when necessary, along seasonal non-fish bearing waters to protect key non-timber resources, such as water quality, fish, wildlife habitat and sensitive riparian plant species.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

Riparian Management Zones Alternative 3 and Wetlands Alternative 2 have been integrated into a new policy subject area. See new integrated policy statements discussion and analysis of impacts under 3.2.10 Riparian Conservation.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

See the discussion under the Alternatives Suggested But Not Analyzed subsection in the Riparian Conservation policy subject area.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Significant Impacts and Mitigation Measures are discussed under the Riparian Conservation policy subject area (see section 3.2.10).

CUMULATIVE IMPACTS

Cumulative Impacts are discussed under the Riparian Conservation policy subject area (see section 3.2.10).

3.2.9 Wetlands (integrated with "Riparian Management Zones" and retitled "Riparian Conservation" – see 3.2.10)

INTRODUCTION

Wetlands are defined by forest practices rules (WAC 222-16-010) as:

" … those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, such as swamps, bogs, fens and similar areas. This includes wetlands created, restored, or enhanced as part of a mitigation procedure. This does not include constructed wetlands or the following surface waters of the state intentionally constructed from wetland sites: irrigation and drainage ditches, grass lined swales, canals, agricultural detention facilities, farm ponds and landscape amenities."

Wetlands provide vitally important hydrologic and habitat functions that play a role across the landscape in all ecoregions of Washington State, influencing ecosystems far beyond their specific boundaries. Wetlands support populations of wildlife, including fish, birds, reptiles, amphibians and invertebrates; enhance downstream ecosystems, including fish habitat through their water quality functions; and mitigate effects of flood events. DNR recognized the important role wetlands play in forestland health since 1992, when *Forest Resource Plan* Policy No. 21 was adopted.

The forest practices rules further define wetland functions to "include the protection of water quality and quantity, providing fish and wildlife habitat and the production of timber." Protection of wetland acreage and function is an integral part of the HCP's riparian strategy.

Although the Wetlands policy emphasizes the following Policy Objective:

- Ensure policies are succinct, relevant and easily understood by the public and department employees (Policy Objective 3);

it works in conjunction with several other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

This subsection incorporates a discussion of the following elements of the affected environment related to the healthy functioning of wetlands: soils, surface water and groundwater exchange, runoff and floodwater behavior, water quality, plants, animals and habitat.

Wetlands are characterized by a high diversity, density and productivity of both plant and animal species. They provide some of the most important fish and wildlife habitat in

forestlands. Wetlands are areas where water saturates or floods the soils for long enough during the growing season to develop an anaerobic rooting zone, excluding plants that are not adapted to life in saturated soils. Wetland habitats in forested landscapes include freshwater marshes, swamps, bogs, fens, seeps, wet meadows and shallow ponds. Wetlands can be forested or dominated by shrubs, herbs, mosses, grasses or grass-like plants. They may be isolated from other surface waters or associated with surface water bodies, such as ponds, lakes, rivers and streams. Maintaining the hydrologic functions of wetlands and riparian areas is essential to maintaining the health and function of the entire aquatic ecosystem and contributes to the health of upland ecosystems as well. Since European colonization, it is estimated that 30 to 50 percent of wetland acreage in Washington State has been lost due to human activity (National Wetlands Inventory, United States Fish and Wildlife Services, 1999). On forested landscapes, wetland losses are very difficult to track. DNR's inventory capability has been limited to aerial photo interpretation, which typically underestimates forested wetlands. It is assumed that losses of forested wetlands and their ecological functions are related primarily to timber harvest and associated activities. Climate, substrate and landforms influence the extent and types of wetlands found in different parts of Washington and general patterns can be observed over the nine ecoregions that occur in the state.

In Western Washington, generally high rainfall and soils that commonly have soil horizons that restrict water movement give rise to a great many forested wetlands, marshes, shrub dominated and riparian wetlands. Bogs, while generally rare on the landscape, are relatively more common in the Northwest Coast ecoregion than in other parts of Western Washington, because of its geological and glacial history. The Puget Trough ecoregion experiences less rainfall than other parts of Western Washington, but includes many wetlands of similar character to those in the other westside ecoregions, due in part to the impermeability of some soils derived from glacial till and outwash. In the North Cascades and West Cascades ecoregions, sharp topographic relief, dissected terrain, high elevations and glacially derived landforms shape a variety of wetlands, from high elevation glacial lakes and alpine wet meadows, to lower elevation forested and riparian wetlands.

In the forested portions of the East Cascades, Okanogan, Canadian Rocky Mountains, Columbia Plateau and Blue Mountains ecoregions, the climate, soils and topography dictate a different landscape for wetlands than is found in Western Washington. Cold, snowy winters with snow pack forming in higher elevations and hot, dry summers give rise to vernal pools, riparian wetlands, groundwater fed basins and occasional bogs and fens. In comparison to Western Washington, forested wetlands are less frequently observed and provide a stark contrast to forested uplands. Wetlands east of the Cascade Mountain crest are important water sources. These fragile habitats are dependent on surrounding forests to insulate them from ambient temperature extremes. Because of the more continental climate in Eastern Washington, wetland hydrology is more susceptible to both domestic and wild animal grazing and timber harvest impacts than many of their westside counterparts.

Because wetlands vary in hydrology, soils, vegetation, size and position on the landscape, they also vary considerably in the types of functions they perform and the degree to

which they perform them. Wetland quality is inextricably related to wetland function, that is, rare, unique or vital functions are served by high quality wetlands.

A majority of the terrestrial vertebrate species in Washington depend on wetlands for their habitat needs, either seasonally or for some portion of their life cycle. Seventy-seven percent of inland bird species that breed in Washington and Oregon nest in wetland and riparian areas and 65 percent of Washington and Oregon's mammal species use riparian or wetland habitats (Johnson and O'Neil, 2001). Some wetlands provide over-wintering habitat for fish, amphibian and invertebrate species and many wetlands influence downstream water quality in ways that help maintain fish habitat in streams and rivers. Hydrologic functions of wetlands include providing sites for groundwater exchange (recharge at some locations and discharge at others), storm water detention and seasonal stream flow augmentation.

Wetlands contribute to maintaining water quality through sediment trapping, including removal and transformation of nutrients, such as nitrate and phosphorus, and toxicants, such as pesticides and heavy metals. Wetlands cycle and export nutrients, produce and store or export organic carbon and provide fuel in the form of periphyton for downstream ecosystem productivity, supporting food webs for aquatic life, including fish.

Wetlands are ecologically important because of functions related to water quality, floodwater retention, groundwater recharge and habitat for many kinds of organisms:

- Hydrologic functions include discharge of water to downstream systems, low-flow augmentation and flood-peak attenuation, surface and subsurface water storage, water dissipation through transpiration, and sediment retention.
- Biogeochemical functions include organic carbon production and export, cycling of elements and compounds, and maintenance of conditions, including soils that support diverse plant communities. Benefits: food chain support, toxicant and nutrient recycling, natural waste treatment, substrate for habitat diversity.
- Habitat functions include maintenance of characteristic habitat structures, habitat interspersion and connectivity, and vegetative community composition. Benefits: essential habitat for amphibians and aquatic invertebrates, utilization for nesting and feeding by numerous bird and mammal species, food web support, human aesthetic enjoyment, connectivity for wildlife movement, and refugia during environmental fluctuations.

For further discussion of wetland functions and values on state lands in Washington, please refer to the discussion incorporated here by reference in the following documents: the *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources*, page 3-90; the *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*, page 4-96; and the *Final Environmental Impact Statement Habitat Conservation Plan*, page 4-175 to 176.

Timber harvest and associated road building activities in wetlands can have various impacts on wetlands and their functions. Removal of trees and other vegetation can result in hydrologic changes, including a raised water table. Alteration of the water table can change local floodwater behavior and increase runoff. Vegetation changes due to water table changes also alter habitat features in wetlands causing varying effects depending on the species involved. In addition, water temperatures can be raised by removal of shading canopies.

Soil impacts, such as rutting or compaction, within wetlands or in the adjacent uplands can result in decreased infiltration and/or channelization and associated diversion or alteration of flow, e.g., transforming subsurface flow to surface flow. Soil disturbance due to harvesting and road building can also result in sedimentation, with associated water quality being degraded both locally and in downstream ecosystems.

Functions vary considerably among wetlands and there are limited data available on wetland hydrology or the impacts of harvest on wetlands, specifically in the Pacific Northwest. Most of the studies available have been done in other parts of the country, and generalizations related to harvest activities in the Pacific Northwest should be stated with caution. Brief descriptions on the impacts to wetland functions are provided below; more detail is available in the HCP Environmental Impact Statement (DNR, 1996).

Tree-harvesting, especially clearcutting, in wetland sites can alter wetland hydrology and raise the elevation of the water table. Timber harvest has also been found to increase the range of week-to-week water level fluctuations (Verry, 1997).

Changes in hydrologic patterns of wetland sites can directly influence plant species and growth within the wetland site. Excessive water in the substrate stops root growth and microbial activity, and can lead to unfavorable biochemical activity (Verry, 1997). As discussed in the HCP Environmental Impact Statement (DNR, 1996), wetlands provide important habitat for plants and receive disproportionately high use by wildlife. Changes in vegetation and substrate can have positive or negative impacts on specific species.

The altered water table and associated streamflow relationship, over large areas, could increase localized runoff and flooding. These effects can be short term, and cease once a site becomes revegetated with emergent, shrub, or forest vegetation (Grigal and Brooks, 1997). In some cases, an elevated water table resulting from timber harvest in a forested wetland could preclude the re-establishment of trees in the long term. Because there are little data on forested wetland hydrological response to timber harvest in the Pacific Northwest, this represents an unknown risk. An inability to regenerate trees would be considered a loss of function in a forested wetland. As discussed in the HCP Environmental Impact Statement (DNR, 1996) wetlands perform an important function in augmenting streamflow during low-flow periods and in moderating flows during storm events.

Water quality of wetland sites can be measurably affected by harvest activities, although effects can be transient depending on the activities (Shepard, 1994). Harvest and associated activities (road-building and use) can deliver sediment to wetlands, diminish water quality, and lead to the filling of wetland sites. Nutrient pathways within wetlands

can also be affected. Nutrients are removed directly from wetlands during harvest, and increases in export of nutrients can occur after harvesting.

The timing and method used to extract products from the forest can significantly influence effects on wetlands. Heavy equipment use in wetlands usually has concentrated impacts in specific areas that can alter soil properties locally. Additionally, soil rutting and compaction from timber-harvest activities can reduce infiltration, redirect flow, and alter pathways by which water moves through and from wetlands (Grigal and Brooks, 1997).

Tree harvesting and associated activities can also affect wetland sites and adjacent or nearby land by potentially altering hydrology; changing nutrient pathways; delivering sediment (which can diminish water quality); changing species composition, growth, and structure; and reducing shading. These factors could result in some loss in wetland functions. While the hydrologic and biogeochemical functions begin to return as soon as tree revegetation occurs, habitat functions can require more time and forest regrowth to return.

Another potential impact to forested wetlands is related to the wetland inventory done before a harvest. The forest practices rules do not require an on-site survey to delineate all wetlands, but call for approximate determination of the wetland boundaries within the proposed harvest area. Forested wetlands and wetlands smaller than 0.25 acre are difficult to identify through aerial photographs, are not always accurately located on maps, and are sometimes difficult to distinguish on the ground, especially during the dry season. Therefore, a functioning wetland could be misidentified as non-wetland during the planning and/or harvest activities.

While efforts are made to prevent this type of error by field foresters, a wetland could be harvested as non-wetland. In this case, the wetland would not receive the protection of minimized disturbance as directed in the forest practices rules and HCP, and as discussed above. The wetlands would be expected to experience at least short-term loss in wetland area and/or functions. While the hydrologic and biogeochemical functions can return if there is tree re-vegetation, the habitat functions can require more time and forest re-growth to return.

Construction of roads through wetlands can have the greatest direct impact on wetlands because it permanently removes the area from the wetlands, thereby eliminating the associated biological functions and potential for future tree growth from the impacted area. Additionally, crossing wetlands with roads and without adequate provision for cross-drainage can lead to flooding on the upslope side and subtle drainage changes on the downslope side of crossings (Stoeckeler, 1967; Boelter and Close, 1974).

A less obvious impact to wetlands is the indirect impact of harvest in adjacent acreage. Harvest of adjacent acres may affect the water quality and hydrologic functions through increased sedimentation and changes in the local hydrology. Harvest also could have an effect on habitat functions.

Estimates of wetland acreage in Washington are based primarily on the National Wetlands Inventory, which was conducted in the 1970s and 1980s by the United States Fish and Wildlife Service, using stereoscopic analysis of aerial photos to identify and classify wetlands. Most of the wetlands identified through National Wetlands Inventory were not field verified. The National Wetlands Inventory is believed to have underestimated forested wetlands and very small wetlands, due to the limitations inherent in aerial photo interpretation and the difficulty of identifying wetland vegetation through forest canopies. A second data source for classifying land types is DNR's Forest Resource Inventory System. Like the National Wetlands Inventory, the Forest Resource Inventory System is based on aerial photo analysis and has been field verified to varying degrees. Unlike National Wetlands Inventory, the Forest Resource Inventory System was never intended as a means to identify wetland areas, which strongly limits its utility in this respect.

REGULATORY FRAMEWORK

Wetlands are protected at the federal level through section 404 of the Clean Water Act (33 U.S.C. sec. 1251 et seq.), which requires a federal permit for discharge of dredge spoil or fill material into wetlands. However, section 404(f)(1) provides an exemption for normal agricultural, ranching and silvicultural activities, as well as maintenance of existing drains, farm ponds and roads.

Existing *Forest Resource Plan* Wetland Policy No. 21 and HCP strategies were developed to reduce potential effects of harvest to forested wetland functions. Maintaining and perpetuating a windfirm stand with a minimum basal area of 120 square feet per acre required by the HCP and protection of all wetlands greater than ¼ acre in size should maintain at least 95 percent of the evapotranspiration and prevent large changes to hydrology (DNR, 1996). Retaining these trees would also reduce the loss of habitat. Minimizing disturbance as directed in the HCP reduces potential impacts to water quality and other functions through reducing of sedimentation, retention of soil conditions, and cycling of nutrients. Thus, the objectives of reducing timber harvest impacts to forested wetlands can be met while still allowing DNR to meet its other management objectives.

The forest practices rules require accurate delineation of wetland boundaries for the portions of any wetland where road construction could result in filling or draining more than 0.1 acre. This would ensure that all potential losses of wetland acreage are identified. Avoidance of wetlands during road planning is a primary method for preventing effects to wetlands.

The HCP requires on-site and in-kind, equal-acreage mitigation for wetland losses. By implementing this mitigation, there should be no significant net effect to the acreage or hydrologic and biochemical function of wetlands in the site.

The buffers required for forested trust lands and Olympic Experimental State Forest wetlands were selected to protect the wetlands from impacts of forestry activities. In the *Forest Practices Rules Final Environmental Impact Statement* (Washington Forest Practices Board, 2001), several references were cited to show that, in general, a buffer width of 100 feet or greater has been found to provide protection from impacts to the

water quality and hydrologic needs. Discussions in that document also noted that a larger buffer would be needed to fully protect fish and wildlife habitat functions.

On the westside of the Cascade crest, the HCP's riparian strategy provides protection for all wetlands greater than one-quarter of an acre on state land through managed buffers designed to maintain hydrologic functions. The HCP requires an average minimum of 120 square feet of residual basal area in forested wetlands and all wetland buffers. This is designed to maintain at least 95 percent of natural potential evapotranspiration to protect the hydrology of the wetland, as described in the HCP.

The forest practices rules regulate timber harvesting and road building activities in and around wetlands on all state and private forestlands in Washington. The forest practices rules define wetland management zones as managed buffers, which provide wildlife benefits for non-forested wetlands greater than one-quarter of an acre. Wetland management zones may encompass adjacent forested wetlands as part of the required buffers. Limited operations and operational restrictions are required in forested wetlands. The forest practices rules do not require wetland management zones or leave trees on forested wetlands, although landowners are encouraged to clump leave trees within wetlands. Timber harvest, however, is prohibited within 50 feet of headwater and sideslope perennial seeps and most riparian wetlands would receive protection through riparian management zones. Under the forest practices rules, the basal area that would be represented by the minimum number and size of leave trees required in wetland management zones is 38.7 square feet per acre for Western Washington and 34.4 square feet per acre for Eastern Washington.

Neither the forest practices rules nor the HCP provide protection for isolated wetlands less than one-quarter acre.

DNR is currently unable to assess whether or not the intent in Policy No. 21 of no net loss is fulfilled by either the forest practices rules or the HCP for wetlands greater than one-quarter acre, because there isn't an existing system for tracking wetland losses and impacts. Thus, losses cannot be documented. While it is probable that the HCP meets the intent of Policy No. 21 for westside wetlands greater than one-quarter acre, the forest practices rules probably do not meet policy intent for eastside wetlands. This is because many forested wetlands have no buffer requirement and the minimum residual basal area represented by minimum leave tree requirements within wetland management zones is very low, in comparison to the basal area requirements of the HCP, as described above.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 creates a no net loss standard. Alternative 1 recognizes that some temporary loss of function may occur in the course of forest management activities, but requires DNR to restore the wetlands or acquire a sufficient amount of new wetlands to avoid

overall net loss of naturally-occurring wetlands on forested state trust lands. Alternative 1 emphasizes avoiding the loss of wetlands and allows for mitigation if loss occurs. If mitigation is necessary, preference is given to on-site and in-kind replacement of acreage and function. Alternative 1 focuses on naturally occurring wetlands, suggesting that "artificially created" wetlands are not subject to Alternative 1. This focus may not meet the intent of the HCP and does not reflect the requirements of the current forest practices rules. Alternative 1 does not appear to meet Policy Objective 3 as well as Alternative 2 or the Board's Preferred Alternative.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 21, Wetlands: "The department will allow no overall net loss of naturally occurring wetland acreage and function."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 and the Board's Preferred Alternative create a more extensive no net loss standard. Alternative 2 and the Board's Preferred Alternative applies to wetlands as defined in the forest practices rules, specifically including wetlands created inadvertently through past forest management activities that meet the forest practices rules definition. Alternative 2 and the Board's Preferred Alternative recognizes that some loss of function may occur in the course of forest management activities and it requires DNR to restore or replace the wetlands, requiring no net loss of wetlands on forested state trust lands. These alternatives emphasize avoiding the loss of wetlands and allow for mitigation if loss occurs. If mitigation is necessary, preference will be given to on-site and in-kind replacement of acreage and function. Alternative 2 and the Board's Preferred Alternative better meets the intent of the HCP and is consistent with current forest practices rules. Alternative 2 and the Board's Preferred Alternative best meets the applicable policy objective as it updates and clarifies the policy to be compliant and consistent with forest practices rules and the intent of the HCP by removing the word "overall" and "naturally" from the policy statement and adding "as defined by forest practices rules" (Policy Objective 3).

POLICY STATEMENT

The department will allow no net loss of acreage and function of wetlands as defined by forest practices rules.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

Riparian Management Zones Alternative 3 and Wetlands Alternative 2 have been integrated into a new policy subject area. See new integrated policy statements, discussion and analysis of impacts under 3.2.10 Riparian Conservation.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Significant Impacts and Mitigation Measures are discussed under the Riparian Conservation policy subject area (see section 3.2.10).

CUMULATIVE IMPACTS

Cumulative Impacts are discussed under the Riparian Conservation policy subject area (see section 3.2.10).

3.2.10 Riparian Conservation (formerly "Riparian Management Zones" and "Wetlands")

INTRODUCTION

For a discussion about this integrated policy subject area, please see the introduction paragraphs for Riparian Management Zones (section 3.2.8) and Wetlands (section 3.2.9).

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative has combined the Riparian Management Zones and Wetlands policy subject areas. The Board's Preferred Alternative distinguishes between riparian and wetland management in Western and Eastern Washington, specifying reliance on HCP riparian conservation strategies for wetlands and riparian protection in Western Washington, better emphasizing both Policy Objectives 3 and 5; as well as establishment of riparian and wetland management zones in Eastern Washington. The Board's Preferred Alternative includes Alternative 2 for Wetlands with clarification that wetlands are defined by State Forest Practices Rules. The Board's Preferred Alternative is more clear and succinct, as well as consistent with Forest Practices definitions (Policy Objective 3) for forested state trust lands in Eastern Washington.

In Western Washington, protection and restoration of riparian acreage and function on forested state trust lands is an integral part of the HCP. The objectives of the HCP riparian strategy are to 1) maintain or restore salmonid freshwater habitat on DNR-managed lands, and 2) contribute to the conservation of other aquatic and riparian obligate species. To meet these objectives, the HCP requires establishment of riparian management zones, including wetland management zones, and provides protection measures that exceed the requirements of the forest practices rules. In addition, DNR and the Federal Services have agreed on implementation procedures for the *Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy For Westside Planning Units excluding the Olympic Experimental State Forest* (April 2006) (April 2006).

In Eastern Washington, the protection of riparian and wetland acreage and function is especially important. Although these ecosystems are only a small portion of the Eastern Washington landscape, they are disproportionately important as habitat. Riparian and wetland areas in Eastern Washington are more strongly differentiated from surrounding uplands than the same areas in Western Washington and therefore, provide a more specialized habitat for rare plant and animal species.

POLICY STATEMENTS

In Western Washington, the department will maintain or restore salmonid freshwater habitat on department-managed lands and contribute to the

conservation of other aquatic and riparian obligate species through implementation of DNR's *Habitat Conservation Plan*.

In Eastern Washington, the department will establish riparian management zones along fish-bearing waters, perennial non-fish bearing waters, and when necessary, along seasonal non-fish bearing waters. The department will also establish wetland management zones. In both management zones, the department will protect key non-timber resources, such as water quality, fish, wildlife habitat and sensitive riparian and wetland plant species.

Statewide, the department will allow no net loss of acreage and function of wetlands, as defined by state forest practices rules.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

A comment was made that larger stream buffers could benefit stream stability, fish habitat and water quality and that Alternative 3 and the Board's Preferred Alternative provides no additional protection to some Type 4 and 5 streams in Eastern Washington over Alternative 1. In Eastern Washington, DNR recognizes that in some cases, simply increasing the size of stream buffers could benefit streamside stability, habitat and water quality.

It is accurate to say that a moderate to high risk of adverse impacts to several functions of non-fish bearing waters exists for Eastern Washington under Riparian Management Zone Alternative 3 and the Board's Preferred Alternative for Riparian Conservation in this *Final EIS on the Policy for Sustainable Forests*. The *Draft EIS on the Policy for Sustainable Forests* and *Final EIS on the Policy for Sustainable Forests* analysis have highlighted the importance of the implementation phase of this policy proposal under the Board's Preferred Alternative in achieving the objectives set out by the Board of Natural Resources in meeting the purpose and need of the *Policy for Sustainable Forests*. In the past and currently, DNR is complying with Alternative 1 by placing riparian management zones along all non-fish perennial streams and along some non-fish seasonal streams when its deemed necessary to protect key non-timber resources. However, DNR has identified the need for additional implementation direction to ensure consistent approaches to non-fish streams in Eastern Washington and to ensure DNR fully meets the intent of the Board's Preferred Alternative. The Board's Preferred Alternative states that DNR will establish riparian management zones along seasonal non-fish bearing waters when necessary to protect key non-timber resources, such as water quality, fish, wildlife habitat and sensitive riparian and wetland plant species. Implementation direction should be in place upon adoption of the policy or shortly thereafter (within six months) and may either be procedural or substantive (requiring SEPA analysis), but in either case the intent is to ensure that the policy is achieved.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

In Western Washington, Alternatives 1, 2, 3,and the Board's Preferred Alternative have or will be implemented through compliance with the HCP riparian conservation strategies, including development of a type 5 streams conservation strategy by 2007 (*Final Habitat Conservation Plan*, 1997 pp. 55-80). Compliance with the HCP will be achieved through implementation of the *Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy For Westside Planning Units excluding the Olympic Experimental State Forest* (April 2006) discussed in the Regulatory Framework section of the Riparian Management Zone subject area in Section 3.2.8 for the five westside HCP planning units. Management of Riparian Management Zones in the Olympic Experimental State Forest will continue under the guidance in the Olympic Experimental State Forest management options defined in the HCP (*Final Habitat Conservation Plan*, 1997 pp. 106-133).

For this analysis, the following is incorporated by reference:

For a discussion of the environmental consequences of the Riparian Conservation Strategy for the Olympic Experimental State Forest, please refer to *Draft Environmental Impact Statement Habitat Conservation Plan*, 1996, section 4.4.2 and Final EIS DNR HCP, 1996, section 4.4.2.

For a discussion of the environmental consequences of the HCP for protection of riparian ecosystem components, please refer to *Draft Environmental Impact Statement Habitat Conservation Plan*, 1996, section 4.2.3, the *Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy For Westside Planning Units excluding the Olympic Experimental State Forest* (April 2006) and *Addendum to the Draft and Final Environmental Impact Statement, Final Habitat Conservation Plan*, April 2006.

In Eastern Washington, Alternative 2 relies on state forest practices rules for protection and management riparian areas in Eastern Washington (*Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources*, p. S-10). The *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources* points out that "Overall [the forest practices rules] appears to provide adequate protection for most riparian functions except for those along many small streams which have no riparian management zones. In general, the risk of inadequate protection of riparian function appears to be higher for the eastside." The *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources* concluded that large woody debris recruitment, stream shade and leaf and litter production has the potential to be moderately impacted along non-fish perennial or type 4 streams, while there is potential for high impacts to riparian function along non-fish seasonal or type 5 streams. In particular, Type 5 streams and the portion of Type 4 stream reaches clearcut under the clearcut strategy in the forest practices rules are at greatest risk of adverse impacts due to shade loss, interruption of detrital inputs and sediment delivery. The risk of adverse impacts due to diminished large woody debris recruitment is moderate to potentially high along all stream types, fish and nonfish-bearing. These risks of adverse impacts are further

elevated in watersheds that are already degraded. Recent research indicates that nonfish-bearing headwater streams play an important role for downstream habitat (Wipfli, 2001).

Protection of non-fish seasonal or type 5 waters under Riparian Management Zones Alternative 2 for the eastside is largely deferred to a regulatory adaptive management process, under the guidance of the Cooperative Monitoring, Evaluation and Research Committee (CMER), which will conduct validation and effectiveness monitoring and research to facilitate achieving the resource objectives for "aquatic resources" (*Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources*, page 2-32). A scientific review committee designated by the Forest Practices Board is accountable for this process in that they provide peer review of CMER's work. Disputes are resolved by the Forest Practices Board, and the Timber, Fish and Wildlife Policy Group seeks consensus before recommendations on rule changes that provide protection of aquatic resources are provided to the Forest Practices Board.

The risk along non-fish perennial or type 4 streams is reduced due to the requirements for some tree retention along 70 percent of the stream reach with clear cutting not to exceed 300 feet of a stream reach within a harvest unit within the first 50 feet on either side of the stream. The adverse effects to the riparian microclimate along nonfish-bearing streams are considered high to very high, since the 50-foot width is at most one-third of the minimum recommended buffer for the various microclimate variables (*Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources*, Summary, Chapter 3, page 3-87). Particular concern exists over air temperatures and humidity, which affect amphibian habitats and stream temperatures that could be transferred to downstream fish streams. A discussion of this analysis is hereby incorporated by reference: *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources*, Summary, pages S-9 to S-14, and Chapter 3, pages 3-50 to 3-88.

Riparian Management Zones Alternatives 1, 3 and the Board's Preferred Alternative for Riparian Conservation all provide an increase in protection of non-fish perennial or type 4 and non-fish seasonal or type 5 over state Forest Practices Rules by requiring use of riparian management zones along non-fish perennial or type 4 streams and where necessary along non-fish seasonal or type 5 streams to protect key non-timber resources. All of these alternatives provide the use of riparian management zones to mitigate impacts to riparian functions and key non-timber resources along non-fish perennial or type 4 and, where necessary along non-fish seasonal or type 5 streams in Eastern Washington.

Moreover, most of the rare plant species that occur along or within forested riparian areas have somewhat of a clumped distribution, rather than being evenly distributed along the riparian zone. They also tend to be specific to a relatively narrow range of stream types. That is, a given rare plant species that occurs in non-fish seasonal or type 5 waters may also occur in non-fish perennial or type 4 waters, but is less likely in fish bearing waters (types 1, 2, and 3). Appropriate placement of and management within riparian management zones has the potential to accommodate most of the conservation needs of

rare riparian plant species. Those plant species limited in their occurrence to Type 5 waters are at greatest risk of damage and disruption under alternative 2 due to the potential for clearcutting and equipment operation.

The analysis for Riparian Management Zones Alternative 3 and the Board's Preferred Alternative for Riparian Conservation is identical to the analysis for Riparian Management Zones Alternative 1. However, the addition of the word "riparian" in Riparian Management Zones Alternative 3 and in the Board's Preferred Alternative helps focus protection on those species most dependant on the riparian environment. Riparian Management Zones Alternative 3 and the Board's Preferred Alternative better meets Policy Objective 3 by providing clarity and consistency with current Forest Practices terminology and for the Board's Preferred Alternative with the HCP for Western Washington.

Direction for determining adequate riparian protection on non-fish bearing streams and when riparian management zones are necessary on non-fish seasonal streams will be needed to achieve the outcomes described in the Board's Preferred Alternative. That direction should be in place upon adoption of the policy or shortly thereafter (within six months), and may either be procedural or substantive (requiring SEPA analysis) but in either case the intent is to ensure that the policy is achieved.

Wetlands

There is an increased risk of adverse impacts to constructed wetlands and wetlands inadvertently created as a result of past management practices under Wetlands Alternative 1. As stated in the policy discussion, Wetlands Alternative 1 limits protection to those wetlands that are "naturally occurring." This puts the policy in conflict with the forest practices rules, which use a broader definition of wetlands, including constructed wetlands created as part of mitigation plans, wetlands inadvertently created as a result of past management practices and other wetlands that meet the ecological criteria in the definition. Because the HCP also bases its wetland strategy on the definition in the forest practices rules, Wetlands Alternative 1 is also in conflict with the HCP and in turn with Policy Objective 1.

Many wetlands on state land have appeared as a result of past management activities that altered hydrology. An example of this might be where road building obstructed sub-surface flow and subsequently forced water to the surface, creating a wetland. Many of these areas are now decades old and provide many habitat, water quality and hydrologic functions. These wetlands require the same protection as "naturally occurring" wetlands, because of their functional contributions and because they may partly offset the negative effects of historic wetland loss. Such wetlands may not be protected through wetlands Alternative 1. As a result wetland function could be lost through compaction, interruption of hydrologic continuity, filling and draining of non-naturally occurring wetlands under Alternative 1. This would also result in a net loss in wetland function and acreage statewide which would also reduce habitat for wetland dependent plants and animals, many of which are state or federal listed as sensitive, threatened or endangered.

No significant adverse impacts have been identified under Wetlands Alternative 2 or the Board's Preferred Alternative for Riparian Conservation. Alternative 2 and the Board's

Preferred Alternative are adequately aligned with the forest practices rules, the intent of the HCP and Policy Objective 1 because they define wetlands using the definition in the forest practices rules. This definition includes wetlands that may not have been specifically protected through Wetlands Alternative 1. Wetland acreage and function of wetlands that meet the definition in the forest practices rules are protected, regardless of wetland size, and mitigation is required to address any losses of function or acreage. The preference for on-site and in-kind mitigation means that wetland losses must be rectified when possible within the same sub-basin where the loss has occurred. This mitigation should replace the same wetland functions and acreage as were lost. For instance, a forested wetland must be replaced by a forested wetland, not by an emergent or shrub-dominated wetland.

The word "overall" in Wetlands Alternative 1 was originally intended to be inclusive of all wetlands on forested state trust lands, implying that the permanent loss of state-managed wetlands could be mitigated by the creation or purchase of additional wetlands. In Wetlands Alternative 2 and the Board's Preferred Alternative for Riparian Conservation, the term "net" should be viewed as inclusive of all wetlands on state trust lands. The term "overall" is not needed, as it would be redundant.

CUMULATIVE IMPACTS

The potential for significant adverse cumulative impacts to instream and riparian habitat is related to current conditions, the intensity and type of future forest management in riparian areas and the risk associated with upslope activities on unstable slopes that could result in large mass movements.

Cumulative impacts are generally addressed through the establishment of minimum standards for all forest practices. A discussion of this is incorporated by reference from the *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources*, Chapter 3, pages 3-207 to 3-216. Additional rules, such as those dealing with Class IV-Special applications or road maintenance and abandonment plans, further address cumulative impacts. These rules are particularly important in regard to cumulative adverse effects on riparian habitat, since sediment is the primary pollutant associated with forest management activities. In addition, the potential for cumulative impacts is assessed at multiple levels of implementing Board of Natural Resources' policies through integration with SEPA reviews during planning and site-specific project proposals.

Under all Riparian Management Zone alternatives, riparian management zones on the westside will be managed under the *Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy For Westside Planning Units excluding the Olympic Experimental State Forest* (April 2006), a procedure approved by the Federal Services under the HCP, which allows riparian thinning activities to be conducted outside a 25-foot no-harvest zone for riparian forest restoration. The Riparian Forest Restoration Strategy itself has monitoring and adaptive management components, designed to study any adverse impacts and respond to them as needed. Additionally, a Type 5 Stream Conservation Strategy will be completed by 2007. Therefore, the risk of

adverse cumulative impacts from ground disturbance and tree removal is low and will be addressed within the context of the *Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy For Westside Planning Units excluding the Olympic Experimental State Forest* (April 2006) and on a project-by-project basis.

Under Riparian Management Zones Alternative 2, there is an increased risk of an adverse cumulative impact regarding the effects of the lack of riparian management zone buffers on many nonfish-bearing streams on the eastside, because cumulative impacts may not be addressed, particularly in watersheds with a high level of recent past harvest. The uncertainty relates to issues regarding effects on sediment delivery to fish streams, large woody debris and leaf/needle litter recruitment from non-fish to fish streams, and the effects of shade reduction and microclimate changes on non-fish stream temperatures and their ultimate effect on fish stream temperatures. A discussion of this is incorporated by reference from the *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources*, Summary, pages S-9 to S-14, Chapter 3, pages 3-7 to 3-89, 3-106 to 3-116, 3-143 to 3-174, and 3-207 to 3-216.

Although Riparian Management Zones Alternatives 1, 3, and the Board's Preferred Alternative for Riparian Conservation provide for riparian management zones along nonfish seasonal streams where necessary to protect key nontimber resources, direction for implementation is needed to mitigate the risk of adverse cumulative impacts to key nontimber resources described above. Without clear direction, especially that which would be used to determine when a riparian management zone is necessary on non-fish seasonal streams, impacts such as elevated water temperatures and sediment loading will be higher. Direction should be in place upon adoption of the policy or shortly thereafter (within six months), and may either be procedural or substantive (requiring SEPA analysis) but in either case the intent is to ensure that the policy is achieved.

In the case of procedural direction, the potential for impacts and mitigation will be assessed through SEPA at the time a management activity is proposed or a plan to accomplish the outcomes identified in the policy is developed.

The cumulative impacts on riparian rare plant species occurring within or along Type 1 through Type 3 waters are similar for all Riparian Management Zone alternatives. However, riparian rare plant species occurring along Type 4 and 5 waters in Eastern Washington are at greater risk of cumulative impacts under Riparian Management Zone Alternative 2. This increased risk is mitigated under Riparian Management Zone Alternatives 1, 3 and the Board's Preferred Alternative for Riparian Conservation, because of their emphasis on using riparian management zones, including Type 4 waters and Type 5 waters when necessary, to protect various features and/or functions, including riparian rare plant species. However, similar to Riparian Management Zones Alternatives 1, 3 and the Board's Preferred Alternative for other key nontimber resources direction is needed for determining "when necessary," to mitigate the risk of adverse cumulative impacts to riparian plant species. Direction should be in place upon adoption of the policy or shortly thereafter (within six months), and, as stated above, may either be procedural or substantive (requiring SEPA analysis) but in either case the intent is to ensure that the policy is achieved.

If applied strictly as written, Wetlands Alternative 1 could result in significant cumulative impacts to wetlands, wetland-dependent wildlife, hydric soils, wetland plants and downstream hydrologic systems, through the lack of protection of wetlands that are not considered “naturally occurring.”

Under Alternative 2 and the Board’s Preferred Alternative for Riparian Conservation, wetlands under a quarter of an acre may not require protection, as outlined in the Affected Environment subsection for this policy subject area because they are neither covered under Forest Practices nor the DNR’s HCP. However, wetlands less than a quarter of an acre in size are often protected through the DNR’s leave tree strategies and other operational activities.

Wetlands that exist within two or more ownerships, or exist within a watershed containing two or more ownerships, could experience cumulative impacts due to less restrictive wetland requirements on other ownerships. Because DNR operates in a mosaic of land ownerships, management of surface and ground water on neighboring properties affects DNR-managed lands. When hydrology is disrupted, the effects cross ownership boundaries. Hydrologic disruption could increase flooding, or in other circumstances drain or pollute wetlands on DNR-managed wetlands. This is true for all of the alternatives. By the same token, DNR- managed wetlands could also experience loss of acreage or function due to changes in climate, “acts of God” or other disruptions unrelated to DNR’s land management activities, however, the concept of “no net loss” applies only in so far as DNR’s own management activities are concerned.

3.3 Social and Cultural Benefits

This major policy category contains policy subject areas related to social and cultural benefits that are provided from forested state trust lands and through DNR's management activities. Forested state trust lands play an important role in providing opportunities for public access and recreation; protecting areas of cultural concern; preserving the visual integrity of Washington's forested landscapes; as well as contributing to local, regional and state economies.

3.3.1 Public Access and Recreation

INTRODUCTION

DNR provides public access opportunities on forested state trust lands as directed by the Multiple Use Concept (RCW 79.10.100), as long as these opportunities are consistent with trust objectives. There are substantial public expectations for public access and recreation, which are not always compatible with a managed landscape. Recreation on forested state trust lands is diverse. Such uses can and do occur in both a dispersed or concentrated way and, in some cases, are supported by developed facilities, such as campgrounds, trailheads and trails. Population growth has greatly increased the demand for access and recreation, as well as increased the incidents of public abuse and illegal activities. At the same time as this demand and level of activities has increased, funding to provide multiple use opportunities from the State-General Fund and a variety of grant programs has decreased.

Although the Public Access and Recreation policy subject primarily meets the following Policy Objectives:

- Meet all state and federal laws, including the trust obligations and the contractual commitments of the HCP (Policy Objective 1); and
- Balance trust income, environmental protection, and other social benefits from four perspectives: the prudent person doctrine; undivided loyalty to and impartiality among the trust beneficiaries; intergenerational equity; and not foreclosing future options (Policy Objective 2);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

DNR provides recreation and public access opportunities across 2.1 million acres of forested state trust lands. Every year hikers, hunters, trail riders, campers and others who enjoy recreating outdoors make more than nine million visits to DNR-managed lands. Recreation on DNR lands tends to be dispersed and emphasizes trails. Activities also

include low impact education-centered recreational opportunities. Much recreation takes place in forest settings supported by primitive facilities.

DNR ownership patterns influence the accessibility of the land to the state's population. Lands managed by DNR in Western Washington have been for the most part aggregated in large blocks. Much of the land also lies in low to middle elevations, making it accessible for most, if not all, of the year. Areas such as the Capitol State Forest at more than 93,000 acres and the Tahuya State Forest at 23,000 acres provide large landscapes for public access. The high rainfall, especially in the fall, winter and spring, means that recreation facilities require constant maintenance to remove overgrowing vegetation and stabilize soils against erosion.

The geographic locations of forested state trust lands are, in many instances, between high density urban or urbanizing areas and higher elevation federal lands. This tends to increase their accessibility to the major population centers of the state. Surveys have shown that the number of people accessing state trust lands has grown as population has increased. This is especially true in Western Washington because of the short travel distances from major cities and towns. In some locations, recreational activities on forested state trust lands provide a significant contribution to local economies.

Recreation use in Eastern Washington is also concentrated in larger blocks of moderately unrestricted access land. The Loomis State Forest, at 134,000 acres, is one of the largest contiguous block of forested state trust land managed by DNR. The state forests in the Naneum area are another example of large unconsolidated ownerships with lots of recreational use. Eastern Washington forests are generally more open with less dense understory vegetation, providing more opportunities for dispersed recreation activities. Lower rainfall and higher snowfall allow recreation in winter, such as snowmobiling and cross-country skiing. Vegetation management along trails is less of a concern. High snowfall can close or restrict use in some areas because of access difficulty.

Recreation opportunities in Eastern Washington also exist long distances from population centers. This favors "destination-site" activities that include camping or staying in vacation facilities close to forestlands. Dispersed activities, especially hunting, are popular and the high temperatures of the summer months tend to push recreation to sites with water access. Many dispersed activities occur from a campsite or recreational vehicle parked within a developed recreation area or a clearing in the forest.

As of 2004, DNR's Recreation Program includes 143 recreational sites and more than 1,100 miles of trails statewide. Of the sites, 57 percent are campgrounds and 43 percent are day-use facilities (trailheads, picnic areas, boat launches and/or interpretive areas). Additionally, there are countless dispersed opportunities, including an unknown amount of user-built trails. In addition to campgrounds, picnic areas and trails, DNR provides considerable public access along its 12,000 miles of forest roads. See the Forest Roads policy subject area for a full discussion of the alternatives being considered for forest roads.

Forested state trust lands provide a broad range of opportunities, including but not limited to: hunting, fishing, camping, equestrian use, motorcycle and all-terrain vehicle riding,

hiking, mountain biking, camping, 4 x 4 riding, educational field tours, boating and sightseeing. Facilities that DNR manages using State-General Funds, grants and volunteers to support recreational access include: day-use areas with picnic sites and group shelter areas, primitive camping, interpretative centers/nature centers, trailheads, boat ramps and/or docks and public beach access sites. However, most recreation on forested state trust lands occurs on trails and roads.

DNR manages more than 1,100 miles of trails. Of these miles, more than 450 miles are multiple-use non-motorized trails, more than 120 miles are hiking only trails and almost 200 miles are winter trails for snowmobiles and cross-country skiing. As demand for different uses increases, conflicts between different types of recreation and users may increase as well, making multiple use trail systems more difficult. Many more miles of trails have been built by the users themselves that are not designated or managed by DNR. With more than 400 miles of designated motorized trails, DNR provides the most state land off-road vehicle trail riding opportunities in Washington.

A typical developed recreation site could include a variety of improvements and facilities. Camping and day-use areas can include tables, fire pits and vault toilets; improved paths and fencing; directional, interpretive or other signs; horse corrals; water systems; semi-permanent host sites, including utilities hook-up; some limited garbage collection facilities and other ancillary improvements. Trails often include areas hardened with concrete blocks or timbers, bridges with hardened approaches, signage systems, improved parking areas that are graveled or paved and trails within maintained vegetation-free corridors.

Developed sites are found on forest edges and deep within managed forest areas. Trails typically include loops that traverse a variety of forest stand types and elevations. While most of the recreation activity is concentrated in larger forest blocks, even a small parcel of land may be used as a favorite hunting or fishing area or may contain sport trails frequented by a local neighborhood or community.

DNR-designated and financially or otherwise (volunteers) supported facilities such as campgrounds, trailheads, boat launches, roads and trails are designed, located and managed to mitigate potential environmental impacts to earth, water, wildlife and the built environment. Examples include: locating facilities away from streams and wetlands and on flat or gently sloping surfaces; maintaining as much natural vegetation as possible during construction; limiting or completing closures during the wet season; use of drainage structures, bridges and surface hardening; and avoidance of special ecological features or wildlife habitats.

The focus of maintenance activities on recreation sites and trails is to minimize potential impacts to soils. DNR has and continues to relocate trails on soils and terrain that are more stable, have good drainage and are less steep. Management activities focus on stabilizing soil through installation of drainage structures, such as ditches and water bars; use of trail hardening materials in areas prone to erosion, such as curves, slopes and approaches to bridges over streams; imposing seasonal closures of trail segments or systems when rain and snowfall is likely to be highest, and using permits to limit numbers of users.

Dispersed public use of forested state trust lands represent the highest potential for environmental and public safety impacts. Many user-built trails are not located or designed to mitigate potential environmental impacts, nor are they supported financially or otherwise. These trails have no drainage structures, are often located on erodible soils or steep slopes, may have wet crossings of streams (no bridges) and are used during times of the year when impacts can be most severe.

Noise concerns associated with both authorized and unauthorized public uses, especially associated with off-road motor vehicles and recreational shooting are increasing. Such uses in some locations, especially if unmanaged, produce significant noise level impacts to surrounding residential areas. Moreover, concentrated and dispersed target shooting, which has increased significantly during the last decade on forested state trust lands, also pose an increased environmental risk, safety risk to the public and DNR employees, noise, and risk of damage to public property and trust assets.

Existing funding for the Recreation Program from the State-General Fund and grants has declined in terms of real dollars over the past decade. In terms of resources for maintenance and management of facilities and trails, DNR has experienced a decline in the capacity to assess and address potential risks to humans and the environment. Only about 30 percent of existing sites are maintained on a regular basis, with the rest receiving intermittent to very little attention. The result is that most of DNR's developed and designated areas have infrequent garbage collection, vault toilets are pumped irregularly and vandalism or storm damage is not immediately repaired. Due to dwindling resources for public use management, risks of environmental impact cannot always be addressed in a timely manner. While DNR uses all its resources in the most effective way possible by seeking grant and other external funding sources and by leveraging staff capacity with adopt-a-trail and other volunteer-based programs, the need for management is greater than the present capacity to deliver it.

Volunteers are a vital component of DNR's Recreation Program and assist in a variety of ways. They provide support for grant applications, primarily for site and trail maintenance funding. Volunteers also actively participate in trail and facility maintenance activities, such as brushing trails, forest watch, hardening and shaping trails, installing culverts and drainage dips, assisting with bridge construction and bridge maintenance, picking-up garbage, repairing fencing, weed control and painting outhouses and signs. Volunteers also work as campground hosts. In 2004, DNR's Recreation Program benefited from more than 12,000 hours of volunteer labor. The level of authorized recreation and public access that DNR can provide and manage is dependent on DNR's resources, staff time, other support and funding to maintain and manage the program.

Providing access for recreation can have an impact on DNR's road system. Recreational visitors are dependent on the road system that DNR builds and maintains for timber harvest and other land management activities. Except where state and local roads provide additional access, many recreational sites and trail systems can only be accessed from forest roads. The increased use created by recreational visitors can cause wear and tear on road surfaces and increase the amount of maintenance needed to meet public safety and

environmental concerns. Vehicles driven by people seeking to access recreation sites can be two- or four-wheel, but are generally passenger cars, light trucks or sport utility vehicles. The quantity of vehicle trips for recreational access can represent an increased risk of degradation of the road system.

Road closures, particularly during rainy times of the year can help reduce maintenance needs. Paving road segments at greater risk of high use can also reduce the long-term maintenance needs, though initial costs of road construction can be much higher, and increase speed, creating a safety hazard.

Public engagement in recreation activities can increase the need for public services, such as law enforcement, emergency medical resources and search and rescue activities. Activities associated with recreation can include potential risk of harm to the individual participating in the activity and those around them. Motorized activities are likely to include the greatest risk of bodily harm and often require the attention and time of law enforcement personnel to encourage safe operation of recreational vehicles. As the number of uses and users increases, so does the demand for enforcement and other services.

One consequence of managing a very large land base is the risk of illegal activities being carried out in areas not frequented or patrolled by enforcement or other personnel. With thousands of miles of forest roads and hundreds of entry points, DNR is at high risk for illegal activities to occur. Some of those activities may also pose risks to the natural environment and other resources. Common illegal activities that occur include garbage dumping, vandalism, reckless shooting and theft of wood or other forest products. These create impacts to natural resources. Some activities, such as methamphetamine labs, can pose extreme danger to people and the environment. These are some of a wide variety of illegal practices that take place on DNR lands. The potential for impacts from these activities is difficult to anticipate. In order to minimize the risk of these impacts, DNR would have to restrict access to the forested state trust lands and/or greatly increase the amount of enforcement activity across the landscape. This would result in greatly limiting public access and recreational opportunities for the vast majority of law-abiding people.

The state's population has doubled since 1950 and it is expected to double again by 2050. As a result, recreation demand is on the rise. According to the *State Comprehensive Outdoor Recreation Plan* (IAC, 2002):

- ORV use is expected to increase by 20 percent over the next 20 years, and, the amount of available ORV trails is expected to stay static;
- Equestrian use is expected to grow by 29 percent over the next 20 years; and
- Hiking use is expected to grow by 34 percent over the next 20 years.

Recreation activities affect the economics of Washington State. For example:

- According to the study, "Adding it up – Washington communities profit from fish, wildlife and recreation" (Washington State Department of Fish and Wildlife, 2002),

people in Washington State spend more than $2 billion dollars annually for hunting, fishing and viewing wildlife.

- The motorcycle and all-terrain vehicle industry is growing rapidly. The people purchasing these vehicles will be looking for places to ride them. In many cases, they will seek out trails on forested state trust lands.

The demand for recreation on forested state trust lands in the future will very likely reflect these trends. Pressure from the public for more access and opportunities will continue to increase. In addition, the level of abuse and illegal activities has also risen dramatically since 1992. User built trails, theft, meth labs and marijuana plantations on forested state trust lands potentially damage the environment, take revenue away from the trusts and puts public and employee health and safety at risk.

REGULATORY FRAMEWORK

Chapter 79.10 RCW directs DNR to allow multiple use of the trust lands it manages, including recreation areas and trails; education and scientific studies; special events; hunting and fishing; and maintenance of scenic areas and historic sites, when such uses are compatible with trust land management. Chapter 79.10.120 RCW also states, "If such additional uses are not compatible with the financial obligations in the management of trust land, they may be permitted only if there is compensation from such uses satisfying the financial obligations". Chapter 46.09 RCW applies to all lands of the state, including private and forested state trust lands, and sets standards for the permitting and use of off-road and non-highway vehicles. It does not apply to the use of snowmobiles or any vehicle designed primarily for travel on, over or in the water. Chapter 332-52 WAC, Managed Lands and Roads-Use Of, controls public use activities that occur on all lands under the jurisdiction of DNR. The rules are aimed at protecting recreational, economic and industrial activities on land and roads.

Chapter 4.24 RCW limits the liability of DNR from unintentional injuries suffered by anyone recreating on DNR-managed lands, as long as DNR does not charge a fee for public access and recreation.

ALTERNATIVES

Table 1: Summary of Alternatives for Public Access and Recreation

Alternatives	Approach	Emphasis
Alternative 1 (No Action)	Passive	Compatibility Not Adequately Addressed
Alternative 2	Active Control	Ensure Compatibility by Closing, Limiting and Restricting Access
Alternative 3	Active Collaboration	Ensure Compatibility through Collaboration and Increased Funding
Alternative 4	Active Evaluation and Management	Ensure Compatibility through Evaluation, Active Management and Collaboration
Board's Preferred Alternative	Active Evaluation and Management	Ensure Compatibility through Evaluation, Active Management and Collaboration

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 commits DNR to provide public access and recreation as required by the Multiple Use Concept, when compatible with the policies in the *Forest Resource Plan* and trust objectives. Alternative 1 states that DNR may, in some circumstances, control access and recreation when necessary to accomplish specific management objectives, protect public safety or to control environmental impacts. Alternative 1 does not provide adequate guidance related to compatibility with trust objectives, given current or future demands for public access and recreation on forested state trust lands. Alternative 1 meets Policy Objective 1, but it does not appear to meet Policy Objective 2 as well as other alternatives.

POLICY STATEMENTS

***Forest Resource Plan* Policy No. 25, Providing Public Access: "The department will provide public access for multiple uses on state forestlands. In certain circumstances the department will control vehicular or other access, but only where necessary to accomplish specific management objectives. Public access may be closed, restricted or limited to protect public safety; to prevent theft, vandalism and garbage dumping; to protect soils, water quality, plants and animals; or to meet other objectives identified in the plan."**

***Forest Resource Plan* Policy No. 29, Recreation on State Forestlands: "The department will allow recreation on state forestland when compatible with the objectives of the *Forest Resource Plan*. As part of its efforts, the department will continue to comply with the Statewide Comprehensive Outdoor Recreation Plan."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 emphasizes limiting, restricting or closing public access to address any negative impacts, the requirement for adequate funding from sources other than the Resource Management Cost Account (RMCA) (RCW 79.64.020) or the Forest Development Account (FDA) (RCW 79.64.100) (management funds), which involve trust revenues that must be used for trust management purposes. Alternative 2 also ensures safety and compatibility with trust objectives, including environmental stewardship. Adequate funding for recreation generally needs to come from the State-General Fund appropriation or some external source. Alternative 2 describes the actions DNR will take to ensure safety and compatibility with trust objectives. Alternative 2 limits expenditures from the RMCA or FDA to control incompatible dispersed public access and illegal activities to meet trust objectives and protect trust assets. The policy statements below generally reflect DNR policy, PO 10-002: Public Use on DNR-Managed Trust Lands that currently applies to all DNR-managed trust lands, including forested state trust lands.

Alternative 2 requires adequate support from non-RMCA or FDA sources for public access and recreation on forested state trust lands. If resources and funding are not available for safe, positive experiences for the public, and environmental and economic impacts cannot be minimized, access and recreation would be restricted or limited to the level that is compatible with public safety and trust objectives. This is a more active approach to managing recreational access and allows for activities to be redirected or discontinued if impacts unacceptable to the trusts or the public occur. It is also; however, a more passive approach to pursuing funding to help support recreation on forested state trust lands and implement the Multiple Use Concept. Alternative 2 appears to meet Policy Objective 1, but does not appear to meet Policy Objective 2 as well as Alternatives 3 and 4.

POLICY STATEMENTS

When managing public access and recreation use on forested state trust lands, the department will seek to balance economic, ecological and social concerns, with a general emphasis on ensuring minimal ecological and economic impacts to the trusts, and positive, safe experiences for the public.

When designated or dispersed public access and use on forested state trust lands are resulting in threats to public, employee and department contractor safety; in theft, vandalism, garbage dumping and other illegal activities; or in damage to soils, water quality, plants and animals or other elements of the forest environment, the department will work to control those negative effects, including closing, limiting or restricting public access when necessary.

The department will limit expenditures of management funds to the closing, limiting or restricting of public access to control the impacts of incompatible dispersed public access and illegal activities to meet trust objectives and protect trust assets.

■ ALTERNATIVE 3

DISCUSSION

Alternative 3 emphasizes enhancing the compatibility of increased public access and recreation with trust objectives and public safety. Alternative 3 focuses on collaboration with the public, user groups, other landowners, other agencies and organizations to seek funding to ensure compatibility, as well as mitigate any negative impacts associated with incompatible dispersed public access. Management funds originating from revenue-producing activities and dedicated to the management of trust assets on behalf of the trust beneficiary would be invested under Alternative 3 to control the impacts of incompatible public access. Management funds (RMCA and FDA) would also be invested where benefits, including financial, to the trusts can be demonstrated. Such benefits could include reducing management costs to the trusts in the short and long-term, as well as investing in public access and recreation as a financial diversification strategy to increase net revenues to the trust beneficiaries. Under Alternative 3, PO 10-002, Public Use on DNR-Managed Trust Lands, would no longer apply to forested state trust lands.

POLICY STATEMENTS

When managing public access and recreation use on forested state trust lands, the department will seek to balance economic, ecological and social concerns, with a general emphasis on enhancing the compatibility of increasing public access and use with trust objectives.

Compatibility may be enhanced through collaborative work with the public, user groups, other landowners, other agencies and organizations; through active pursuit of non-trust financial and other support; and through prudent expenditures of management funds, where benefits to trust management can be demonstrated.

When designated or dispersed public access and use on forested state trust lands are resulting in threats to public, employee and department contractor safety; in theft, vandalism, garbage dumping and other illegal activities; or in damage to soils, water quality, plants and animals or other elements of the forest environment, the department will work to control those negative effects through collaboration with the public, user groups, other landowners, other agencies and organizations. In limited circumstances, the department will control those negative impacts by closing, limiting or restricting public access.

The department will expend prudent levels of management funds to control the impacts of dispersed public access and illegal activities to meet trust objectives, protect trust assets and meet the intent of the Multiple Use Act.

■ ALTERNATIVE 4

DISCUSSION

Alternative 4 directs DNR to evaluate and manage public access and recreation based on: a) the physical condition of the area in a landscape context, including neighboring landowners; b) the characteristics of the users, including their degree of organization; and c) the reasonable availability of DNR financial, staff and other resources for sustainable and compatible long-term management. The management of public access and recreation must ensure protection of trust interests, including an analysis of costs and benefits. Alternative 4 describes the actions DNR may take to ensure safety and compatibility with trust objectives, including environmental stewardship, through collaboration with the public, user groups, other landowners and other agencies and organizations to mitigate negative impacts, and by limiting, restricting and closing public access when necessary. Alternative 4 states that management funds (from the RMCA and FDA will be expended to protect trust assets from any impacts associated with incompatible dispersed public access and illegal activities. Under Alternative 4, PO 10-002, Public Use on DNR-Managed Trust Lands, would no longer apply to forested state trust lands.

Alternative 4 best meets the applicable policy objectives by meeting the requirements of the Multiple Use Concept (Policy Objective 1), while still providing the right balance between trust income and asset protection and providing social benefits associated with public access and recreation (Policy Objective 2).

POLICY STATEMENTS

When managing public access and recreation use on forested state trust lands, the department will seek to balance economic, ecological and social concerns by evaluating on a landscape or case-by-case basis: a) the physical condition of the area in a landscape context, including neighboring landowners; b) the characteristics of the users, including their degree of organization; and c) the reasonable availability of department financial, staff and other resources for sustainable, long-term management. The department's conclusion must ensure protection of trust interests, including an analysis of costs and benefits.

When designated or dispersed public access and use on forested state trust lands are resulting in threats to public, employee and department contractor safety; in theft, vandalism, garbage dumping and other illegal activities; or in damage to soils, water quality, plants and animals or other elements of the forest environment, the department will work to control those negative effects through collaboration with the public, user groups, other landowners, other agencies and organizations to mitigate negative impacts. Mitigation will include the closing, limiting or restricting of public access when necessary.

The department will limit expenditures of management funds to the closing, limiting or restricting of public access to control the impacts of incompatible dispersed public access and illegal activities to meet trust objectives and protect trust assets.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative is the same as Alternative 4, with some minor edits to ensure the policy is clear and succinct (Policy Objective 3).

The Multiple Use Concept states that DNR shall provide recreational opportunities where such uses are compatible with trust objectives. Therefore, public access and recreation must be compatible with trust objectives. Compatibility can be achieved by:

- Obtaining compensation to the trust(s) for developed facilities;
- Ensuring that dispersed uses have minimal adverse economic, ecological or social impacts, or
- Enhancing trust returns.

The compatibility of dispersed uses with trust objectives is a function of the physical location of the use, its intensity, and the availability of the users, DNR staff and resources to manage or exploit the use. In some cases, dispersed uses must be mitigated, redirected, limited, or eliminated to ensure compatibility with trust objectives. In addition, collaboration between DNR, the public, user groups, other landowners, and other agencies and organizations is critical for providing safe public access and recreation opportunities on forested state trust lands and meeting trust objectives.

POLICY STATEMENTS

When managing public access and recreation use on forested state trust lands, the department will protect trust interests and seek to balance economic, ecological and social concerns by evaluating the following on a landscape or case-by-case basis:

- **The physical condition of the area in a landscape context, including neighboring landowners;**
- **The characteristics of the users, including their degree of organization;**
- **The reasonable availability of financial, staff and other resources for sustainable, long-term management; and**
- **Cost and benefit to the trust(s).**

The department will work to control negative effects of designated or dispersed public access and use on forested state trust lands through collaboration with the public, user groups, other landowners, and other agencies and organizations. Negative effects include:

- **Threats to public, employee and department contractor safety;**
- **Theft, vandalism, garbage dumping and other illegal activities; or**
- **Damage to soils, water quality, plants, animals or other elements of the forest environment.**

Mitigation will include the closing, limiting or redirecting of public access when necessary.

In meeting the intent of the Multiple Use Concept, the department will only expend management funds for closing, limiting or redirecting public access in order to meet trust objectives or protect trust assets by controlling the impacts of incompatible dispersed public access and illegal activities.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Under Alternative 1, there is an increased risk of adverse environmental impacts to soils, plants and animals, and water, and an increase in public safety concerns. Where recreation and public access is passively managed or supported, it has resulted in activities and potential impacts not being monitored as closely. Assessment of need for correction takes longer to occur. Declining funding and resources requires DNR to favor areas of greatest use that have the greatest need for budget support, and leaves other areas with fewer resources to deal with problems. If use is not actively managed, monitored

and directed, facilities and trails may deteriorate, storm and vandalism damage may not be known and assessed quickly, and use may proliferate in areas without designated and managed trail systems. As the number of activities and users rise without being managed and monitored, the risk of activities taking place in a manner or area that is not compatible with the natural environment, public safety or trust objectives also rises. The potential for impacts to riparian areas including sensitive plants, soils, water quality and fish habitat through erosional processes, and public safety increases. It is increasingly difficult to direct use toward areas and use types that minimize environmental impacts and are more appropriate and compatible with trust objectives and public safety.

Under Alternative 2, the risk of adverse impacts to the natural environment is lowered, while the risk of adverse impacts to the built environment, i.e., less recreational opportunities on forested state trust lands, is increased. The critical aspects of Alternative 2 are the requirements that ensure that adequate and appropriate funding and support are available to ensure compatibility of public access and recreation with trust objectives. If an activity or level of use cannot be provided in a way that minimizes potential environmental and economic risks, that use will be eliminated. Activities and use levels that are adequately and appropriately funded would be maintained. This approach results in a decrease in the potential for significant environmental impacts to the natural environment and to public safety primarily through the control of unauthorized and non-supported uses. Alternative 2 is dependent on active monitoring and assessment of recreation uses and a reliable decision-making process for problems that are encountered. The active approach in controlling access under Alternative 2 would likely require a much higher level of management fund expenditures to identify, assess and close incompatible and potentially some currently designated public access and recreational uses that were incompatible with trust objectives or posed an unacceptable risk to the environment, the public and/or employee safety.

While Alternative 2 decreases potential risk to the natural environment, it also potentially decreases the amount of recreational access that would be allowed on forested state trust lands. As the funding for recreation and public access has dwindled, unmanaged use has increased. DNR resources, as currently funded, are not adequate to monitor recreation activities across all DNR-managed lands. Full implementation of Alternative 2 could result in closures of areas that cannot now be managed, particularly those where unmanaged use represents high potential for environmental damage to riparian areas, including sensitive plants, water quality, soils and fish habitat. For instance, areas found to have trails not designated and managed by DNR would likely have access restricted and facilities without funding for proper maintenance would be closed. This would result in fewer recreation opportunities on forested state trust lands and forcing these activities on other lands would likely increase the environmental impacts on other lands.

Alternative 3 is not likely to decrease recreation opportunities on DNR-managed forested state trust lands. Alternative 3 directs DNR to collaborate with others to support recreation activities at present and increasing levels. Under ideal situations where collaboration is very successful, the result would be that recreation enthusiasts could continue to engage in the variety of activities that take place on forested state trust lands

today and in the future and the number of designated sites, trails and road miles open to use would likely increase, as would levels of compatible dispersed public access.

However, while funding would be actively pursued under Alternative 3 to address problems that were discovered through monitoring and management of recreational access and activities to ensure compatibility with public safety, environmental protection, and trust economic objectives, the magnitude of impacts associated with the level of use would be challenging to control. Therefore, Alternative 3, even with its emphasis on collaboration, and funding to support recreation and reduce the risk of impacts to the natural environment and trust economic objectives, likely represents a level of impacts to the natural environment higher than Alternatives 2 and 4 due to increased levels of use.

Alternative 4 and the Board's Preferred Alternative are a more proactive approach to public access and recreation management through evaluation of the physical compatibility of the landscape to support public access and recreation and to support infrastructure available to manage public access and recreation to ensure compatibility with trust environmental and economic objectives and public safety. Alternative 4 and the Board's Preferred Alternative direct DNR to limit recreational uses if they pose risks to trust assets, people, resources and the environment and limits expenditures of management funds to the closing, limiting or restricting of public access to control environmental or other trust asset impacts. It also promotes collaboration with others that could redirect uses to other DNR-managed facilities or provide for measures that would minimize or mitigate impacts.

Impacts to the natural environment under Alternative 4 and the Board's Preferred Alternative would likely be less than under Alternatives 1 and 3. This is a result of actively assessing the compatibility of public access and recreation with environmental sustainability; and managing to ensure compatibility with trust objectives, other *Policy for Sustainable Forests* policies, and public safety.

CUMULATIVE IMPACTS

Impacts to the natural environment, primarily riparian areas, including sensitive plants, soils, water quality and fish habitat, from recreational activities can increase, as the types and frequency of activities occur in a given area, especially those that are incompatible with trust objectives and are unmanaged and unsupported by appropriate funding or other resources.

Alternative 1 will result in a higher risk of impacts becoming cumulative, due to lack of clear guidance and commitment to manage recreation and public access on DNR-managed lands. If a passive stance is taken to how the public accesses and uses the land, inappropriate use could proliferate and at levels that increase potential for impacts to the natural environment. Without clear direction, frequency and intensity of public access and recreation may not be monitored in a way to allow for limitations being set where appropriate. This would increase the likelihood of significant cumulative impacts to riparian areas, sensitive plants, soils, water quality, and fish habitat.

Alternative 2 allows for recreational and public access, when compatible with trust objectives. Alternative 2 would reduce the likelihood of significant impacts on forested

state trust lands to the natural environment while substantially increasing the likelihood of significant impacts to recreational opportunities by potentially reducing the amount of recreation that occurs on these lands. Alternative 2 could substantially dislocate recreational opportunities, along with the associated negative impacts to riparian areas, including sensitive plants, soils, water quality, and fish habitat, to lands other than forested state trust lands.

Alternative 3 may have an increased risk of cumulative impacts to the natural environment, because it involves less active assessment of compatibility with trust objectives that may lead to greater management controls, but provide more access and recreational opportunities than Alternative 4. In addition, by providing more trust-compatible access and recreational uses, incompatible dispersed uses may decline or be easier to control, thereby mitigating some of the potential for cumulative adverse impacts to the natural environment and that could result from limiting recreational opportunities. Seeking and securing greater funding to support the current authorized level of recreational access could mitigate adverse cumulative impacts to the built environment, i.e., recreation opportunities, by allowing DNR to be proactive in directing and limiting use as appropriate.

Alternative 4 and the Board's Preferred Alternative would reduce the risk of cumulative impacts to the natural environment below Alternatives 1 and 3, by ensuring long-term and sustainable, compatible public access and recreation based on physical compatibility with the landscape and the available support infrastructure.

3.3.2 Cultural Resources

INTRODUCTION

Forest management activities can have various impacts on archaeological, historic and cultural resources. For archaeological and historic sites, these activities can result in physical damage or destruction with a loss of cultural, scientific and historic values. For traditional cultural properties, these activities can result in physical damage or destruction, as well as a loss of privacy, isolation and perceived purity. Forest management can change species composition that can favor resources utilized by the Tribes. For example, timber harvesting, like the traditional burning of forests, can encourage the growth of berry-producing species and provide forage for game animals. Cedar growth is also promoted on many trust lands by the removal of competing tree species.

DNR recognizes the significance of cultural properties, current cultural uses and historic and archaeological sites. DNR also acknowledges the importance of government-to-government communications with the Tribes, as discussed in the *Commissioner's Order on Tribal Relations* (see Appendix C), as well as communications with interested stakeholders.

Although the Cultural Resources policy subject primarily meets the following Policy Objectives:

- Balance trust income, environmental protection, and other social benefits from four perspectives: the prudent person doctrine; undivided loyalty to and impartiality among the trust beneficiaries; intergenerational equity; and not foreclosing future options (Policy Objective 2); and
- Seek productive partnerships that help DNR achieve policy objectives (Policy Objective 4);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

Cultural resources include prehistoric and historic archaeological sites, historic structures and areas and traditional cultural properties. The Office of Archaeology and Historic Preservation maintains both Tribal and non-Tribal information on more than 20,000 archaeological sites and more than 100,000 historic properties. Many Tribes maintain an extensive listing of cultural resource properties within ceded lands and usual and accustomed areas, although some Tribes do not share this information. Information related to cultural properties is not available through the Office of Archaeology and Historic Preservation.

Historic sites on forested state trust lands are likely to be remnants of logging, mining, homesteads and early transportation routes. For a historic overview, see Appendix D, as well as the *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*, pages D-67 to 69.

Cultural properties on forested state trust lands can take many forms. Vision quest sites, ceremonial bathing and gear storage sites, plant gathering and hunting sites are all examples. These sites are either known and recorded by the Tribes or are known by the Tribes, but not recorded or shared.

REGULATORY FRAMEWORK

Chapter 27.34 RCW, Archaeology and Historic Preservation: The Legislature declares it the public interest to designate, preserve, protect, enhance and perpetuate structures, sites, districts, buildings and objects of historic, archaeological, architectural or cultural value. The Office of Archaeology and Historic Preservation administers this law.

Chapter 27.44 RCW, Indian Graves and Records: Indian burial sites, cairns, glyptic markings and historic graves located on public and private land are to be protected. Any person who knowingly removes or damages Native American cairns, graves, pictographs or petroglyphs, or sells artifacts or human remains from graves is guilty of a Class C felony. A Tribe or enrolled member can bring civil action to secure an injunction, damages or other appropriate relief.

Chapter 27.53 RCW, Archaeological Sites and Resources: Information from archaeological sites is declared a public interest. Archaeological sites and artifacts on forested state trust lands, whether previously recorded or still unrecognized, are declared property of the state. Disturbing archaeological resources without a permit from the Office of Archaeology and Historic Preservation is unlawful. Civil and criminal penalties may apply. Archaeological site information is declared exempt from public disclosure.

Chapter 25-48 WAC (implements chapter 27.53 RCW): Archaeological excavation and removal permit.

WAC 222-16-050(1)(f) (forest practices rules): Timber harvest, construction of roads, landings, rock quarries, gravel pits, borrow pits and spoil disposal areas on archaeological or historic sites registered with the Office of Archaeology and Historic Preservation or on sites containing evidence of Native American cairns, graves or glyptic records, as provided for in chapters 27.44 RCW and 27.53 RCW are Class IV-Special forest practices. DNR shall consult with affected Tribes in identifying such sites.

WAC 222-16-050(5)(k) (forest practices rules): Harvesting, road construction, site preparation or aerial application of pesticides on lands with cultural, historic or archaeological resources are Class III forest practices. Cultural resources must be on or be eligible for listing on the National Register of Historic Places or must have been identified to DNR as being of interest to an affected Tribe.

WAC 222-20-120: Notice of forest practices to affected Indian Tribes: (1) DNR shall notify affected Indian tribes of all applications of concern to such tribes, including those

involving cultural resources, identified by the Tribes. (2) Where an application involves cultural resources the landowner shall meet with the affected tribe(s) with the objective of agreeing on a plan for protecting the archaeological or cultural value. DNR may condition the application in accordance with the plan. (3) Affected Indian Tribes shall determine whether plans for protection of cultural resources will be forwarded to the Office of Archaeological and Historic Preservation.

WAC 222-16-010 General definitions: "Cultural Resources" means archaeological and historic sites and artifacts and traditional religious, ceremonial and social uses and activities of affected Indian Tribes.

1987 Timber, Fish and Wildlife Agreement: DNR will update and maintain a system with information on archaeological and cultural resources. The Tribes may provide DNR with general location information for those resources. Forest practices applications will be cross-checked against the system and landowners/operators and the affected Tribe(s) will be immediately notified. All requirements of forest practices rules must be met.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 directs DNR to establish a program for identifying and protecting historic and archeological sites on forested state trust lands. Alternative 1 is limited, because it doesn't address culturally-significant areas, such as traditional cultural properties and current cultural uses. They are, however, addressed under the forest practices rules WAC 222-20-120 and WAC 222-16-010. Alternative 1 does not appear to meet Policy Objectives 2 and 4 as well as Alternative 2 because it does not specifically include reference to culturally significant areas.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 24, Identifying Historic Sites: "The department will establish a program to identify and inventory historic and archaeological sites and protect them at a level which, at a minimum, meets regulatory requirements."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 directs DNR to maintain its existing program for identifying and protecting historic and archaeological sites consistent with state and federal law. Alternative 2 directs DNR to actively communicate and promote collaboration with the Tribes on issues related to culturally-significant areas, such as traditional cultural properties and current cultural use. Alternative 2 also directs DNR to work with interested stakeholders on issues related to non-Tribal cultural uses, historic and archaeological sites. Alternative 2 recognizes that on occasion, it may be in the best interest of the trusts to consider

transferring ownership of trust lands with significant archaeological, historic and cultural resources, when compensation to the trusts is secured. Alternative 2 best meets the applicable policy objectives by encouraging partnerships with the Tribes and interested stakeholders (Policy Objective 4). In addition, Alternative 2 provides balance between trust income and protection of historic, archaeological and culturally-significant areas or resources through compensation to the affected trust where appropriate (Policy Objective 2).

POLICY STATEMENTS

The department will protect significant historic and archaeological sites consistent with state and federal law.

The department will actively communicate and promote collaboration with Tribes and interested stakeholders to address culturally-significant areas.

When in the best interest of the trusts, the department will consider transfer of ownership of historic, archaeological and culturally-significant areas when compensation to the trusts is secured.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative is the same as Alternative 2, with some minor edits to ensure the policy is clear and succinct (Policy Objective 3).

POLICY STATEMENTS

The department will protect significant historic and archaeological sites, consistent with state and federal law.

The department will actively communicate and promote collaboration with Tribes and interested stakeholders to address culturally significant areas.

When in the best interest of the trust(s), the department will consider transfer of historic, archaeological and culturally significant areas out of trust status, when compensation to the trust(s) is secured.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

No significant adverse impacts are identified for any of the alternatives. DNR has a tribal liaison, a professional archaeologist, cultural resource technicians in every region except Northeast and many field personnel trained to recognize cultural resources.

In addition, DNR frequently enters into memoranda of agreement with Tribal governments to protect traditional cultural properties and maintain Tribal access to resources and localities important to the continued practice of their traditional cultures.

The biggest challenge in implementing DNR's cultural resource program involves enough dedicated time for the cultural resource technicians to address cultural resource issues, including procedural communication and collaboration with the Tribes and other interested stakeholders. As a result, known-state recorded sites are systematically identified, evaluated and mitigated, while known-not recorded and Tribally-recorded (such as traditional cultural properties) and unknown-unrecorded sites are not systematically identified, evaluated and mitigated, which increases the potential for impacts to these sites from timber harvest and other management activities if they are not discovered during the activity. The impacts could range from temporary short-term impacts, e.g. to traditional uses such as bathing, vision questing, berry picking and other low-intensity resource extraction to complete disruption or destruction of archaeologic resources. Mitigation of these types of impacts is dependent upon DNR receiving knowledge of these sites. The intent of the Board's Preferred Alternative is to actively communicate and promote collaboration with the tribes to make DNR aware of potential sites so that they can be protected.

Similar to what is required under current forest practices rules, Alternative 2 and the Board's Preferred Alternative commits DNR to actively communicate and promote collaboration with the Tribes on issues related to Tribal access, Traditional Cultural Properties and cultural uses. DNR will also work with other interested stakeholders on issues related to non-Tribal cultural uses, and historic and archaeological sites. Alternative 2 and the Board's Preferred Alternative emphasize this broader need to address cultural resource issues and will help DNR fulfill the cultural resource commitments made in the HCP. Known-state recorded sites will continue to be systematically identified, evaluated and mitigated. In addition, the likelihood that Tribally-recorded, known-not recorded and unknown-unrecorded sites will also be systematically identified, evaluated and mitigated is increased.

CUMULATIVE IMPACTS

Although current state and federal law addresses the need to communicate with the affected Tribes, the emphasis under Alternative 2 and the Board's Preferred Alternative to promote collaboration regarding culturally-significant areas with the Tribes and others is intended to provide additional mitigation. The expectation is that short- and long-term adverse impacts, as described above, will be avoided or minimized, as well as cumulative impacts in terms of decreasing the risk of compounding project-specific impacts to cultural resources, e.g., traditional uses that may occur across landscapes, apart from this emphasis.

3.3.3 Visual Impacts (formerly "Visual Management")

INTRODUCTION

Population growth, especially in Western Washington, has significantly increased the visibility of DNR management activities. DNR activities can alter the visual nature of forest stands and forested landscapes. These visual changes can be local in nature, such as views from a recreational trail or an individual residence, or regional, such as foreground and background views from a county road or state highway, or a background view to cities and towns.

Although the Visual Impacts policy subject primarily meets the following Policy Objectives:

- Balance trust income, environmental protection, and other social benefits from four perspectives: the prudent person doctrine; undivided loyalty to and impartiality among the trust beneficiaries; intergenerational equity; and not foreclosing future options (Policy Objective 2); and
- Pursue outcome-based management within a flexible framework (Policy Objective 6);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

The visibility of forestry operations and the potential for visual impacts is influenced by many factors. These factors include the position and distance of the viewpoint from the activity, the topography of the land, the type of operation and the intensity and/or concentration of activities, what is revealed as a result of the activity and how long the activity is in view. The observer's background and personal values influence whether the reaction to the visual impact is positive, neutral or negative.

DNR currently utilizes a variety of strategies and mechanisms to mitigate visual impacts. DNR often uses early community outreach to help determine any visual sensitivity to the proposed activity.

Visual impacts can be mitigated through a variety of strategies and mechanisms:

- Early outreach to the community to help determine the visual sensitivity to a proposed activity;
- Use of land management requirements—such as riparian and wetland buffers, protection of unstable slopes, and location and arrangement of wildlife trees—to create buffers or screen harvest activities;

- Use of different silvicultural strategies—timing, design and size of timber harvest units; the arrangement of harvest units over time and space across landscapes; compliance with the "green-up" requirements of the state forest practices rules;
- Visual modeling tools to help assess and mitigate visual impacts; and/or
- Use of partial or selective harvests rather than even-aged harvest, particularly in Eastern Washington, where selective harvest is the dominant harvest technique.

DNR's forest land planning process may be used to identify areas of visual sensitivity and develop strategies to mitigate visual impacts.

The visual impacts of DNR's harvest activities have been limited to an average of 12,000 to 14,000 acres per year over the past several years. This accounts for all harvest operations and is considerably less than anticipated in the HCP, which was up to 24,600 acres per year over the first decade in Western Washington alone. The range represented by these acreages varies from 0.57 percent to 1.2 percent of the total forested state trust land base managed by DNR (2.1 million acres). In Western Washington, approximately 75 percent of the annual harvest would be from regeneration harvests, i.e., those that leave eight to 20 trees per acre, and while the remaining harvest activities are thinnings or partial harvest. The majority of harvests in Eastern Washington are partial or selective harvests.

REGULATORY FRAMEWORK

The forest practices rules (WAC 222-30-025) address even-aged harvest size and timing. In addition, the rules address forest management activities within the boundaries of any national park, state park or any park of a local governmental entity. While these rules are not specifically related to mitigating visual impacts of harvest activities, they can have that result. Generally, these rules restrict even-aged harvests to 240 acres maximum, with any even-aged harvest between 120 acres and 240 acres potentially reviewed by an interdisciplinary team. Even-aged harvest, as defined in WAC 222-16-010, generally means:

- Clearcuts;
- Seed tree or shelterwood harvests in which 20 or fewer trees per acre remain after harvests;
- Group or strip shelterwood harvests creating an opening wider than 2 tree heights, based on dominant trees;
- Shelterwood removal harvests which leave fewer than 150 trees per acre, which are at least 5 years old or 4 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 10 feet in height remain after harvest; and

- Other harvesting methods designed to manage for multiple age classes in which 6 or fewer trees per acre remain after harvest.

The rules go on to state that harvest units shall be designed so that each unit meets at least one of the following criteria:

- At least 30 percent of the unit's perimeter is in stands of trees that are 30 years of age or older;
- At least 60 percent of the unit's perimeter is in stands of trees that are 15 years or age or older; or
- At least 90 percent of the unit's perimeter is in stands of trees that have survived on site a minimum of 5 growing seasons or, if not, have reached an average height of 4 feet.

The Columbia River Gorge National Scenic Area provides additional regulatory framework for DNR. The scenic area was established in 1986 to protect and provide for the enhancement of the scenic, cultural, recreational and natural resource of the Columbia River Gorge and protect and support the economy of the Columbia River Gorge area by encouraging growth to occur in existing urban areas and by allowing future economic development.

The Columbia River Gorge National Scenic Area is divided into three categories of land: Urban Areas, the Special Management Area and the General Management Area. There are approximately 2,900 acres of forested state trust lands within the Special Management Area. These lands must be managed according to the restrictions of the Special Management Area, which include a maximum even-age harvest unit size of 15 acres, variable unit boundary lines, retention of 17 snags per acre and a submission of all harvest proposals to the Scenic Area Review Committee.

In addition to the Forest Practices Act and state forest practices rules and the Columbia River Gorge National Scenic Area requirements, DNR must comply with the State Environmental Policy Act (chapter 43.21C RCW), which requires consideration of aesthetic impacts from its timber harvesting activities.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 limits the visual impacts of even-aged timber harvesting by limiting the size of harvest units and by controlling and dispersing harvests over time. Even-aged timber harvesting involves cutting most of the trees on a particular site or unit at one time to produce stands that are of the same relative age. It is generally any harvest that retains 20 trees per acre or less after harvest. A particular timber harvest may involve multiple harvest units. Alternative 1 limits these harvest units to a maximum of 100 acres in size.

It also intends to further restrict size and timing by prohibiting harvesting within 300 feet of another harvest unit, if the combined acreage of the two units exceeds 100 acres. While this requirement was not mentioned in the actual policy statement, it was included in the policy discussion as an intended outcome of this policy. Alternative 1 has been referred to as "green-up," because it requires DNR to have visible trees, at least four feet in height, before an adjacent stand can be even-aged harvested. Alternative 1 applies to all even-aged harvest units, regardless of their visibility or the nature of the visual impact. Alternative 1 is not as flexible in recognizing and using methods to mitigate for visual impacts as a result of harvest methods, arrangement of leave trees or the presence of riparian and wetland buffers as Alternative 2.

Because Alternative 1 was put in place prior to the HCP and forest practices rules related to even-aged harvest size and timing, Alternative 1 does not recognize the mitigation provided by the forest practices rules regarding even-aged harvest size and timing. Nor does it consider that retention of riparian and wetland buffers, protection of unstable slopes, and arrangement of leave trees all break up the visual impact of harvest activities on the landscape. Alternative 1 does not appear to meet Policy Objectives 2 and 6 as well as other alternatives.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 32, Green-up of Harvest Units: "The department will reduce the impacts of clearcutting and certain even-aged silvicultural systems by generally limiting the size of harvest areas to a maximum of 100 acres, requiring "green-up" of adjacent areas before harvesting timber and employing other techniques to blend harvested areas into the landscape."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 eliminates the 300-foot buffer requirements intended with Policy No. 32 Alternative 2 relies on development of strategies to mitigate for regional visual impacts of DNR's management activities. DNR will assess the cost/benefit to trust beneficiaries of prudent expenditures to mitigate visual impacts, in light of regional public concerns. For mitigation of local impacts, DNR will generally rely on other land management requirements, e.g. forest practices rules and other Board of Natural Resources policy. The 100-acre limit on even-aged harvest units is retained in Alternative 3 and the Board's Preferred Alternative for Watershed Systems. Alternative 2 does not appear to meet Policy Objective 2 as well as Alternative 4, but appears to meet Policy Objective 6 as well as Alternative 4.

POLICY STATEMENTS

The department will consider the visual impacts of management activities and design appropriate mitigation strategies based on whether the impacts are of local or regional significance.

For local visual impacts, the department will generally mitigate visual impacts through design and application of other land management requirements. For regional visual impacts, the department will develop additional strategies to mitigate impacts. The department will assess the cost/benefit to trust beneficiaries of prudent expenditures to mitigate visual impacts, in light of regional public concerns.

■ ALTERNATIVE 3

DISCUSSION

Alternative 3 eliminates the 300-foot buffer requirements intended with Policy No. 32. Alternative 3 specifies a case-by-case approach and provides no guidance as to methods to mitigate for visual impacts based on local or regional significance. Alternative 3 may not result in adequate mitigation in some cases or, in other cases, it may provide more than is necessary to address impacts. The 100-acre limit on even-aged harvest units is retained in Alternative 3 and the Board's Preferred Alternative for Watershed Systems. Alternative 3 does not appear to meet Policy Objective 2 as well as the other alternatives, but best meets Policy Objective 6.

POLICY STATEMENT

The department will mitigate visual impacts as needed for local or regional issues, recognizing that there may be different strategies, depending on the scope and scale of the issue.

■ ALTERNATIVE 4

DISCUSSION

Alternative 4 eliminates the 300-foot buffer requirements intended with Policy No. 32. In addition, Alternative 4 integrates other management requirements, such as leave trees, riparian and wetland buffers and protection of unstable slopes into site-specific visual management for local impacts. Alternative 4 relies on developing strategies to mitigate for regional visual impacts of DNR's management activities. DNR will assess the cost/benefit to trust beneficiaries of prudent expenditures to mitigate visual impacts, in light of regional public concerns. As under Alternative 2, DNR will utilize land management requirements, such as riparian and wetland buffers; protection of unstable slopes; and location and arrangement of wildlife trees, to create buffers or screening of harvest activities. In addition, DNR utilizes different silvicultural strategies; timing, design and size of timber harvest units; the arrangement of harvest units over time and space across landscapes; compliance with the "green-up" requirements of the forest practices rules; as well as visual modeling tools to mitigate visual impacts. Alternative 4 also provides a mechanism for transferring forested state trust lands that are visually significant out of trust status, with compensation to the affected trust(s). The 100-acre limit on harvest units is retained in the Alternative 3 and the Board's Preferred Alternative for Watershed Systems.

Alternative 4 meets the applicable policy objectives, as it allows flexibility for professional field staff to address visual impacts based on the nature of the impact and use of a variety of strategies for mitigation where appropriate, while still meeting the needs of each trust beneficiary (Policy Objective 6). Alternative 4 also provides balance between trust income and mitigation for impacts to visually significant areas through compensation to the affected trust where appropriate (Policy Objective 2).

POLICY STATEMENTS

The department will consider whether there are visual impacts of management activities and design appropriate mitigation strategies based on whether any impacts are of local or regional significance.

For local visual impacts, the department will generally mitigate visual impacts through design and application of other land management requirements. For regional visual impacts, the department will develop additional strategies to mitigate impacts. The department will assess the cost/benefit to trust beneficiaries of prudent expenditures to mitigate visual impacts, in light of regional public concerns.

When in the best interest of the affected trust(s), the department will consider transfer of ownership of significant scenic areas, when compensation to the affected trust(s) is secured.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative builds on Alternative 4 by directing DNR to seek compensation for mitigation strategies where appropriate. The Board's Preferred Alternative improves DNR's ability to meet Policy Objective 2.

POLICY STATEMENTS

The department will consider whether there are visual impacts of management activities and will design appropriate mitigation strategies based on whether impacts are of local or regional significance as follows:

- **For local visual impacts, the department will generally mitigate visual impacts through design and application of other land management requirements; and**
- **For regional visual impacts, the department will develop additional strategies to mitigate impacts. The department will assess the cost/benefit to the trust(s) of prudent expenditures to mitigate visual impacts, in light of public concerns, and seek compensation where appropriate.**

When in the best interest of the trust(s), the department will consider transfer of significant scenic areas out of trust status, when compensation to the trust(s) is secured.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

There is an increased risk of adverse impacts to the natural environment due to the potential for increased road mileage under Alternative 1. Alternative 1 applies visual criteria to all harvest units, regardless of their visibility. Spacing timber harvest units 300 feet apart and regulating their size to less than 100 acres is used to break up the unnatural pattern of clearcutting to promote shapes, patterns, scale and size that more reflect the natural characteristics of the landscape. Requiring 300-foot buffers between 100-acre maximum harvest units may require more roads to be kept open for longer periods of time in some limited circumstances. This is due to the need to retain and maintain access to adjoining stands until they can be harvested, whereas under Forest Practices rules, these adjoining stands could be all harvested at the same time, thus eliminating the need to keep roads open. Open roads allow prolonged public access and can lead to greater impacts to wildlife habitat, e.g. interruption of migration routes; to fish habitat, water quality and quantity, e.g. increased sediment; as well as to visual impacts. Although these impacts would be mitigated by compliance with state forest practices rules and other Board of Natural Resources policy, the potential for additional impacts could last indefinitely, as long as the roads are kept open. Although Alternative 1 provides greater certainty of minimal widths between harvest units, it does not provide maximum flexibility to minimize total open road mileage and will likely increase the risk of adverse impacts to fish habitat, water quality and quantity, and aesthetics than the other alternatives.

Although elimination of the 300-foot buffer requirement between even-aged harvest units may result in a small increase in land available for harvest, there will not be a substantial increase in acres harvested. The additional acres available for harvest each year (approximately 1,500 acres) will not result in significant adverse impacts to aesthetics or to other elements of the natural environment, due to requirements of the HCP for riparian protections, unstable slope protection, hydrologic maturity and habitat thresholds. Those conservation strategies result in retention of more trees across the landscape in irregular patterns that break up visual impacts of harvest unit boundaries. In Eastern Washington, harvest is expected to be predominantly partial cuts. The environmental impacts associated with forest practices rules regarding even-aged harvest size and timing are discussed in the *Final Environmental Impact Statement for the Proposed Forest Practices Rules and Regulations and Appendixes* pages 91 to 98, and are incorporated here by reference. The retention of the 100-acre maximum even-aged harvest unit limit in Alternative 3 and the Board's Preferred Alternative of the Watershed Systems policy subject area is expected to continue to provide additional mitigation of visual impacts. The policy would not change harvest levels. Average even-aged harvest unit size would be expected to stay relatively the same on forested state trust lands in Western Washington, due to requirements of the HCP for riparian protections, unstable slope

protection, hydrologic maturity and habitat thresholds. Treatment of forest health issues will sometimes require larger harvest units and more intense harvesting in both Eastern and Western Washington (see the Forest Health policy subject area discussion).

Under Alternative 2, DNR would further reduce regional visual impacts of its harvest activities when they are identified, through development of additional mitigation strategies.

Under Alternative 3, the reliance on site specific evaluation and strategies designed to mitigate on a case-by-case basis increases the risk of adverse impacts to some aesthetic resources, because of the lack of a consistent standard in Alternative 3 regarding the distinction between local and regional issues. The potential for treating a regional issue similar to a local issue is increased and may limit the consideration of strategies to mitigate impacts of existing land management requirements, rather than developing additional strategies where needed to address regional issues.

The environmental impacts associated with Alternative 4 and the Board's Preferred Alternative are similar to those associated with Alternative 2. Any adverse impacts to water quality and quantity, and aesthetics under Alternative 4 and the Board's Preferred Alternative would also be mitigated by the 100-acre even-aged harvest size limitation under Alternative 3 and the Board's Preferred Alternative for Watershed Systems.

The potential adverse impacts under Alternative 4 and the Board's Preferred Alternative are expected to be less than the other alternatives, because of the increased flexibility added to Alternative 4 and the Board's Preferred Alternative that can provide permanent protection of visually significant forested state trust lands through transfer out of trust status with compensation to the affected trust(s). Under Alternative 4 and the Board's Preferred Alternative, visually significant forested state trust lands can be permanently protected through transfer out of trust status, with full market value compensation to the affected trust(s). However, this strategy is primarily reserved for Common School Federal Grant Lands, and is not generally available for other types of trust lands, especially State Forest Lands.

Under all alternatives, the environmental impacts associated with visual management strategies that are developed through a forest land planning process or as part of a timber harvest design would be evaluated at that time as part of a SEPA review.

CUMULATIVE IMPACTS

Under all alternatives, visual impacts of DNR activities are mitigated as a result of several factors. In Western Washington, compliance with HCP commitments, including the establishment of riparian and wetland buffers, protection of unstable slopes, maintenance of hydrologic maturity, specific habitat development and retention strategies, along with leaving legacy trees, provide for mitigation of visual impacts. In Eastern Washington, visual impacts are mitigated by several factors, including providing nesting, roosting and foraging habitat in areas covered by the HCP on the eastern slopes of the Cascades; specific habitat development and retention strategies for Lynx in the Loomis State Forest and other parts of northeastern Washington; leaving legacy trees; the predominance of partial or selective cutting timber harvests; the forest practices rules;

and the development of strategies to protect late successional forest in the Loomis State Forest. Because DNR has these requirements (that in most cases exceed forest practices rules), visual impacts of DNR activities should be less than those associated with many forestlands without these requirements. Where DNR also develops other strategies to mitigate visual impacts (Alternatives 2, 4 and the Board's Preferred Alternative), in addition to mitigation provided by complying with Forest Practices Act and state forest practices rules and the HCP, then cumulative impacts to visual resources should be further reduced. Finally, provisions for considering transfer of ownership of visually significant forested state trust lands, with full market value compensation to the affected trust(s) under Alternative 4 and the Board's Preferred Alternative, provides a mechanism for more permanently protecting highly valued scenic resources associated with forested state trust lands.

3.3.4 Local Economic Vitality

INTRODUCTION

Meeting each trust beneficiary's economic and ecological objectives results in social benefits. Management of forested state trust lands provides clean water, wildlife habitat, forests for recreation, as well as jobs for local economies. Forested state trust lands near local communities supply jobs in the forest products industry, both in the woods and in local mills that process timber from forested state trust lands. Some niche industries are dependent on forest products from forested state trust lands. In addition, these lands often attract recreationalists who spend money in local communities. These products and uses contribute to local economic vitality, which can be affected by location and timing of management activities and access to forested state trust lands.

Although the Local Economic Vitality policy subject primarily meets the following Policy Objective:

- Balance trust income, environmental protection, and other social benefits from four perspectives: the prudent person doctrine; undivided loyalty to and impartiality among the trust beneficiaries; intergenerational equity; and not foreclosing future options (Policy Objective 2);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

In 1996, DNR commissioned a study by Deloitte and Touche LLP on the economic value and contributions of state management trust lands and activities associated with them. This study, in part, investigated the extent that activities on DNR-managed lands contributed indirectly to the community and state through the creation of jobs; through the wages and salaries, i.e., income, that are created by those jobs; state and local taxes, which included "market related" activities or jobs, incomes and tax payments that resulted from commercial activities; as well as "non-market" activities related to recreational, social, cultural and ecological activities. The findings of this study for forested state trust lands are summarized in Table 1.

Table 1: Annual Indirect Market and Non-Market Benefits from Forested State Trust Lands

Benefit Type	Market	Non-Market	Total
Jobs Generated	7,900	6,340	14,240
Wage & Salary Income Earned	$ 170,373,000	$ 54,597,600	$ 224,970,600
Taxes Paid	$ 25,364,000	$ 21,638,000	$ 47,002,000

Market and non-market activities on forested state trust lands make significant contributions to local, regional and state economies beyond direct financial support of trust beneficiaries. A full discussion of indirect market and non-market benefits and the

methodology for calculation is contained in the 1996 Deloitte and Touche study (Chapter 5).

REGULATORY FRAMEWORK

The regulatory framework for local economic vitality is made up of all the legal requirements, contracts and other agreements, e.g. the DNR's HCP, that the DNR adheres to in the management of forested state trust lands.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 provides no policy direction with regard to local economic vitality. Currently, the contribution to local economies as a result of land management activities is not a formal consideration by DNR, but happens coincidentally with management on behalf of each trust beneficiary. Alternative 1 does not appear to meet Policy Objective 2 as well as other alternatives.

POLICY STATEMENT

No current policy direction.

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 directs DNR to support local economic vitality when doing so is compatible with, or contributes to, attainment of trust objectives. Alternative 2 requires DNR to work with local economic interests during DNR forest land planning efforts. Alternative 2 commits DNR to consider local economic impacts of its land management decisions and activities. Alternative 2 better meets Policy Objective 2 than Alternative 1, but not as well as Alternative 3 and the Board's Preferred Alternative, because of the vagueness of "actively support."

POLICY STATEMENTS

The department will actively support local economic vitality as part of its management of forested state trust lands when it is compatible with or contributes to the attainment of trust objectives.

The department will work with local economic interests as part of its forest land planning processes.

■ ALTERNATIVE 3

DISCUSSION

Alternative 3 recognizes the relationship between DNR's management activities and local economic vitality and suggests that DNR may make decisions that contribute to local economic vitality when compatible with meeting trust objectives. Alternative 3 best meets the applicable policy objective by providing the right balance between trust income and providing other social benefits through promotion of local economic vitality (Policy Objective 2).

POLICY STATEMENT

The department may consider the relationship between local economic vitality and forest management activities and may take actions in support of local economic vitality when they are compatible with or directly support trust objectives.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative is the same as Alternative 3, with some minor edits to ensure the policy is clear and succinct (Policy Objective 3). The Board's Preferred Alternative more clearly assumes the strong relationship that exists between local economic vitality and DNR's forest management activities.

POLICY STATEMENT

In considering the relationship between local economic vitality and forest management activities, the department may take actions in support of local economic vitality when they are compatible with or directly support trust objectives.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

A suggestion was made to use full cost accounting to consider the economic benefits of ecological services to local communities. Whether full cost accounting is an appropriate approach to achieving the intent of this policy can be considered during implementation. DNR will explore and develop strategies to achieve the intent of this policy as part of implementation. The intent of Board of Natural Resources policy is to describe outcomes for DNR to achieve in managing forested state trust lands. Consequently, the policy statements do not describe or include directives on how to achieve those outcomes.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Any contributions to local economic vitality are coincidental to management activities that implement other Board of Natural Resources policy. Those activities are reviewed under SEPA at the appropriate point of planning and implementation. Consequently,

there would be no significant environmental impacts or mitigation measures unique to this proposal.

Under Alternative 2, DNR may alter location and timing of certain land management activities or uses to support local economies when compatible with trust objectives. These uses and activities would be carried out in compliance with existing Board of Natural Resources policy, including HCP requirements and state and federal law. Any environmental impacts associated with actions taken as a result of consideration of local economic vitality cannot be identified at this time.

The analysis for Alternative 3 and the Board's Preferred Alternative is identical to the analysis for Alternative 2.

CUMULATIVE IMPACTS

There are no cumulative adverse impacts identified for any of the alternatives considered under this policy subject area proposal. The location and timing of certain land management activities or uses to support local economies would be carried out in compliance with existing Board of Natural Resources policy including HCP requirements and state and federal law, when compatible with trust requirements. Any activity or use would undergo any required SEPA review at the time it was considered. Any cumulative environmental impacts associated with actions taken in consideration of local economic vitality cannot be identified at this time.

3.4 Implementation

This major policy category contains policy subject areas related to implementation of the *Policy for Sustainable Forests*. These subjects address DNR's forest land planning approach; silvicultural and research activities on forested state trust lands; public relations and communication; as well as the processes DNR will utilize to ensure that Board of Natural Resources policies are kept current and meaningful.

3.4.1 Forest Land Planning (formerly "Forestland Planning")

INTRODUCTION

The purpose of forest land planning is to translate outcomes established by state and federal law and Board of Natural Resources policy into specific activities in the field. Forest land planning should document forest management strategies and demonstrate where and what types of activities will most likely meet the outcomes. DNR has always believed that a dynamic planning process will accommodate management needs, changing rules and public concerns.

Although the Forest Land Planning policy subject primarily meets the following Policy Objectives:

- Ensure policies are succinct, relevant and easily understood by the public and department employees (Policy Objective 3); and
- Use professional judgment, best available science and sound field forestry to achieve excellence in public stewardship (Policy Objective 5);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

Forest land planning by itself does not modify the environment. However, planning results in defining standards that control management activities across landscapes and, therefore, planning decisions are subject to State Environmental Policy Act (SEPA) review (WAC 197-11-800(20) and WAC 197-11-704(2)(b)).

DNR currently has one planning policy in the *Forest Resource Plan*, Policy No. 16, Landscape Planning. In addition, DNR developed a planning procedure for guiding the implementation of the 2004 sustainable harvest calculation (*Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*, Appendix F, Procedure No. PR14-001-010, Sustainable Harvest Implementation Planning).

The purpose of landscape planning identified in Policy No. 16 is "to develop a pragmatic working tool for the professional forester that will show at any given time DNR's plans for a particular landscape." DNR's landscape planning efforts are based on a process of developing management objectives for forested state trust lands at a landscape, watershed or ecological unit scale. The size of these planning units has ranged from several thousand acres to tens of thousands of acres. The purpose of landscape planning has been to translate the general policies of the *Forest Resource Plan* into specific activities in the field, including evaluating harvest and multiple-use activities.

In Western Washington, DNR delineated 83 landscape planning units. To date, numerous landscape plans have been started and seven completed. These landscape plans contain management objectives for conducting silvicultural activities; scheduling timber harvests; protecting aquatic systems, watersheds, riparian areas, wetlands and wildlife habitat, including endangered or threatened species; building or maintaining road systems; and various other components.

The Sustainable Harvest Implementation Planning Procedure No. PR14-001-010 provides direction for developing strategies to implement Board of Natural Resources policies and the sustainable harvest calculation. The primary purpose of the Sustainable Harvest Implementation Planning Procedure is to describe how field operations within a HCP planning unit and over a ten-year period, are going to achieve the outcomes identified in the sustainable harvest calculation and other Board of Natural Resources policies.

The implementation plans will be subject to environmental analysis and public review under SEPA. Once finalized, each implementation plan will be subject to approval by DNR's Land Steward (*Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*, Appendix F).

DNR's HCP contains geographic-specific conservation objectives and strategies. These include development of nesting, roosting, foraging and dispersal habitat, and analysis of hydrologic maturity as it relates to rain-on-snow zones. The HCP anticipated that landscape planning would be part of the process for implementing conservation strategies (*Final* HCP, page IV. 192).

DNR has agreed (March 2006 Settlement Agreement) to ensure that forest land planning in the Olympic Experimental State Forest will include all elements of the landscape planning process required by the HCP.

REGULATORY FRAMEWORK

There are no specific regulations that direct DNR to engage in Forest Land Planning. See Affected Environment discussion.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 is based on a process of developing management objectives for forested state trust lands at a landscape, watershed or ecological unit scale. The size of these planning units has ranged from several thousand acres to tens of thousands of acres. The purpose of landscape planning has been to translate the general policies of the *Forest Resource Plan* into specific activities in the field. Alternative 1 focuses on developing management objectives through a public process, consistent with Board of Natural Resources policy for individual landscapes. Alternative 1 does not appear to meet Policy Objectives 3 and 5 as well as Alternative 2.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 16, Landscape Planning: "The department will develop plans by setting management objectives for timber and non-timber resources for specified landscapes consistent with the *Forest Resource Plan*."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 proposes a DNR forest land planning process that: 1) describes measurable outcomes as established by state and federal law, as well as Board of Natural Resources policy for a specified geographical area (smaller than the state); 2) specifies forest management strategies to achieve outcomes; and 3) provides adaptive management through feedback and communication that refine strategies and outcomes as appropriate.

Measurable outcomes can encompass aspects of the economic, ecological and social environment. These outcomes are reflected in the HCP, the *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington* and other policies that make up the proposed *Policy for Sustainable Forests*. Examples include desired stand structures, volume targets and riparian and wetland buffers. Forest management strategies developed through forest land planning assist DNR's forest managers in creating and implementing efficient and effective operational plans to achieve outcomes. Feedback and communication components of a forest land plan provide important information for developing, modifying and adapting plans to meet the outcomes, as well as guide any appropriate refinements to those outcomes and the strategies developed to achieve them. These components include status reports to the Board of Natural Resources on progress toward accomplishment of outcomes and provide for important stakeholder and public participation. In addition, environmental review requirements of SEPA provide a mechanism to not only identify the impacts of forest land planning.

Alternative 2 provides a clearer distinction of the planning steps, articulating already established policy outcomes and developing forest management strategies to achieve outcomes. Alternative 2 establishes communication and feedback components to provide for stakeholder and public participation. Alternative 2 proposes to enlarge the geographic planning scale for developing forest land plans from several thousand acres, to HCP planning units (hundreds of thousands of acres in size). The enlarged planning scale will provide a more comprehensive examination of the effects of forest management strategies across multiple landscapes in achieving outcomes. However, some forest management strategies may focus on smaller geographic units to address critical, localized issues. Cumulative impacts will be assessed at varying scales and intensity to address unique circumstances. Alternative 2 allows the flexibility to analyze potentially significant cumulative impacts at an appropriate scale whether by watershed or HCP planning unit. Alternative 2 recognizes that these plans will be developed as time and resources allow and will integrate, as appropriate, other existing forest plans. Alternative 2 best meets the applicable policy objectives by clearly describing how DNR will utilize forest land planning to communicate management outcomes and strategies to achieve those outcomes within specified landscapes (Policy Objective 3).

POLICY STATEMENTS

The department will develop forest land plans at the *Habitat Conservation Plan* planning unit scale in implementing Board of Natural Resources policy.

For areas outside the *Habitat Conservation Plan*, the department will develop forest land plans at a scale similar to *Habitat Conservation Plan* planning units in implementing Board of Natural Resources policy.

The department may use different scales to address unique circumstances.

The department will utilize the State Environmental Policy Act to communicate department objectives and outcomes; to consider local, regional and statewide interests and concerns; and to develop and analyze forest management strategies.

The department will prioritize and develop new forest land plans over time. The preparation of plans will be based on available resources and budget.

As plans are developed, the department will integrate previous planning work within new forest land plans, as appropriate.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative is the same as Alternative 2, with some minor edits to ensure the policy is clear and succinct (Policy Objective 3).

POLICY STATEMENTS

In implementing Board of Natural Resources policy, the department will develop forest land plans at geographic scales similar to DNR's *Habitat Conservation Plan* planning units.

The department may use different geographic scales to address special circumstances.

The department will utilize the requirements of the State Environmental Policy Act to communicate department objectives and outcomes; to consider local, regional and statewide interests and concerns; and to develop and analyze forest management strategies.

The department will prioritize and develop new forest land plans over time. The development of plans will depend on available resources and budget.

As plans are developed, the department will integrate previous planning work within new forest land plans, as appropriate.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

There are no probable significant adverse environmental impacts from either alternative. These alternatives describe a planning process DNR will use. Any adverse environmental impacts, including cumulative impacts, of activities to be conducted under the plans will be analyzed under SEPA at the time the plans are developed. The planning process described in Alternative 1 was designed to integrate the various elements that must be considered in managing forested state trust lands. Policy No. 16 intended to use geographical information systems to generate detailed maps. These geographical information systems were expected to display physical information, such as soil types, roads and wildlife habitat locations on a computer-generated map. Landscape-level maps and supporting information were expected to contain specific objectives for DNR activities developed through the landscape planning process (*Final Environmental Impact Statement for the Forest Resource Plan*).

In setting management objectives under Alternative 1, the landscape planning process sometimes resulted in reinterpreting or redefining already established outcomes. In addition, the cost to undertake and complete these plans has been prohibitive. This has primarily been driven by not having a well-defined planning process or product, and the requirement for numerous plans. These problems resulted in sporadic planning efforts around the state. Under Alternative 1, some landscape plans are still being developed, such as the *Loomis State Forest Final Landscape Plan.*

Under Alternative 2 and the Board's Preferred Alternative, established outcomes would be clearly described for the planning unit. The forest land planning process would not seek to reinterpret or change these expected outcomes. Under Alternative 2 and the Board's Preferred Alternative, forest management strategies would be developed to achieve these outcomes. These strategies will link outcomes with operational activities and will provide a working tool for use by DNR's land managers and foresters.

Alternative 2 and the Board's Preferred Alternative incorporate public participation and communication into its forest land planning process. The process will allow Tribes, stakeholders and the public the opportunity to learn about expected outcomes, provide input and receive feedback on DNR strategies to achieve those outcomes. This process will provide DNR and the Board of Natural Resources with information on the effectiveness of the proposed policy direction and expected outcomes and on the environmental impacts of their decisions.

Under Alternative 2 and the Board's Preferred Alternative, landscape plans still being developed, such as the *Loomis State Forest Final Landscape Plan*, would be integrated into this new planning approach, if adopted by the Board of Natural Resources.

CUMULATIVE IMPACTS

There are no adverse cumulative impacts related to these policy alternatives. The potential for significant cumulative impacts, if any, that may result from the plans will be evaluated under SEPA when the plans are developed.

3.4.2 General Silvicultural Strategy

INTRODUCTION

DNR defines silviculture as the art and science of cultivating forests to achieve outcomes identified by state and federal law and Board of Natural Resources policy. Silviculture is a tool that consists of a set of methods or techniques used to create a desired outcome (future) for a forest/stand, such as revenue or habitat. The application of silvicultural strategies is one of the primary mechanisms for achieving desired outcomes across landscapes. These strategies may be developed and analyzed through forest land planning. Silvicultural prescriptions incorporate activities, such as site preparation; planting specific tree species at specified densities; fertilization; removal of non-desirable species; and intermediate as well as final harvesting of trees. Stand-specific activities contribute to landscape and statewide outcomes, such as the sustainable harvest calculation and the HCP.

Although the General Silvicultural Strategy policy subject primarily meets the following Policy Objectives:

- Use professional judgment, best available science and sound field forestry to achieve excellence in public stewardship (Policy Objective 5); and
- Promote active, innovative and sustainable stewardship on as much of the forested land base as possible (Policy Objective 7);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

The practice of silviculture on forested state trust lands potentially affects several elements of the environment, including habitat, plants and animals, water, earth and aesthetics. Although these elements may be directly affected by the practice of silviculture, its impact to specific elements are addressed under other specific policy subject areas, e.g., Forest Health; Wildlife Habitat; Watershed Systems; Riparian Conservation; and Visual Impacts. These other policy subject areas cover the range of silvicultural activities used on forested state trust lands and their potential for affecting elements of the environment. Silvicultural prescriptions are designed and implemented to accomplish site-specific stand objectives. Stand objectives are written to help meet landscape or statewide objectives or outcomes, such as revenue generation, restoration of structurally complex forests and creation of habitat. Silvicultural treatments do not always result in removal of material from the stand. These types of treatments, known as pre-commercial thinnings, leave cut material in the stand to provide woody debris or habitat value to the stand.

In contrast, commercial thinning removes a portion of a stand, leaving a substantial number of trees and portions of debris (limbs, roots, nutrients, etc.) after a timber harvest.

Commercial thinnings are typically carried out where there are multiple objectives, such as generating revenue, while accelerating the forest stand's development towards functional wildlife habitat.

In meeting economic and other landscape and statewide objectives, DNR most often implements commercial thinnings in stands that are in the competitive exclusion stage of stand development, particularly in stands where thinning would accelerate achievement of wildlife habitat objectives or outcomes. For a description of the stand development stages, see the *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*¸ Appendix B. Trees in the competitive exclusion stage compete for direct sunlight, nutrients and water. Where soil moisture is in ample supply, competition is generally between tree-crowns for sunlight. In arid forests, common to the oak, ponderosa pine and Douglas-fir series in Eastern Washington competition for soil moisture is keen, resulting in open-grown stands due to root, instead of crown, competition. At the competitive exclusion stage, stands are nearing, full-site occupancy and have little diversity in tree size, unless legacy trees remain from previous successions or management. Traditional commercial forestry thinning sought to capture natural tree mortality before it occurred, by harvesting the smaller trees that would likely die without harvest. Commercial thinning in these competitive exclusion stands is usually conducted from below the upper canopy, i.e., the thinning treatment removes the smallest trees first. Thinning usually results in about 70 percent of the initial stand remaining after harvest. Traditional thinning treatment typically does not affect the stand's most dominant trees. The diversity of tree sizes of the dominant trees remains much the same as prior to the thinning treatment, but the stand's optimal growth rate is sustained.

A structurally complex forest stage must have vertical and horizontal diversity in terms of tree heights, diameters, tree spacing, large standing dead trees (snags) and large woody debris. To obtain those structural characteristics, a stand needs to develop along somewhat specific developmental "pathways" through time. The earlier a stand's intended pathway is initiated, the better control the forest manager has over mixtures of shade tolerant and intolerant species, which influence vertical development and diversity, as well as stocking levels, which influence horizontal development and diversity. Stands that have progressed to a competitive exclusion stage present a decision as to whether or not to accelerate the stand's transition into an understory development stage. Establishing shade tolerant tree species under the main tree canopy provides smaller trees that can grow and develop into a mid-story. This development will, in time, accelerate the vertical and horizontal diversity of tree sizes. The remaining overstory trees will continue to develop and grow larger until they can be recruited either naturally or artificially through management intervention to provide large standing dead trees or large woody debris.

Managing stands along developmental pathways require forest managers to have a comprehensive understanding of the structures and processes in forest stands (Franklin, 2002; and Carey, 2003). Carey et al., (1996) used the phrase "biodiversity pathways" for the management of forest stands and forested landscapes to achieve objectives of conserving biodiversity and generating revenue through the application of innovative silviculture that accelerates the development of structurally complex stands. This is

particularly important on those lands targeted to provide the most benefit to wildlife species, i.e. spotted owl conservation areas, the Olympic Experimental State Forest, and owl areas as described in the March 2006 Settlement Agreement (approximately 74 percent of forested state trust lands in Western Washington).

Although the developmental pathways approach has focused on forests west of the Cascade crest, the ecological principles apply to Eastern as well as to Western Washington. Silvicultural treatments, if grounded in biological capabilities of each site and constraints of surrounding landscapes, will accelerate and guide stand development along pathways that may be designed to optimize achievement of landscape and statewide objectives.

DNR uses chemicals and other biologic pathogens or predators in three primary silvicultural applications: site preparation, reducing competition from species in areas to be reforested; vegetation management, reducing competition from species after reforestation has been initiated; and to temporarily reduce impacts from insect epidemics. The first two involve herbicides and the last involves insecticides, other biologic pathogens or predators.

Site preparation and vegetation management are performed on more than one-half of all forest management units on forested state trust lands managed by DNR and often more than one treatment is required. Some competing vegetation or weed species may be reduced to acceptable levels by leaving an overstory of trees when harvesting timber. However, this approach is often counterproductive in that it precludes successful reforestation and vigor of planted seedlings and is, therefore, generally not considered. Other weed species may be treated by manual slashing during a period each year when growth hormones are entirely in the crowns of the target species and thus, re-sprouting is precluded. Other weed species, however, do not have such a period and respond to manual slashing by accelerating growth. The latter can be controlled by herbicides.

Insect epidemics occur sporadically, but often with serious consequences. As discussed in the Forest Health policy subject area, forest insects occupy natural niches in the forest ecosystem when present endemically. However, when forest insect populations reach epidemic proportions, the subsequent fire danger from dead and dry trees can pose an unacceptable hazard to human life, resources and property. In order to stave off outbreaks in high risk forests for a year or two before converting them to a more healthy condition, insecticide or other biologic pathogen applications or introducing predators are sometimes the best short-term approach.

Between fiscal years 1999 and 2003, DNR annually treated an average of 4,194 acres with aerial-applied herbicides and 3,891 acres with ground-applied herbicide. DNR last applied aerial pesticides in fiscal year 2000 to 3,618 acres.

Chemical and processed natural fertilizers have been applied to forested state trust lands. In recent years, severe budget restrictions have precluded application of chemical fertilizer. Fertilization is an investment that, if applied to sites with high potential for favorable response, are highly likely to generate positive returns both in terms of trust revenue and accelerated stand development for non-fiduciary objectives, such as wildlife

habitat and visual quality. DNR's application of chemical fertilizer has averaged 2,647 acres between fiscal years 1999 and 2003.

DNR has also applied bio-solids (a processed natural fertilizer) to forested state trust lands, primarily in King County, with a general objective to dispose of processed urban sewage effluent where it could be done with mechanical scattering techniques. A measurable favorable growth response has been recorded through sampling.

REGULATORY FRAMEWORK

The regulatory framework consists of the State Environmental Policy Act (RCW 43.21C), the Forest Practices Act (RCW 76.09), the federal Endangered Species Act (16. U.S.C. 1531 et seq.), implemented primarily through DNR's HCP and the modified *Lynx Habitat Management Plan*. In addition, at the federal level, silvicultural application of chemicals is governed by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA—7 U.S.C. s/s 136 et seq. 1996). This act provides federal control of chemical distribution, sale and use. Under the Federal Insecticide, Fungicide and Rodenticide Act, only chemicals certified and labeled for safe use by the United States Environmental Protection Agency may be used and only for the particular applications the agency has approved, and then only with conformance of the requirements specified on the chemical label. Furthermore, the act requires users to register chemical purchases and applicators to possess a current certification for the class of application they practice. Certification is delegated to the states under federal standards.

At the state level, the Washington State Department of Agriculture is responsible for ensuring that chemicals are used safely and legally. To this end, the Department of Agriculture performs a number of activities, including registering the pesticidal products in the state, investigating complaints of possible misuse, maintaining a registry of pesticide-sensitive individuals and administering a waste pesticide collection program. These duties are performed under the authority of the Washington Pesticide Control Act (15.58 RCW), the Washington Pesticide Application Act (17.21 RCW), the General Pesticide Rules (WAC 16-228), the Worker Protection Standard (WAC 16-233) and a number of pesticide and/or county-specific regulations. In addition, forest practices rules (WAC 222-38-020) translate these various legal requirements into rules that govern details of pesticide handling, storage and applications on forested state trust lands, particularly in regard to aerial application and protection of wetlands and riparian areas.

The primary regulatory framework that pertains to application of chemical fertilizer on forested state trust lands is found in the forest practices rules, which govern handling, storage and application of chemical fertilizers, with particular emphasis on aerial application in the vicinity of bodies of water. State Forest Practices Rules and DNR procedures require buffering of water bodies from application. Notification of the public of proposed aerial application is also required. Other requirements involve analysis of potential environmental impacts due to application of chemicals through SEPA.

The Federal Insecticide, Fungicide and Rodenticide Act encourages and DNR practices Integrated pest management. Integrated pest management is a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way

that minimizes economic, health and environmental risks. In addition, SEPA requires site-specific analysis of the adverse environmental impacts of proposed actions.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

WESTERN WASHINGTON

Policy No. PO14-C was adopted for Western Washington by the Board of Natural Resources on September 8, 2004, as part of the sustainable harvest calculation decision. It canceled *Forest Resource Plan* Policy Nos. 11 and 30 for Western Washington only.

PO14-C GENERAL SILVICULTURAL STRATEGY APPLIED TO THE TIMBER RESOURCE BASE AVAILABLE FOR SUSTAINABLE HARVEST IN WESTERN WASHINGTON

POLICY STATEMENTS IN PO14-C

The department will follow legal requirements in maintaining the greatest possible portion of the trust forestlands as on-base.

The department will provide professional management of forestlands through active stewardship of on-base lands. Active management of the land base will be carried out as an integral part of the department's fiduciary responsibilities to achieve, on a landscape basis, a combination of forest structures that over time provide for broad and balanced economic, ecological and social benefits. The department will use intensive and innovative silviculture to guide the desired progression of stand development to simultaneously produce trust revenue and create structural diversity across the landscape.

The department will target over time 10 to 15 percent of each Western Washington *Habitat Conservation Plan* planning unit for old forests based on structural characteristics. In meeting these targets, Old Growth Research Areas will continue to be deferred and existing old growth (as defined by the *Habitat Conservation Plan*) and older stands will be a priority focus in developing the *Habitat Conservation Plan* planning unit targets.

EASTERN WASHINGTON

Under Alternative 1 for Eastern Washington, *Forest Resource Plan* Policy Nos. 11 and 30 still apply.

***Forest Resource Plan* Policy No. 11, Managing On-Base Lands: "The department will manage on-base forestlands at different levels of intensity depending on biological productivity and economic potential. Investment decisions will be made according to expected returns."**

***Forest Resource Plan* Policy No. 30, Silviculture Activities: "The department will plan and implement silvicultural activities to meet trust responsibilities. In cases warranting special attention, the department will accept a reduction in current income or return on investment when the department determines it is necessary to provide extra protection for soil, water, wildlife, fish habitat and other public resources."**

STATEWIDE

Under Alternative 1, the following policies from the *Forest Resource Plan* apply in both Western and Eastern Washington and were not directly addressed as part of the Board of Natural Resources decisions on September 8, 2004.

***Forest Resource Plan* Policy No. 31, Harvest and Reforestation Methods: "The department will select the harvest method which produces the best mix of current and long-term income, achieves reforestation objectives and integrates non-timber resource objectives identified in the *Forest Resource Plan*. Reforestation objectives must ensure adequate restocking, produce acceptable benefits to the trusts and protect public resources."**

***Forest Resource Plan* Policy No. 33, Control of Competing Vegetation: "To prevent domination of crop trees by other vegetation, the department will select from these methods for controlling competing vegetation:**

- **No treatment.**
- **Non-herbicide.**
- **Ground-applied herbicide.**
- **Aerial-applied herbicide.**

The department will consider the no treatment method first and then move sequentially down the list. The department will select the first method on the list which is both effective and produces an acceptable return on investment. A method lower on the list may be used only if it substantially outperforms other methods."

***Forest Resource Plan* Policy No. 34, Fertilizing, Thinning and Pruning: "The department will use fertilization, thinning and pruning on stands which will respond and produce an acceptable rate of return on investment."**

■ ALTERNATIVE 2

Under Alternative 2, the following policy statements apply statewide. Alternative 2 modifies Policy No. PO14-C that was adopted by the Board of Natural Resources on September 8, 2004, by moving the policy statement related to older forests and old growth research areas to the Old-Growth Stands in Western Washington policy subject area in this Final EIS for the *Policy for Sustainable Forests* and extending policies

adopted by the Board of Natural Resources for Western Washington to Eastern Washington as well. Alternative 2 recognizes that the subjects addressed in *Forest Resource Plan* Policy Nos. 31, 33 and 34 are silvicultural "methods" or "techniques," rather than policy statements. They specify harvest and reforestation methods; control of competing vegetation; and fertilizing, thinning and pruning as necessary to achieve a combination of forest structures over time, as well as to provide for balanced economic, ecological and social benefits.

Under Alternative 2 and the Board's Preferred Alternative, *Forest Resource Plan* Policy Nos. 11, 30, 31, 33 and 34 would be discontinued. Alternative 2 and the Board's Preferred Alternative direct DNR to use intensive and innovative silviculture to achieve desired stand and landscape objectives in both Western and Eastern Washington. Alternative 2 and the Board's Preferred Alternative best meet the applicable policy objectives by promoting use of professional judgment, best available science and sound field forestry to achieve excellence in public stewardship (Policy Objective 5) through active, innovative and sustainable management of all forested state trust lands (Policy Objective 7).

Management of a stand does not always imply that activities will occur on the ground. Active management means also reviewing the progress of a stand to meet its objective, and evaluating that progress on a regular basis. Field staff will evaluate if an activity would speed the progress of the stand to meet its stand level objective and if the investment in the stand would be warranted. DNR's field staff reviews the progress of many stands on a regular basis and only proposes activities when stand level objectives will be delayed or will not be met without intervention. By management of "the greatest possible portion of forested state trust lands" more of the stand will meet its objectives sooner.

POLICY STATEMENTS

The department will follow legal requirements in actively managing the greatest possible portion of forested state trust lands.

The department will provide professional management of forestlands through active stewardship of forested state trust lands. Active management of the forestland base will be carried out as an integral part of the department's fiduciary responsibilities to achieve, on a landscape basis, a combination of forest structures that over time provide for broad and balanced economic, ecological and social benefits. The department will use intensive and innovative silviculture to guide the desired progression of stand development to simultaneously produce trust revenue and create structural diversity across the landscape.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative builds on Alternative 2 by including the following: the discussion for old growth has been moved to the Old-Growth Stands in Western Washington policy subject area; specifies how suitable older stands will be identified to help meet older-forest targets; emphasizes that the 10-15 percent older-forest targets will be accomplished over time; and specifies that once older-forest targets are met (expected to take 70 years or more), structurally complex forest stands that are not needed to meet the targets may be considered for harvest activities.

DNR intends to actively manage structurally complex forests, especially those suitable stands in the botanically diverse stage of stand development, to achieve older-forest structures across 10-15 percent of each Western Washington HCP planning unit in 70-100 years. Older-forest structures that contribute to this target are represented by stands in the niche diversification or fully functional stage of stand development.

The landscape context of a structurally complex stand greatly influences its suitability to be managed to meet older-forest targets. The size of the stand, its proximity to old-growth or other structurally complex forest stands, or the scarcity of old-growth and other structurally complex stands are all factors in determining if a stand is suitable for contributing to older-forest targets. Assessment of the landscape conditions can identify the relative contribution that a structurally complex forest stand can make toward achieving those targets. Decisions regarding old growth are guided by the Old-Growth Stands in Western Washington policy.

POLICY STATEMENTS

The department will provide professional management of forested state trust lands through active management and stewardship of the greatest possible portion of these lands.

The department will carry out active management as an integral part of the department's fiduciary responsibilities to achieve, on a landscape basis, a combination of forest structures that, over time, provide for broad and balanced economic, ecological and social benefits.

The department will use intensive and innovative silviculture to guide the desired progression of stand development to simultaneously produce trust revenue and create structural diversity across the landscape.

The department will target 10-15 percent of each Western Washington *Habitat Conservation Plan* planning unit for "older" forests-based on structural characteristics-over time.

Through landscape assessments, the department will identify suitable structurally complex forest stands to be managed to help meet older-forest targets. Once older-

forest targets are met, structurally complex forest stands that are not needed to meet the targets may be considered for harvest activities. However, old growth is addressed in the Old-Growth Stands in Western Washington policy.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

A suggestion was made that language from *Forest Resource Plan* Policy 30 that granted discretion to reduce trust income to provide extra protection for certain resources should be included in the updated policy. Since the protection of resources is covered in the individual policy subjects, and coupled with the fact that the General Silvicultural Strategy is simply the means of integrating and implementing the policies on the ground, it is unnecessary to include this language in the updated policy.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

For impacts associated with the first two policy statements under Alternative 1 for Western Washington, see the *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*.

The risk of adverse impacts to the environment, particularly wildlife habitat, plants and animals, water, earth and aesthetics, is increased under Alternative 1. Alternative 1, in retaining *Forest Resource Plan* Policy Nos. 31 and 34, attempts to provide a site-specific and outcome-oriented approach to managing DNR's forested state trust lands. In doing so, Alternative 1 mandates techniques and field craft that are something less than a landscape scale approach to silviculture. This approach will most likely focus on stand-level technical proficiency at the expense of achieving desired landscape conditions for wildlife, forest health, water and soil. Alternative 1 emphasizes activity or unit objectives over strategic landscape objectives. Activity objectives are construed without comparison to strategic landscape objectives. Examples include: planting a standard number of trees per acre regardless of objective-based rotational outcomes and biological productivity of the specific site; thinning at a prescribed age to a routine stand density without regard to rotational site objectives; and foregoing control of invasive vegetation, because techniques rather than outcomes are dictated. Impacts from *Forest Resource Plan* Policy No. 33 would continue to be minimized and mitigated through the integrated pest management approach.

The risks of adverse impacts to the environment are expected to be less under Alternative 2 and the Board's Preferred Alternative, because statewide and landscape scale strategic objectives are considered and integrated into site and stand-level silviculture treatments. In any one landscape, landscape-level ecological services, such as wildlife diversity, habitat complexity and hydrologic processes, are more likely to occur under Alternatives 2 and the Board's Preferred Alternative than under Alternative 1. By including landscape and broader scale concerns and needs in silvicultural planning, Alternative 2 and the Board's Preferred Alternative will more likely avoid or reduce effects of large stand-replacing fires, insect outbreaks or other extreme natural events than Alternative 1. Although complete avoidance of the effects of broad-scale extreme events is not possible, Alternative 2 and the Board's Preferred Alternative will provide increased protection of

potential adverse impacts to plants, wildlife species and habitats, water quantity and quality, and soils than Alternative 1, by integrating stand-level activities into the realities of naturally-occurring landscape-level processes. For example, silviculturally treating stands most likely to initiate insect outbreaks or treating stands to reduce fuel ladders can reduce fire spread and severity. The moderation of the extremes under Alternative 2 and the Board's Preferred Alternative mitigate probable significant adverse impacts to well-functioning ecosystems.

CUMULATIVE IMPACTS

In managing for multiple objectives, DNR seeks to manage landscapes in forest management units (stands) or smaller. Nature operates at all scales, without artificial boundaries from cataclysmic scale at a multi-century to multi-millennium interval, to smaller scales at more frequent intervals. The resulting ecosystem function and balance, including that related to species populations, often fluctuate beyond an acceptable range of variation to avoid the risk of cumulative impacts from forest management activities. By managing landscapes, Alternative 2 and the Board's Preferred Alternative seeks to moderate extreme events, thereby reducing the risk of cumulative impacts, especially fire and pathogen epidemics, by managing forests to meet multiple objectives and values at a constant rate, by manipulating the forest at the stand level. Alternative 2 and the Board's Preferred Alternative seeks to perpetuate relatively stable and viable ecosystems within their natural range of variability. To accomplish this, it is necessary to define statewide landscape and stand outcomes (e.g., specific wildlife habitats, revenue for the trusts, visual management, etc.) and to implement forest management unit silvicultural prescriptions that achieve the outcomes. These outcomes must be synchronized at all levels so that any and all activities support rotational forest management unit (stand) objectives, which in turn support desired balances and spatial arrangements over landscapes.

Alternative 1 mitigates probable significant adverse impacts caused by isolated activities by limiting or promoting certain techniques. However, none of the policy statements have direct linkage to landscape management. In fact, Alternative 1 fails to provide a viable mechanism for linking individual projects to management of cumulative impacts over landscapes e.g., Policy No. 11 links management intensity to return on investment, but not to ecosystem maintenance over landscapes. The landscape concepts therefore, did not translate into practical silvicultural means.

Alternative 1 addresses cumulative impacts by mitigating the likelihood of significant adverse impacts at the activity level. Alternative 1, however, likely constrains individual activities in such a way that broader landscape objectives become unattainable or may even be adversely affected. For example, financial inability to control undesirable vegetation likely delays attainment of desired wildlife habitat structure at the stand level, thereby affecting habitat needs at the landscape level. Thus, Alternative 1 increases the risk of adverse impacts to wildlife habitat, plants and animals, water, earth and aesthetics, due to lack of landscape objectives.

Alternative 2 and the Board's Preferred Alternative benefit from being fully integrated into a landscape-level sustained harvest implementation process. Integrating unit-by-unit

objectives with landscape-level processes over space and time reduces probable significant adverse cumulative impacts from individual projects.

Alternative 2 and the Board's Preferred Alternative emphasize an overall vision of long-term, viable landscape-level ecosystems for native species and other ecosystem values by dovetailing silvicultural policies into a landscape-level system of planning and implementation. This integrated approach addresses and mitigates the potential for cumulative significant adverse environmental impacts from activities not only during the operation, but over landscapes and through time and provides a foundation for beneficial effects on the environment. Habitats for threatened and endangered species are restored and social concerns are addressed in consideration of ecological and economic scientific knowledge. For example, frequency and timing of creating openings in the forest canopy or use of forest chemicals, primarily herbicides and fertilizer, will be implemented, postponed or avoided based on their likelihood of achieving desired outcomes over time and space. Alternative 2 and the Board's Preferred Alternative provide linkages between silvicultural practices and landscape scale strategies that can reduce risks of significant adverse cumulative impacts over both the short- and long-term and increase both short- and long-term benefits to water, wildlife and other elements of the environment.

3.4.3 Forest Land Transactions

INTRODUCTION

State law and DNR's *Asset Stewardship Plan* provides overall guidance for land transactions, including forest land transactions. Forest land transactions include selling, purchasing and exchanging lands, and acquiring and granting rights of way and easements. Transactions are critical for improving the performance of the forest trust asset by upgrading its productive capacity reducing management costs and improving DNR's ability to meet ecological objectives, including protection of special ecological features.

AFFECTED ENVIRONMENT

DNR uses land transactions to maintain and improve the quality, value and productive capability of forested state trust land assets. In general, the goal is to dispose of properties that are unproductive or underperforming and replace them with others of higher financial capacity to produce income for the trust beneficiaries, both in the short and long-term. Many of the properties identified for disposal have attained higher and better use characteristics, which may increase their value, but render them unsuitable for resource management by DNR. In addition, forest land transactions allow protection of special ecological features and other social and ecological amenities by entities with those primary objectives through transfer out of trust ownership, when full market value compensation to the trust(s) is secured.

The trust land base is strongly dominated by forested holdings, both in terms of acreage and value, so diversifying over time into other asset classes is a key goal in selecting replacement properties. DNR's repositioning strategy aims to reduce financial risk and increase prospects for immediate income, typically through agriculture and commercial property leases. DNR's internal Asset Management Council directed that for fiscal year 2003-2005, one third of acquisition funds should be used to purchase commercial agriculture properties, one third for commercial properties and one third for protecting and enhancing existing assets, i.e., by purchasing in-holdings within forest blocks and making infrastructure investments.

In addition to diversifying into non-forestry asset classes, DNR uses transactions to upgrade, consolidate or reestablish holdings within asset classes to produce higher rates of return. For example, a low productivity growing site or high operational cost forestland has been sold or exchanged for higher site or lower operational cost forestland. Table 1 summarizes transaction activity over the last 20 years.

Table 1: Trust Land Transactions by Asset Class (Fiscal Year 1984 to Fiscal Year 2004) *					
	Acres Disposed	**Value Disposed**	**Timber Value to Common Schools**	**Acres Acquired**	**Value Acquired**
Ag/Grazing	17,495	$3,610,335	NA	11,331	$15,746,477
Grazing Converted to Conservation Use	5,227	$728,900	NA	NA	NA
Commercial **	360	$21,601,215	NA	37	$57,600,000
Forest Management	21,935	$162,438,424	NA	NA	NA
Forest Converted to Conservation Use ***	45,361	$32,241,300	$137,144,500	70,456	$214,187,546
Higher & Better Use	9,440	$53,402,725	$31,812,000	364	$27,400
Total	99,818	$274,022,899	$168,956,500	82,189	$287,561,423

* Monies received from disposal of trust land are used to purchase replacement properties, which may be in any of the asset classes. Disposals from a particular asset class are not necessarily reinvested into the same asset class.

** Disposals are primarily undeveloped commercial acreage and acquisitions are developed commercial properties.

*** Forest Converted to Conservation Use value disposed includes Trust Land Transfer timber value deposited into the Common School Construction Account.

REGULATORY FRAMEWORK

Significant legal authorities from the Enabling Act, the State Constitution, common law and the statutes are available to DNR, which are designed to enhance the stewardship of lands through transactions. The regulatory framework established by these legal authorities direct DNR in protecting, diversifying, repositioning and making the lands productive in perpetuity. These tools include the Land Bank statutes permitting sales followed by replacement and exchange statutes.

The Land Bank was established in 1977 under Chapter 79.66 RCW. Proceeds from permanent dispositions of granted lands under constitutional provision and statutes are deposited in permanent funds. The Land Bank statutes provided a formal mechanism for trust lands to be sold and replaced, so that no permanent disposition of lands is made. This is used to sell lands which have low potential for natural resource management, low income generating potential or which, because of geographic location or other factors, are inefficient for DNR to manage. The Legislature has found that it is important to acquire lands for long-term management and to replace those sold, so that the publicly-owned land base will not be depleted and the publicly-owned forest base will not be reduced. Additional limitations state that it cannot be used as an exercise of eminent domain acquisition of property and the total acreage held in the Land Bank is not to exceed 1,500 acres. The purpose of the RCW is to provide a means to facilitate such sales and purchases, so that the diversity of public uses on the trust lands will be maintained. In

making these determinations, DNR is to comply with local land use plans and applicable growth management principles. By statute, the lands to be purchased are to be desirable for addition to the public lands of the state, because of the potential for natural resource or income production of the property. The RCW also allows for certain exchanges for other property which have greater potential for natural resource production, income production or which could be more efficiently managed by DNR.

Appropriation may be made from the Forest Development Account or the Resource Management Cost Account for the purposes of this RCW. The RCW also created a Land Bank Technical Advisory Committee to provide professional advice and counsel to the Board of Natural Resources regarding Land Bank sales, purchases and exchanges involving urban property. At intervals to be determined the Board of Natural Resources, DNR is to identify trust lands which are expected to convert to commercial, residential or industrial uses within ten years. The Resource Management Cost Account was established in 1992 in RCW 79.17.210 to hold funds received in payment for transfers in lieu of condemnations, transfers to public agencies and transfers to resolve trespass and property ownership disputes, permitted under RCW 79.17.200. “Public agency” is broadly defined and includes the United States and any Tribe recognized by the federal government. The proceeds are to be used to buy replacement property for the affected trust in order to maintain the real property asset base managed by DNR. The account is to be used to complete transactions without reducing the real property asset base. RCW 79.17.200 allows for direct transfers or sales without public auction only after appraisal for at least fair market value and only if the transaction is in the best interest of the state or affected trust.

These two innovative programs provide DNR with significant opportunities to purchase specific parcels of trust lands, transfer them to their highest and best public use, and acquire replacement land better suited to be managed for the trusts (see RCWs 43.30.385, 43.30.265 and 43.51.270). Areas desirable for recreation or of natural significance, such as intact ecosystems which could not be effectively managed for long-term income production, are purchased from the trusts with State-General Fund monies and replaced with more suitable lands.

Currently, the focus is on Common School lands. The largest portion of the value of lands which has been included in this program consists of the timber value. When a transfer is made with State-General Fund money, the timber value is deposited in the Common School Construction Account. The land value is retained by DNR to acquire replacement land. This is to comply with the intent to maintain the land base of the affected trusts.

Over the past 35 years, DNR has completed land exchanges encompassing more than a half million acres of forestland in Western Washington. The vision and result of this large repositioning effort was to consolidate or “block up” DNR-managed lands to achieve management cost reductions through increased efficiency. DNR’s partners in these exchanges have typically been other large forest landowners and the federal government.

The Legislature adopted exchange authority for State Forestlands in 1937 and for trust land in general in 1957. Exchanges are carried out to better position the trust land base within the regulatory constraints of maintaining the state land and commercial forest base. As with all transactions, exchanges are subject to approval by the Board of Natural Resources.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 reflects current practice and is consistent with state law and guidance in the *Asset Stewardship Plan*.

POLICY STATEMENTS

Forest Resource Plan* Policy No. 1, Federal Grant Land Base: "The department will maintain a diversified base of Federal Grant lands, including nonforest properties. In deciding whether to sell, exchange or acquire lands, the department will balance current economic returns and trust benefits with future economic returns and trust *benefits."

***Forest Resource Plan* Policy No. 2, Forest Board Land Base: "The department will perpetuate a productive forest base of Forest Board lands. In deciding whether to exchange lands, the department will assess whether timber harvesting is impractical on these properties and, if so, will attempt to replace them with productive forestlands."**

■ ALTERNATIVE 2 & BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

Alternative 2 and the Board's Preferred Alternative recommend no policy in the *Policy for Sustainable Forests* related to forest land transactions, as policy direction is already provided through state law as is documented in the Regulatory Framework subsection and the *Asset Stewardship Plan,* which is a stand-alone plan independent of the *Policy for Sustainable Forests*.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

A comment was submitted that urged DNR to reconsider their practice of converting shrub-steppe. Consistent with the DNR's *Asset Stewardship Plan*, DNR has been looking at opportunities to sustainably manage these in conjunction with forest environs; to consider alternative land uses; and to exchange high quality shrub-steppe to other agencies, such as the Bureau of Land Management and Washington Department of Fish and Wildlife, to ensure its protection.

In terms of DNR's agricultural lands, which are not governed by the *Policy for Sustainable Forests*, some conversion of lower quality fragmented shrub-steppe to cultivated agricultural or other income generating uses will occur. Others may occur through higher use, such as oil and gas production. Higher quality and larger contiguous patches of shrub-steppe habitat will continue to be evaluated for meeting trust objectives or transfer out of trust status, with compensation to the trusts, to ensure its protection.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Most sales, transfers and exchanges of land and purchases of land are categorically exempt from SEPA review, because they are not the type of activities that have probable significant adverse environmental impacts (see WAC 197-11-800(5)).

Any adverse environmental impacts, of these policy alternatives are speculative and, therefore, not analyzed in this Final EIS.

However, the SEPA Rules recognize the potential for adverse impacts from the sale, transfer or exchange of publicly-owned land that is subject to an authorized public use. Individual SEPA review will be done for any project specific transactions where there is an authorized public use.

CUMULATIVE IMPACTS

See the Significant Impacts and Mitigation Measures discussion.

3.4.4 Forest Roads (formerly "Roads")

INTRODUCTION

DNR repairs and maintains about 14,000 miles of forest roads statewide (12,000 on forested state trust lands and 2,000 on other non-DNR lands. Estimates done in 2004 from DNR's Forest Practices Transportation Layer indicate that of 12,000 statewide road miles on DNR-managed lands, just over 8,000 miles of road are in Western Washington (see the *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*, Road Density Analysis, Chapter 4, Section 4.6.3, incorporated here by reference). DNR abandons or eliminates roads that are no longer needed for management purposes.

Timber harvest, fire control and recreation activities all generate traffic on DNR forest roads. The largest single source of traffic is associated with DNR's management of forested state trust lands, although public access and recreation access may be a large use in some areas. Traffic from these activities extends from the network of DNR and private forest roads onto county roads, as well as state and interstate highways. County and state roads are affected to varying degrees by logging trucks and other traffic generated from timber harvesting and forest management activities on forested state trust lands, as well as timber harvesting on other types of land ownership.

Forest roads increase the value of the asset. The road system also provides a variety of social benefits, including recreational access and access to private forestlands and residences. Roads, if not properly managed, have the potential to cause increased costs and risks by damaging the environment or providing opportunities for illegal activities on forested state trust lands. DNR carefully weighs the impacts of forest roads with regards to environmental protection, public use and forestland management needs. Where appropriate, roads are abandoned. Where appropriate, DNR uses alternative harvest systems to minimize forest road density (roads/square mile).

Forest road-spacing is mostly dependent on topography. Topography drives the type of logging system used to achieve the desired silvicultural objectives, which in turn dictates optimal yarding distance to road-spacing combinations.

Although the Forest Roads policy subject primarily meets the following Policy Objectives:

- Meet all state and federal laws, including the trust obligations and the contractual commitments of the HCP (Policy Objective 1);
- Balance trust income, environmental protection, and other social benefits from four perspectives: the prudent person doctrine; undivided loyalty to and impartiality among the trust beneficiaries; intergenerational equity; and not foreclosing future options (Policy Objective 2); and
- Use professional judgment, best available science and sound field forestry to achieve excellence in public stewardship (Policy Objective 5);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

DNR's current method of road inventory utilizes the Forest Practices Transportation Layer in DNR's geographic information system. DNR has complied with the forest practices rules' Road Maintenance and Abandonment Plan requirement to have all of its forest roads inventoried, environmental issues assessed and maintenance and abandonment activities prioritized by December 2005. DNR estimates that approximately 12,000 miles of road exist on state land, with an additional 2,000 miles of easements on other lands. Most of these roads have a rock surface and are 12 to 16-feet in width. A geographical information system study in 1996 estimated that DNR's road system accessed approximately 70 percent of forested state trust lands. It is expected that 3,500 miles of additional roads will be necessary over the next 20 years to access the remaining forested land base. Currently, DNR abandons approximately 150 miles of road per year and will likely continue that trend for the next ten years, for a reduction of 1,500 miles of road. This range of alternatives does not consider, nor do they affect, the net increase in road miles necessary to access the remaining forestland base. The net amount of roads over the near and long-term is determined by the access needed to meet DNR's sustainable harvest level, HCP targets and state forest practices rules, which have all undergone a SEPA EIS analysis and are incorporated by reference in this Final EIS. None of the alternatives modify the targets by the sustainable harvest level and the HCP. Any new roads required to achieve Board of Natural Resources policy objectives are reviewed under SEPA at the time that subsequent road plans are developed.

There have been a number of accomplishments related to roads management since the HCP was implemented. These include:

- Baseline inventory of roads completed in December 1999;
- Inventory of all stream crossings and assessment and prioritization of culvert fish blockages completed in April 2001;
- 223 fish blockages repaired or abandoned;
- 907 miles of road decommissioned or abandoned;
- HCP guidelines for assessment of potentially unstable slopes completed in September 2003; and
- As of December 31, 2003, approximately 75 percent of the HCP planning unit road assessments have been completed under the approved Road Maintenance and Abandonment Plans, according to Forest and Fish regulations. The law required DNR, at the end of 2003, to be 60 percent complete.

Roads can potentially affect water quality, hydraulics, wildlife habitat, unstable slopes, native plant species, aesthetics and public access and recreation in several ways. A

number of processes are important to understand the potential for adverse environmental impacts to these elements. The processes include mass wasting, surface erosion and changes in soil productivity.

The primary concern about roads is the amount of sediment that is delivered to streams. The amount of impact is dependent on construction techniques; proximity to streams; parent soil types; surfacing type; cross drain culvert spacing and location; and quality and frequency of maintenance and road use.

Management activities that potentially increase the risk of mass wasting include road building (*Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources*, pages 3-29 to 3-31). Careful road planning can reduce the risk of mass wasting due to management activities and its effects. Sediment produced as a result of use of roads can be delivered to the aquatic system from episodic landslides initiated as a result of poor road construction and maintenance.

The role of mass wasting in aquatic systems is described in more detail in the *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources* (pages 3-7 to 3-25) and incorporated here by reference. Potential impacts from road-building and timber harvest are minimized through effective planning, design and review of appropriate harvest practices on all non-federal lands in Washington, with special requirements on unstable or potentially unstable slopes. Roads can have a significant influence on unstable slopes, due to the interception and redistribution of normal groundwater patterns and interruptions of precariously steep ground slopes in unstable soil types.

Generally, forest vegetation stabilizes soils, reduces soil erosion and slows sediment transport to streams, thereby minimizing the impact of sedimentation on water quality. However, surface erosion from roads, harvest units and skid trails can be a chronic source of fine sediment to the drainage network, as well as an episodic source of coarse sediment. Chronic sources of fine sediment can have potentially significant adverse effects on the physical habitat of the aquatic system and certain lifestages of aquatic biota, degrade water quality and affect soil productivity in both riparian and upland areas.

Road-related surface erosion and delivery of fine sediments to streams is a concern, because of the thousands of miles of forest roads that exist to transport harvested timber and other forest products in forested regions. Surface erosion is affected by slope gradient and shape, soil texture properties (density, cohesion, sorting, etc.), parent material, precipitation, groundwater movement, vegetation cover and human activities. Rates of sediment delivery to streams, predominantly from timber haul (heavy truck traffic), but also public use of unpaved roads is correlated to traffic volume, design and maintenance of the road and associated drainage structures, and the location of the road relative to streams (United States Department of Agriculture Forest Service, 2001; Rashin et al., 1999; Reid and Dunne, 1984). The amount and types of traffic and road maintenance practices also influence delivery.

Approximately 70 percent of DNR’s current land base is already actively managed and accessed by roads which are used for a variety of land management purposes, including

harvesting timber and other forest products, recreation, silviculture and wildfire suppression, all of which are factors in the sediment production and delivery processes.

In assessing road surface erosion, sedimentation processes are more of a complex factor than the number of truck miles driven on the roads. Topography, aspect, surface materials, construction/maintenance techniques, proximity to a riparian area, micro-climates, time of year, storm events and public access play a role in sedimentation. Forest roads that have not yet been updated to be in compliance with the forest practices rules are at greater risk for sediment production than those that have been updated. One of the objectives of the Road Maintenance and Abandonment Plans is to have roads constructed in a manner that prevents the delivery of sediment to streams, regardless of levels of traffic.

A summary of the analysis of the types of impacts that roads can have from the HCP, pages IV. 77 to 78, and the *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources*, pages 3-29 to 3-31, hereby incorporated by reference, are outlined as follows:

- Roads can affect the surface water hydraulics by intercepting, concentrating and rerouting normal run-off patterns;
- Roads and the stream-crossing structures they incorporate can have an impact on fish, mammal, and riparian obligate species, migration corridors and to a limited extent, disturb and displace species through introduction of human activity;
- Road building can affect soil productivity. Factors involved include road location relative to sensitive soils and soil moisture, type, area and frequency of disturbance, e.g., skid roads;
- Roads can facilitate the introduction of non-native plant species into the forest environment; and
- Roads can have visual impacts. This perspective is amplified when high road densities are coupled with large contiguous harvest units visible from populated locations on state and local highways.

Many of DNR's forest roads are used to access DNR-managed lands for a variety of recreation activities, involving both developed facilities and trail systems, as well as for more dispersed activities such as hunting, fishing and sightseeing. DNR receives some funds from the Off-Road Vehicle Account for road maintenance to support public access. In addition, some developed recreation sites are leased to the Interagency Committee for Outdoor Recreation, with access provided via DNR-developed roads. Changes to the road system can have an impact to the recreational activities to which those roads provide access. The biggest potential significant adverse impact comes from loss of recreational opportunities due to road closures and abandonment. However, this potential is often mitigated by road relocation, e.g., abandon the stream-adjacent road and relocate it to the top of the ridge.

REGULATORY FRAMEWORK

The basic structure of HCP commitments for forest roads is stated in the *Riparian Conservation Strategy for the Five Westside Planning Units*, Part IV, Section D. DNR committed to the following principles for road network management:

- Minimization of active road density;
- Site-specific assessments of alternative harvesting systems that require less road construction;
- A baseline inventory of roads and stream crossings;
- A prioritized system for road decommissioning and abandonment, upgrading and maintenance; and
- Identification of fish blockages caused by stream crossing structures and a prioritized approach to repair or remove.

In addition, the state Forest Practices Act (RCW 76.09) regulates DNR. This act contains many sections designed for protection of the environment. The Forest and Fish regulations were passed into law after DNR's HCP agreement and have significantly raised the level of environmental protection provided by the forest practices rules with respect to road management, unstable slopes and fish blockage repair. State Forest Practices Rules cover all phases of roads, from planning to abandonment. Additionally, each road that is constructed is further evaluated under SEPA as a part of DNR's review of timber sale proposals occurring on forested state trust lands.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 essentially directs DNR to plan, build, construct, control, maintain and abandon roads to support proprietary activities and provide for multiple use, in compliance with state law and Board of Natural Resources policy. While adopted prior to the HCP, it also directly supports the HCP commitments. Alternative 1 focuses on reducing the total amount of roads through coordination and cooperation with other landowners; using the most cost-efficient road construction and maintenance methods that meet applicable laws, contractual requirements and Board of Natural Resources policy; controlling adverse environmental impacts of roads, including road closures; and building and maintaining roads to meet or exceed safety standards for the uses intended, including multiple use. Alternative 1 meets Policy Objective 1, but doesn't appear to meet Policy Objectives 2 and 5 as well as other alternatives.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 28, Developing and Maintaining Roads: "The department will develop and maintain a road system which integrates management needs and controls effects on the forest environment."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 primarily directs DNR to plan, build, construct, control, maintain and abandon roads to support trust objectives, including enhancing asset value. Alternative 2 deemphasizes multiple use as a management objective. Alternative 2 relies on compliance with state and federal law, including meeting the contractual commitments in the HCP, to control the environmental impacts of the road system on forested state trust lands. Unlike Alternative 3, Alternative 2 does not specifically address the issue of road density. Alternative 2 meets Policy Objective 1 and meets Policy Objectives 2 and 5 as well as Alternative 3.

POLICY STATEMENTS

The department will develop and maintain roads to meet trust objectives, including enhancing asset value.

The department will, in developing and maintaining roads, rely on the requirements of the *Habitat Conservation Plan*, forest practices rules and the State Environmental Policy Act to minimize adverse environmental impacts.

■ ALTERNATIVE 3

DISCUSSION

Alternative 3 includes all of the components of Alternative 2, while specifically adding the commitment to minimize the road network. This would require a more active effort to do long-range forest land planning to ensure the minimum road network needed to meet trust objectives. Alternative 3 also commits DNR to a more aggressive program of abandoning roads to minimize environmental impacts and reduce road-associated costs. Alternative 3 best meets the applicable policy objectives, as it meets the requirements of the HCP (Policy Objective 1) and allows use of professional judgment and best available science in designing, constructing and maintaining a road system that is both cost-effective and environmentally compatible (Policy Objectives 2 and 5).

POLICY STATEMENTS

The department will develop and maintain roads to meet trust objectives, including enhancing the asset value.

The department will, in developing and maintaining roads, rely on the requirements of the *Habitat Conservation Plan*, forest practices rules and the State Environmental Policy Act to minimize adverse environmental impacts.

The department will, to the greatest extent possible, minimize roads on forested state trust lands while still meeting the needs of each trust beneficiary.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative builds on Alternative 3 by adding language to ensure that minimization of the road network is carried out, consistent with Board of Natural Resources policy direction, e.g. the Public Access and Recreation policy subject area.

POLICY STATEMENTS

The department will develop and maintain forest roads to meet trust objectives and Board of Natural Resources policy, including protecting and enhancing the asset value.

To minimize adverse environmental impacts, the department will rely on the requirements of DNR's *Habitat Conservation Plan*, state forest practices rules and the State Environmental Policy Act, and will minimize the extent of the road network, consistent with other Board of Natural Resources policy.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

It is not possible to predict the location or the amount of subsequent actions that may occur to implement this policy. Therefore, the analysis is qualitative and will be discussed in relative terms of increasing or decreasing risks of impacts to the environment.

Alternative 1 meets forest practices rules for environmental standards on all state lands and a higher environmental standard for those lands covered by the HCP. It is also assumed that Alternative 1 will continue the use of the expanded SEPA checklist on site-specific proposals for road construction to quantify impacts to the environment.

The *HCP Draft Environmental Impact Statement* (pages 4-163 to 170) analyzes effects related to sediment and stream flow and is hereby incorporated by reference. Mitigation in the form of riparian management zones, management for hydrologically mature forest in the significant rain-on-snow zones, wetland protection and road management planning are detailed in those sections.

The following information is incorporated by reference. The *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources* presents an analysis of the effects of sediment, peak flows, roads in riparian areas and wetlands on water quality and on fish. A discussion of sediment is contained in Section 3.2, page 3-7, which discusses road surface erosion and road-related landslides. The evaluation of the alternatives in this analysis offers the 2001 rules package that provides measures necessary to address impacts due to road-related sedimentation (Section 3.2, page 3-16). These mitigation measures include implementation of road maintenance and abandonment plans and the adaptive management program. In addition, the *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources,* Appendix F, page F-2, discusses the effects of road construction and maintenance and describes recommended and accepted practices for building and maintaining roads. It states that, "Roads built following Forest Practices Rules that provide specific direction and recommended Best Management Practices (BMPs) from the literature have the lowest risk of causing sediment delivery." Additional forest road impact discussion is incorporated by reference from Appendix F, Forest Roads, pages F-1 through F-17 of this same document.

The *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources,* page S-9, cites the following impacts: "Alternative 2 [which was adopted by the Forest Practices Board and is the current Forest Practices set of rules] would produce a low to moderate risk of fine sediment delivery primarily because of 1) an outcome-based policy incorporated into the forest road rules that directly addresses the desired outcome of avoiding resource damage, 2) improved rules and best management practices that address road drainage, 3) required development and implementation of road maintenance and abandonment plans within 15 years, and 4) a minimum of a 30-foot equipment limitation zone required on all streams."

The *Final Environmental Impact Statement on Alternatives for the Forest Practices Rules for Aquatic and Riparian Resources,* page S-10, cites the following impact: "Alternative 2 [which was adopted by the Forest Practices Board and is the current Forest Practices set of rules] would also produce a moderate risk of timber-management-related increases in peak flows because watershed analysis would likely be conducted with less frequency, and no other rules would directly address cumulative watershed harvest. Road drainage to streams would, however, be reduced through strengthened rules, and best management practices and road maintenance and abandonment plans would be implemented." However, on DNR lands in Western Washington covered by the HCP, DNR maintains hydrologic maturity in the rain-on-snow zones. This further mitigates the potential for probable significant adverse environmental impacts related to surface hydraulics on DNR-managed lands in Western Washington.

DNR evaluates slope stability and other geomorphologic interactions during site-specific timber sale and road design. A significant part of the evaluation is the use of the expanded SEPA checklist, which adds approximately 100 additional considerations to the original checklist. These considerations focus on environmental issues associated with forest management, including road construction. An understanding of interactions among geology, climate, ecosystems and management activities can lead to informed decisions

and balanced actions that minimize significant adverse environmental impacts. DNR added questions to the base SEPA checklist in the Washington State Department of Ecology's rules to help DNR identify potential cumulative impacts of forest management within watersheds and sub-basin areas within watersheds.

Impacts from noxious plant species are discussed in this Final EIS under the Forest Health policy subject area and impacts related to aesthetics are discussed under the Visual Impacts policy subject area.

Alternative 1 perpetuates the current level of roads available to the public for access and recreation. Alternative 1 also directs DNR to build and maintain a road system to support management needs, including multiple use, while controlling effects on the forest environment. Roads are built to provide user safety and minimize potential environmental impacts. Alternative 1 does not specifically address the opportunities for recreational access provided on DNR roads, but does include multiple use as a goal in developing and maintaining roads on forested state trust lands. The focus of DNR's road system management has been to reduce the total number of miles of roads in keeping with its HCP obligations. While the overall reduction in miles of road can have an impact on access to DNR lands for recreational activities, past practice, prior to adoption of the HCP, has not included a pattern of aggressive road abandonment.

Recently, with the implementation of the forest practices rules and the HCP, DNR has been more active in assessment of its road system and more roads have or will be abandoned to fulfill requirements. This represents an increasing potential impact to access provided to the public on DNR-managed lands. As some roads are closed and other new roads are constructed, there will be a displacement of access and other recreational activities. However, DNR is still required to provide multiple use when compatible with trust requirements and is still required to honor or renegotiate any lease commitments to the Interagency Committee for Outdoor Recreation potentially impacted by Alternative 1.

Alternative 2 provides the same level of environmental protection to the natural environment and the same level of environmental impacts to the natural environment as discussed above under Alternative 1. Alternative 2 de-emphasizes multiple use as a management objective, which would potentially provide less public access to forested state trust lands. This could result in an increased potential of impacts to access and recreational opportunities over the long-term as long as access is limited or reduced.

Under Alternative 3, the evaluation of probable significant adverse environmental impacts and mitigation measures are essentially identical to Alternatives 1 and 2 for lands covered by DNR's HCP. However, Alternative 3 specifically adds the commitment to extend the tools embedded in the HCP in order to minimize the road network in Eastern Washington. Alternative 3 commits the eastside regions to a higher level of standards for design, construction and maintenance than Alternatives 1 and 2. Since the Northeast and Southeast regions have approximately 33 percent of the road net statewide, DNR could expect an increase in abandonment in those regions by an additional 40 miles per year over the next ten years. This additional abandonment effort represents approximately 3 percent of the current total road network statewide on forested state trust lands. Thus,

under Alternative 3, a net reduction in the potential impacts to the elements of the natural environment, i.e., wildlife habitat, water, and soils through errosional processes may occur. However, due to the land ownership pattern in Eastern Washington (i.e., more scattered in nature than consolidated blocks of state land) abandonment efforts must be carefully weighed against existing easements and access to other landowners.

Alternative 3 could also reduce the amount of roads available to the public on the current total road network by approximately 3 percent. As such, Alternative 3 has the greatest potential adverse impact to public access and recreation. As DNR seeks to minimize roads on forested state trust lands, access opportunities for the public will potentially be reduced, changed or displaced to areas of new road construction. A minimum road network managed strictly to meet trust objectives could include the abandonment of roads presently used primarily for access to recreation sites or trail systems, unless adequate and appropriate funding and resources were provided to mitigate environmental and economic impacts to the trusts. While DNR receives some funds from the Off-Road Vehicle Account for road maintenance to support recreational access, the amount is not sufficient to keep roads that provide access to many recreational sites open and maintained.

Many recreational sites were constructed along routes once used for forest or wildfire management, but the needs for the roads for forest management purposes are greatly reduced or no longer exist. The Recreation Program's current budget would not support management and maintenance of those roads and many could be closed under Alternative 3.This could result in a corresponding increase in management fund expenditures to enforce and maintain closures. Sites that were accessed by roads no longer needed for forest management would be closed and facilities removed, as the roads were abandoned. However, some recreational facilities were constructed and leased with grant funds. Any assessment of road system management would include an assessment of recreational site access and an accounting of lease obligations. DNR may have to weigh the cost of replacing or repaying lease values as access is eliminated due to road mile reduction, against the associated costs of road maintenance and enforcement of closures.

When considered with Alternative 4 for Public Access and Recreation, public access would be provided on existing open roads, when there is adequate and appropriate management funding and support to ensure compatibility with trust objectives. However, Alternative 3, if combined with Alternative 2 for Public Access and Recreation, which emphasizes more road closures, may result in a significant adverse impact to recreation and public access due to a loss in access and recreational opportunities. Some mitigation would be provided when roads are relocated, e.g., roads adjacent to stream channels are relocated to where potential adverse impacts to the natural environment are avoided or minimized and recreational opportunities, although relocated, are somewhat retained.

The analysis of the Board's Preferred Alternative is the same as Alternative 3, with an added emphasis on the importance of achieving outcomes of all Board of Natural Resources policies when decisions are made regarding DNR's forest roads. This may result in greater mitigation of potential impacts to public access and recreation under Alternative 3.

CUMULATIVE IMPACTS

Under all alternatives, DNR will continue use of the expanded SEPA checklist to calculate and quantify environmental impacts of project-specific road construction and abandonment, as described under Alternative 1. All alternatives will also be subject to the HCP and the forest practices rules that have been discussed in detail above and analyzed in the EISs incorporated in this Final EIS by reference. DNR will also review the impacts of its forest planning proposals, including road planning proposals, through its forest land planning process that includes review under SEPA. In addition, the potential for cumulative impacts to elements of the natural environment, i.e. slope stability, habitat, water and soils, from forest roads should be further reduced from additional road abandonment and closure. Any cumulative impacts to the built environment, i.e. public access and recreation, will be considered in conjunction with the Board's Preferred Alternative for Public Access and Recreation at the time that subsequent actions are taken that implement this policy.

3.4.5 Acquiring Rights of Way

INTRODUCTION

DNR acquires land and rights of way across private and other public lands to facilitate management and to increase the value of the trust assets. DNR acquires these rights of ways by gift, purchase, exchange, condemnation or road use agreements. In addition to the *Forest Resource Plan* policy, DNR has one additional policy related to rights of way acquisition, which is titled Acquiring Access to Lands Managed by the Department.

AFFECTED ENVIRONMENT

DNR acquires needed access to state lands by purchasing or exchanging land, easements or permits with other landowners. Landowners may be non-industrial private landowners, other governmental agencies, industrial forest landowners or non-forestry related corporations.

In the past, DNR has acquired access primarily from industrial forest landowners. Changing land use and increased development have resulted in the percentage of acquisitions needed from non-industrial forest landowners to increase, accounting for more than 60 percent of total acquisitions. Normally, greater conflicts may arise between the uses proposed by DNR with a non-industrial forest landowner than with an industry landowner, thus making access more difficult to negotiate.

Access can be needed over any type of land. Most access is acquired by easement. Legally, the easement holder (DNR) is responsible for the maintenance of the access road, unless the easement document states otherwise. Most easements obtained by DNR provide for joint maintenance of the roads. When adjacent landowners were timber industry landowners with similar interests, this worked well. As more adjacent forestland has converted to private residences and non-timber industrial landowners, DNR bears more of the responsibility for the maintenance work, as well as meeting requirements of the forest practices rules. DNR is meeting this challenge by more fully evaluating the costs associated with easement roads in the short and long-term prior to obtaining access, as well as considering fee-simple acquisition of land.

Forest Resource Plan Policy No. 27, Acquiring Rights of Way, was a partial restatement of existing DNR-wide policies. Rights of way policies affect management of all DNR-managed lands, not just forested lands.

REGULATORY FRAMEWORK

There are a variety of statutes that govern the acquisition of rights of way. They include:

- Chapter 8.04 RCW, Eminent domain by state;
- RCW 79.10.140, Outdoor Recreation -- Construction, operation and maintenance of primitive facilities -- Right of way and public access -- Use of state and federal outdoor recreation funds;

- RCW 79.38.010, Acquisition of property for access to public lands;
- RCW 79.38.020, Exchange of easement rights;
- RCW 79.36.310, Acquisition of property interests for access authorized;
- RCW 79.36.320, Condemnation – Duty of attorney general;
- RCW 79.36.340, Acquisition – Payment; and
- Exchange and purchase statutes.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Acquiring rights of way is already addressed in another DNR policy, making this policy redundant.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 27, Acquiring Rights of Way: "The department acquires right of way across private or other public lands to department-managed forestland when this access is needed to increase the value of trust assets or for management purposes. The department will acquire these rights of way by gift, purchase, exchange, condemnation or road use agreement. Permanent, public access rights are preferred."**

■ ALTERNATIVE 2 & BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

Alternative 2 and the Board's Preferred Alternative recommend no policy in the *Policy for Sustainable Forests* related to acquiring rights of way, because this subject is already addressed in other DNR policies and in governing statutes.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Acquiring of any right to real property is categorically exempt from SEPA review, because it is not the type of activity that has significant adverse impacts (see WAC 197-11-800(5)(a)). The impacts to the environment rests with the characteristics of each individual acquisition. Department access needs are evaluated on numerous factors,

including environmental impacts. Existing roads are used whenever possible. Acquisition of access by DNR normally results in an upgrade of an existing road to forest practices standards and the incorporation of that road into DNR's road system, resulting in regular maintenance.

CUMULATIVE IMPACTS

There are no cumulative adverse impacts identified for these policy alternatives. See the Significant Impacts and Mitigation Measures discussion.

3.4.6 Granting Rights of Way

INTRODUCTION

DNR recognizes that other entities may need rights of way across forested state trust lands. Permanent and temporary rights of way include grants or easements for utility, domestic use, timber haul and other purposes. In addition to the policy in the *Forest Resource Plan*, DNR has six policies related to granting rights of way, which are titled Granting of Rights of Way – General; Issuing Domestic Use Road Easements; Granting Rights for County Roads; Granting Utility Rights of Way; Term of Rights of Way Grants; and Charging for Rights of Way Grants.

AFFECTED ENVIRONMENT

DNR grants rights of way across forested state trust lands for a variety of reasons, including what is required by law; in exchange for needed rights; to avoid legal action, such as condemnation; and when it does not conflict with trust land management. Almost all rights are granted by permanent easement, temporary easement or temporary permit. Rights are granted for public and private utilities, county roads, residential access, resource management and a myriad of other purposes. Access may be requested by adjacent landowners or by public entities for public purposes, such as county roads or transmission lines. Almost all parcels of land managed by DNR are encumbered with some type of right granted to someone else.

Forest Resource Plan Policy No. 26, Granting Public Rights of Way, was a partial restatement of existing DNR-wide policies. Rights of way policies affect management of all DNR-managed lands, not just forested lands.

REGULATORY FRAMEWORK

There are a variety of statutes governing granting of rights of way. They include:

- Chapter 8.24 RCW, Private ways of necessity;
- RCW 79.10.120, Multiple uses compatible with financial obligations of trust management -- Other uses permitted, when;
- RCW 79.36.350-650;
- RCW 79.38.020, Exchange of easement rights; and
- RCW 79.38.040, Permits for use of roads.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Granting rights of way is already addressed in other DNR policies, making this policy redundant.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 26, Granting Public Rights of Way: "The department will grant rights of way to private individuals or entities when there is an opportunity for enhancing trust assets and when any detriments are offset."**

■ ALTERNATIVE 2 & BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

Alternative 2 and the Board's Preferred Alternative recommend no policy in the *Policy for Sustainable Forests* related to granting rights of way, because this subject is already addressed in other DNR policies and governing statutes.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Any adverse environmental impacts, including cumulative impacts, of these policy alternatives are speculative and, therefore, are not analyzed in this Final EIS.

Issuance of rights of way, easements and use permits to use existing roads in non-residential areas are categorically exempt from SEPA review, because they are not the type of activities that have probable significant adverse environmental impacts (see WAC 197-11-800(25)(j)). Granting rights of way to construct new roads in any area or to use existing roads in residential areas are subject to SEPA review at the time of an individual proposal.

The impacts to the environment rest with the characteristics of each individual grant. Requests for rights of way are evaluated on numerous factors, including environmental impacts. Negotiation of rights of way terms and denials of high-risk applications are used to avoid or minimize environmental impacts. DNR also works cooperatively with regulatory agencies and the applicant to design rights of way that limit environmental impacts.

CUMULATIVE IMPACTS

There are no cumulative adverse impacts identified for these policy alternatives. See the Significant Impacts and Mitigation Measures discussion.

3.4.7 Research

INTRODUCTION

DNR engages and participates in a broad range of scientific and economic research to support DNR land management programs, financial performance and meet the research commitments of the HCP. This includes participating in a variety of research cooperatives with other agencies and organizations. DNR employs scientists in a range of disciplines necessary to meet research and management needs, including forest ecology, silviculture, economics, hydrology, fisheries, wildlife biology and others.

Although the Research policy subject primarily meets the following Policy Objectives:

- Meet all state and federal laws, including the trust obligations and the contractual commitments of the HCP (Policy Objective 1);
- Seek productive partnerships that help DNR achieve policy objectives (Policy Objective 4); and
- Use professional judgment, best available science and sound field forestry to achieve excellence in public stewardship (Policy Objective 5);

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

DNR has a Research Program to supply information to decision-makers, meet the research obligations of the HCP and increase confidence in new and existing management practices. The goal of research on forested state trust lands is to use new scientific information derived from research to guide changes in forest management to better meet trust objectives.

DNR-sponsored research helps DNR practice active and innovative forest resource management and react quickly to changes in technology and economics. Land management decisions made as a result of research can affect the soils, water and habitat for all species of plants, and vertebrate, invertebrate, aquatic and terrestrial creatures on forested state trust lands. Current research efforts, primarily focused in the Olympic Experimental State Forest HCP planning unit may not be relevant to management decisions in other HCP planning units, because of differences in forest composition, structure, growth and natural disturbance.

DNR's research commitments under the HCP are necessary to obtain information to complete the riparian and marbled murrelet conservation strategies. Sound scientific information translates to an increase in both management confidence and management options. In addition, the science that describes the complex interactions between physical and biological parameters within ecosystems and our understanding of the long-term

impacts of forest management activities on these processes is rapidly evolving. Risk and uncertainty remain with some aspects of the conservation strategies. For example, the effectiveness and cost of specific treatments to accelerate habitat development or how best to manage potential windthrow in riparian management zones. DNR, through research, is investigating alternatives to existing management that will more effectively meet the objectives of the HCP and the trusts.

Research conducted by DNR applies to lands within seven different ecoregions. New information about resource condition, rate of change and management response must be placed within the appropriate ecological context. The emphasis on research and adaptive management is intended to lead to effective changes to the conservation strategies in the HCP planning units. However, due to the focus of research in the Olympic Experimental State Forest in the Northwest Coast ecoregion, may be difficult to apply to other ecosystems, because of the differences in growth, environment, stand composition and disturbance history between ecoregions.

The ultimate result of research is to evaluate the consequences of management practices and provide better alternatives for reaching the management objectives in a specific landscape context. Clearly defined objectives, faithfully conducted management and adequate monitoring and evaluation within the intended scope of the research is the best way to support decision-making and propose alternatives to more effectively meet management objectives.

REGULATORY FRAMEWORK

The Forest Practices Cooperative Monitoring Evaluation and Research group is a research partner. The purpose of the Cooperative Monitoring Evaluation and Research group is to provide science-based recommendations and technical information to assist the Forest Practices Board in determining if and when it is necessary or advisable to adjust rules and guidance to achieve resource goals and objectives. The forest practices research priorities are generally consistent with those of the HCP.

DNR actively manages a research program to ensure that information is obtained in a timely and cost-effective manner and that research is accomplished with high standards of quality and credibility (*Final Habitat Conservation Plan*, page V.8). Research is a required activity under the HCP implementation agreement.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Forest Resource Plan Policy No. 40 required that DNR practice state-of-the-art forest resource management and react quickly to changes in technology and economics. Through the use of professionals in the fields of forestry, economics, fisheries, soils, road engineering, hydrology, logging systems, wildlife management, public relations and other areas, DNR conducted applied research to monitor and evaluate silvicultural activities,

test current practices and, where appropriate, initiate a process for change. The research focused on issues related to protection and conservation, as well as forest production.

Alternative 1 emphasizes research of a practical nature that is focused on efforts to increase DNR's effectiveness as a manager of forested state trust lands. Alternative 1 focuses on DNR-conducted research and, because it was written prior to the HCP, does not include the research role of the Olympic Experimental State Forest. Also, it does not recognize the value of research cooperatives as an effective way to meet DNR's research needs. Alternative 1 does not appear to meet Policy Objectives 1, 4 and 5 as well as other alternatives.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 40, Research: "The department will conduct applied research to monitor and evaluate silvicultural activities, test current practices and, where appropriate, initiate a process for change. The research will focus on issues relating to protection and conservation as well as forest production."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 includes all of the components of Alternative 1. In addition, Alternative 2 recognizes that the Olympic Experimental State Forest was created to allow DNR flexibility to conduct management and research activities ecologically appropriate to the Olympic Experimental State Forest. The purpose is to build new knowledge relevant to trust management objectives and species conservation. The Olympic Experimental State Forest intends to find field-tested solutions to forest management issues related specifically to integrating production and conservation. Alternative 2 also recognizes the value of research cooperatives and the importance of a positive cost-benefit ratio in directing research on behalf of the trusts. Alternative 2 appears to better meet Policy Objectives 1, 4 and 5 than Alternative 1.

POLICY STATEMENTS

The department will conduct applied research to monitor and evaluate silvicultural activities, test current practices and, where appropriate, initiate a process for change. The research will focus on issues relating to protection and conservation as well as forest production.

The Olympic Experimental State Forest will be the focus of department research and experimentation efforts to meet the commitments of the *Habitat Conservation Plan*. The purpose is to build new knowledge relevant to trust management and species conservation.

The department will emphasize its participation in research cooperatives, meeting the research commitments of the *Habitat Conservation Plan*, and conducting research when there is a positive cost-benefit ratio to the trusts.

■ ALTERNATIVE 3

DISCUSSION

Alternative 3 includes all of the components of Alternative 2. In addition, it recognizes the importance of staying current with the latest scientific findings, methods and technology and that Olympic Experimental State Forest research should only be the focus when it's ecologically appropriate to the areas where results may be applied. Alternative 3 meets the applicable policy objectives by meeting the research requirements of the HCP (Policy Objective 1), relying on research cooperatives to help achieve research objectives (Policy Objective 4) and guiding forest management strategies and activities on the best available science and professional judgment to achieve excellence in public stewardship (Policy Objective 5).

POLICY STATEMENTS

The department will conduct applied research to evaluate silvicultural activities, test current practices and, where appropriate, initiate a process for change. In addition, the department will research and evaluate new methods of forestry, silvicultural strategies and changes in technology. The research will focus on issues related to natural resource protection and conservation, as well as the sustained production of forest products.

The Olympic Experimental State Forest will be the focus of department research and experimentation efforts, when ecologically appropriate, to meet the commitments of the *Habitat Conservation Plan*. The purpose is to build new knowledge relevant to trust management and species conservation.

The department will emphasize its participation in research cooperatives, meeting the research commitments of the *Habitat Conservation Plan*, and conducting research when there is a positive cost-benefit ratio to the trusts.

The department will endeavor to stay abreast of and use the best available science.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative removed two policy statements from Alternative 3 related to research in the Olympic Experimental State Forest and emphasizing participation in research cooperatives, as they are more methods used to implement or meet the intent of the Board's Preferred Alternative.

DNR's research efforts are conducted in a variety of ecological settings to ensure relevance and applicability to the diverse forest ecosystems of the state. The Olympic Experimental State Forest plays a key role in DNR research efforts where it is the appropriate ecological setting, but research is also conducted in other areas of the state,

such as in the Capitol State Forest near Olympia. DNR also engages in economic and market research to support meeting trust obligations.

Participation in research cooperatives is critical in meeting DNR's research objectives in an effective and cost-efficient manner and is the intent of this policy. This includes participating in a variety of research cooperatives with other agencies and organizations, such as with the state forest practices Cooperative Monitoring Evaluation and Research group, the University of Washington and the Washington State University. DNR also recognizes the importance and value of peer review.

While the Board's Preferred Alternative still meets research requirements of the HCP (Policy Objective 1), it does not emphasize cooperative research (Policy Objective 4) as well as Alternative 3. It emphasizes professional judgment, best available science and sound field forestry (Policy Objective 5) as well as Alternative 3, but is more concise, relevant and easily understood (Policy Objective 3) than the other alternatives by eliminating any geographically narrowing language and applying to all forested state trust lands as appropriate.

POLICY STATEMENTS

The department will endeavor to stay abreast of and use the best available science.

The department will focus research on issues related to natural resource protection and conservation, and to sustained production of forest products and may include:

- **Applied research to evaluate silvicultural activities, test current practices and, where appropriate, initiate a process for change; and**
- **Research and evaluation of new methods of forestry, silvicultural strategies and changes in technology.**

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Alternative 1 enables DNR's research to supply specific information for influencing the timely completion of and future improvements to DNR's management decision-making. Those decisions affect almost all elements of the environment, including the soils, water and habitat for all species of plants, and vertebrate, invertebrate, aquatic and terrestrial animals on forested state trust lands. Alternative management practices can be developed to better meet DNR's conservation goals.

Adaptive management applies the concept of experimentation to the design and implementation of natural resource policies. Adaptive management is learning at time scales needed to accumulate understanding on an ecosystem, rather than sale-by-sale;

manage ecosystems, rather than individual organisms; and is driven by a time scale of biological relevance, rather than business cycle (Lee, 1993). Alternative 1 fails to incorporate modern adaptive management principles or the framework to maintain ecological context for the information. It also fails to emphasize maintaining the credibility of the scientists and their work for DNR. As such, the effectiveness of applying the results of research to guide management decisions that will mitigate impacts to soils, water and plant and animal species under Alternative 1 may be compromised.

Alternative 2 adds significant opportunities for landscape or basin level research on the Olympic Experimental State Forest. The opportunities afforded by the Olympic Experimental State Forest could provide significant opportunities to meet DNR research needs. Inherent in the Olympic Experimental State Forest guiding principles is the integration of timber production and conservation management objectives into research. Although Alternative 2 could result in research that has broader applicability across forested state trust lands and thereby greater minimization of impacts to soils, water and plant and animal species, it is not as explicit as Alternative 3.

Alternative 3 increases the sophistication of adaptive management, broadens the scope of research to the entire geographic area to which it might be eventually applied and allows the Olympic Experimental State Forest to be fully utilized.

Alternative 3 recognizes a benefit over Alternatives 1 and 2 in the role of research cooperatives in controlling cost and increasing the scope of the applicability of results, which in turn is expected to result in less risk of adverse impacts to the environment over Alternative 1. Alternative 3 reinforces the careful management of cooperatives and selective participation based on need and is consistent with Policy Objective 4 to seek productive partnerships to help achieve policy objectives.

Alternative 3 adds a mitigation aspect to the active maintenance of DNR scientific expertise that is not recognized in Alternatives 1 and 2 through a commitment to keep abreast of and use the best available science. This is consistent with Policy Objective 5 to use professional judgment, best available science and sound field forestry to achieve excellence in public stewardship. The ultimate validity and the ability of DNR to defend its decisions depends in part on the capabilities of its scientists. Alternative 3 broadens the research mandate to include modern, integrated methods and technologies, consistent with modern adaptive management. Long-term impacts of ecosystem processes, such as biogeochemical cycling that cleans water and supports vegetation growth, and environmental condition, such as water quality or structures that provide wildlife habitat, will benefit from the more comprehensive approach on modern adaptive management (Lee, 1993).

Alternative 3 provides the most options to mitigate possible impacts to the environment by providing more relevant research to make informed management decisions for the resources managed by DNR. If the information on which management decisions are based is taken out of context, managers could accept ineffective actions or reject effective measures. If decisions are based solely on observations, observer bias or limited experience could lead to the rejection of a valid management alternative or the continuation of invalid management alternatives that damage resources. For example, in

some cases windthrow may look like devastation to a riparian management area from the roadside, when in fact some windthrow may add large woody debris.

Alternative 3 recognizes the critical importance of the scientific staff maintained by DNR and that outreach to other forest management organizations is an important part of DNR's Research Program. It is recognized that much of the information, that will eventually support change in existing management procedures, can be developed by outside research and monitoring organizations. Maintaining the flow of information from external sources to DNR's adaptive management is an essential research function under Alternative 3 that in turn can lead to mitigation of adverse impacts to the environment.

The make-up of the Board's Preferred Alternative is similar to Alternative 3 in that it provides for relevant research targeted to both conservation and protection of natural resources. Although specific statements regarding the emphasis on cooperatives and the focus of Olympic Experimental State Forest research have been removed, the potential environmental impacts to the elements of the environment are unchanged from the analysis of Alternative 3, as these components will be addressed through implementation that adheres to accepted scientific principles.

CUMULATIVE IMPACTS

The likelihood of probable significant adverse impacts will increase if research fails to provide critical information to advise management decision-making.

Alternative 1 could result in a greater risk of cumulative impacts to the natural elements of the environment in general because it does not explicitly recognize the complexity, risk and uncertainty that remain with some aspects of the HCP's conservation strategies.

Alternative 3 and the Board's Preferred Alternative reduce the likelihood of probable significant adverse impacts, compared to Alternatives 1 and 2, by recognizing that information on management impacts must be applied to the correct ecological context.

Alternative 3 and the Board's Preferred Alternative further reduce the likelihood of probable significant adverse impacts from Alternatives 1 and 2 in recognizing the role of qualified analysis in designing, conducting and interpreting research. Having qualified scientific staff to review the SEPA analysis is important to reducing potential impacts.

Alternative 3 and the Board's Preferred Alternative also reduce the risk of adverse cumulative impacts to the environment resulting from poorly advised management decisions. Alternative 3 ensures research priorities are focused on the areas of greatest uncertainty, research is conducted in the most appropriate location to have the greatest scope of inference and that staff is maintained to gather and interpret results.

3.4.8 External Relationships

INTRODUCTION

As the manager of 2.1 million acres of forested state trust land, DNR is a neighbor to thousands of citizens, businesses and other forest landowners. DNR values agency transparency and openness. Consequently, DNR recognizes the importance of partnering with stakeholders and other governmental agencies, as well as providing information to the public. DNR participates in educational efforts, such as sharing information about the forested state trust lands, including the trust mandate and how DNR's management activities provide funding for construction of schools, universities, prisons, institutions and Capitol buildings. DNR is also well-positioned to offer and promote environmental education, because forested state trust lands can serve as both a laboratory and an outdoor classroom.

Although the External Relationships policy subject primarily meets the following Policy Objective:

- Seek productive partnerships that help DNR achieve policy objectives (Policy Objective 4);

it works in conjunction with other policy to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

DNR currently practices active communication and promotes collaboration and partnering with other agencies, stakeholders and the public to achieve mutual objectives consistent with trust obligations.

REGULATORY FRAMEWORK

The regulatory framework with relation to this policy subject area is the State Environmental Policy Act (RCW 43.21C), which is described in the SEPA Review policy subject area in this Final EIS. In addition, public review is provided for under the state Forest Practices Act, Chapter 76.09 RCW.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 directs solicitation of comments from stakeholders when preparing landscape-level objectives as part of a landscape planning process and as part of implementing and revising the policies in the *Forest Resource Plan*. Alternative 1 does not appear to meet Policy Objective 4 as well as Alternative 2.

POLICY STATEMENTS

***Forest Resource Plan* Policy No. 17, Soliciting Information: "The department will solicit comments from interested parties, including local neighborhoods, tribes and government agencies when preparing landscape-level objectives."**

***Forest Resource Plan* Policy No. 35, Public Involvement: "The department will solicit comment from the public, tribes and government agencies when implementing the *Forest Resource Plan* and when revising policies contained in the document."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 reflects current DNR practices of active communication, promotion of collaboration and partnering with other agencies, stakeholders and the public. Alternative 2 recognizes the importance of establishing and maintaining positive external relationships for sharing information, obtaining input on DNR initiatives and planning and resolving issues. Alternative 2 meets the applicable policy objective by utilizing partnerships with the Tribes, trust beneficiaries, government agencies and stakeholders to help implement Board of Natural Resources policy and DNR programs (Policy Objective 4).

POLICY STATEMENT

The department will actively communicate and promote collaboration and partnering with Tribes; trust beneficiaries; local, state and federal governments; stakeholders; and the public in carrying out department activities, including environmental education.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative is similar to Alternative 2, with the exception that in the Board's Preferred Alternative, the words "and partnering" were removed, as collaboration includes partnering where appropriate. The phrase "including environmental education" was also removed, as it is only one aspect of education that DNR can engage in, as described in the introduction to this policy subject area.

POLICY STATEMENT

In carrying out its management activities, the department will actively communicate and promote collaboration with trust beneficiaries; Tribes; local, state and federal governments; stakeholders; and the public.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Although there are no specific environmental impacts associated with this policy subject area, it is important that DNR has efficient and effective external relationships that provide for effective dialogue regarding DNR's activities. This discussion is intended to set the context and disclose the merits in terms of the effectiveness of the policy alternatives in achieving the Board of Natural Resources policy objectives.

Alternative 1 was adopted in order to correct the situation of dealing with conflicts and controversies on a case-by-case basis. At that time, it was a reactive approach and resulted in some inefficiency and missed opportunities. Since 1992, DNR has made outreach and communication a top priority when performing significant land management activities, both at the program and regional levels. Thus, a policy stating that DNR will solicit comment from the public, Tribes and government agencies when implementing the *Forest Resource Plan* and when revising policies contained in the document does not acceptably convey the efforts DNR has taken and will continue to take to fully communicate and engage the public, Tribes and stakeholders.

DNR has made and will continue to make outreach and communication a top priority, particularly on efforts that are of public concern..

Alternative 2 and the Board's Preferred Alternative recognize the need to establish and maintain external relationships, because they encourage the sharing of information and also provide opportunities to obtain resolution-based results. Strengthening the many relationships with various stakeholders and the public is critical to DNR's success as a trust manager and state agency. In addition, Alternative 2 and the Board's Preferred Alternative reflect DNR's current outreach and communication practices. They also reaffirm their importance and provide direction to all DNR employees to maintain this level of commitment to an effective and productive dialogue with its stakeholders.

CUMULATIVE IMPACTS

Maintaining effective dialogue with stakeholders regarding DNR activities should contribute to minimizing the risk of cumulative impacts to the environment.

3.4.9 SEPA Review

INTRODUCTION

The State Environmental Policy Act (RCW 43.21C) requires state agencies to review actions that may have a probable, significant adverse impact on the environment. DNR must comply with SEPA to ensure timely analysis and appropriate mitigation of environmental impacts during its various activities, including project planning and implementation.

AFFECTED ENVIRONMENT

The affected environment is any element of the environment, as listed in WAC 197-11-444, which may be affected by an agency proposal for action. For purposes of this policy subject area, the existing condition is a description of DNR's current approach to complying with SEPA on actions pertaining to forested state trust lands. SEPA is one of the primary environmental review mechanisms through which mitigation of significant adverse impacts is considered.

Since the adoption of the *Forest Resource Plan*, advancements have been made in the review of management activities on forested state trust lands. Building on the Washington State Department of Ecology's standard SEPA environmental checklist, DNR expanded the SEPA checklist to help DNR disclose and understand landscape level interactions. The expanded SEPA checklist is currently used on all timber sales, except the few that are categorically exempt (WAC 197-11-830(7) and WAC 332-41-833(2)). Adjacency and landscape/watershed administrative unit maps for the proposals are available on the internet at www.dnr.wa.gov under "SEPA Center." These maps promote understanding and analyses of landscape level considerations. DNR expanded the Washington State Department of Ecology's environmental checklist to include approximately 100 additional considerations that describe overall watershed administrative unit conditions and potential future activities in the watershed.

REGULATORY FRAMEWORK

The following rules and statutes govern DNR's SEPA review:

- Chapter 43.21C RCW, State Environmental Policy Act;
- WAC 197-11, State Environmental Policy Act Rules;
- WAC 332-41, Department of Natural Resources State Environmental Policy Act Procedures;
- Chapter 76.09 RCW, Forest Practices Act; and
- WAC 222, Forest Practices Rules.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 states that DNR will comply with SEPA.

POLICY STATEMENT

***Forest Resource Plan* Policy No. 18, State Environmental Policy Act Review: "The department will conduct a State Environmental Policy Act review when subsequent plans and activities constitute a non-exempt agency action under the act."**

■ ALTERNATIVE 2 & BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

Alternative 2 recommends no policy in the *Policy for Sustainable Forests* related to SEPA Review, as DNR must comply with state law.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Alternative 1 states that DNR will comply with SEPA. However, compliance with SEPA is not optional. The analysis of adverse impacts and mitigation measures under this option is non-discretionary.

Alternative 2 recognizes that *Forest Resource Plan* Policy No. 18 is not necessary, as DNR must comply with state law.

CUMULATIVE IMPACTS

There are no probable significant adverse cumulative impacts as a result of these policy alternatives.

3.4.10 Implementation, Reporting and Modification of the Policy for Sustainable Forests (formerly "Implementation, Reporting and Modification")

INTRODUCTION

DNR has the responsibility to fully implement the *Policy for Sustainable Forests*. Ensuring Board of Natural Resources policies remain current requires ongoing monitoring and reporting on implementation. The information gathered through this process will allow review and update of Board of Natural Resources policies in response to changing circumstances. It will also keep the public informed on implementation of Board of Natural Resources policy.

Although the Implementation, Reporting and Modification of the Policy for Sustainable Forests policy subject primarily meets the following Policy Objective:

- Monitor and periodically report to the Board of Natural Resources on the implementation and outcomes of Board of Natural Resources approved policies (Policy Objective 10):

it works in conjunction with other policy subjects to fulfill the need and purpose of the *Policy for Sustainable Forests* in meeting the 10 policy objectives set out by the Board of Natural Resources.

AFFECTED ENVIRONMENT

DNR tracks the implementation of different policies through a variety of operational programs carried out in DNR's six regions across the state. The programs (silviculture, timber sales, rights of way, etc.) monitor individual policy implementation and redirect program implementation as needed to achieve policy objectives and desired outcomes. Training is provided to assure understanding and ensure consistency in implementation.

The *Forest Resource Plan* assumed that some of the monitoring would be done at a landscape level, after the development of landscape plans. A DNR developed system which updates the forest inventory also allows DNR to determine if certain policies are being implemented.

The current focus of DNR's monitoring efforts is on lands covered by the HCP. All timber and non-timber activities are tracked annually and reported to the Federal Services. In addition, several effectiveness and validation monitoring projects on the various HCP strategies are ongoing. DNR has developed several electronic planning and tracking and geographical information systems to assist in monitoring.

The Board of Natural Resources' Resolution No. 1110 (2004) requires DNR to report on an annual basis its assessment of the ecological and economic results of implementing the preferred alternative in the *Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington*. DNR shall

apply a structured monitoring and reporting program. Modification of Board of Natural Resources policies occurs as the need arises. For example, the sustainable harvest calculation resulted in the modification of five policies in the *Forest Resource Plan*.

REGULATORY FRAMEWORK

There are no regulations that apply to this policy subject area.

ALTERNATIVES

■ ALTERNATIVE 1 (NO ACTION)

DISCUSSION

Alternative 1 states that DNR will attempt to meet the key elements of each policy, within budget constraints. Alternative 1 requires DNR to monitor implementation of the *Forest Resource Plan* to ensure implementation and effectiveness of the policies. Alternative 1 commits DNR to seek permission from the Board of Natural Resources to modify policies when necessary and appropriate, based on changes in law, scientific knowledge or public opinion. Alternative 1 directs DNR to recommend any actions needed to the Board of Natural Resources to reconcile conflicting policy direction as a result of other management and policy plans. Alternative 1 does not appear to meet Policy Objective 10 as well as other alternatives.

POLICY STATEMENTS

***Forest Resource Plan* Policy No. 36, Implementing the *Forest Resource Plan*: "The department will attempt, within budget constraints, to meet the key elements in each of the policies described in this Plan."**

***Forest Resource Plan* Policy No. 37, Monitoring the *Forest Resource Plan*: "The department will monitor the *Forest Resource Plan's* implementation to determine whether its policies are being executed efficiently and to measure the success of the plan in meeting its objectives."**

***Forest Resource Plan* Policy No. 38, Modifying the *Forest Resource Plan*: "The department will seek permission from the Board of Natural Resources to modify certain portions of the *Forest Resource Plan* if changes in law, scientific practice, major public attitudes or new management directions require a different course of action not compatible with the policies contained in the plan."**

***Forest Resource Plan* Policy No. 39, Consistency: "The department will review its other management and policy plans and will compare those with the *Forest Resource Plan*. Where policies overlap and where there is apparent conflict in direction, the department will determine precedence and suggest changes to the Board of Natural Resources for resolving these differences."**

■ ALTERNATIVE 2

DISCUSSION

Alternative 2 directs DNR to employ a structured monitoring and annual reporting program to the Board of Natural Resources on the effectiveness and efficiency of the policies and their implementation. Alternative 2 directs DNR to recommend changes to policy as needed due to changes in law, scientific knowledge or other circumstances. These changes could include changing budget and staffing resources that would affect implementation of policies. Alternative 2 assumes a ten-year life to the *Policy for Sustainable Forests*, with substantive review and update every ten years. Alternative 2 appears to meet Policy Objective 10 better than Alternative 1, but not as well as Alternative 3.

POLICY STATEMENTS

The department will employ a structured monitoring and annual reporting program to the Board of Natural Resources on implementation of the policies in the *Policy for Sustainable Forests*.

As needed, the department will recommend changes in policy to the Board of Natural Resources due to changes in law, scientific knowledge, new information or other circumstances.

At ten-year intervals, the department will perform a substantive review and update of the *Policy for Sustainable Forests*. Each review and update will be for a ten-year period.

■ ALTERNATIVE 3

DISCUSSION

Alternative 3 assumes periodic updates based on annual monitoring and reporting to keep the policies current, as well as substantive reviews at five-year intervals. Under Alternative 3, the *Policy for Sustainable Forests* is dynamic, with changes being recommended as needed and with no sunset or expiration date. Alternative 3 meets the applicable policy objective by providing an adaptive management approach for review and update of Board of Natural Resources policy through monitoring and reporting on implementation of the *Policy for Sustainable Forests* (Policy Objective 10).

POLICY STATEMENTS

The department will employ a structured monitoring and annual reporting program to the Board of Natural Resources on implementation of the policies in the *Policy for Sustainable Forests*.

As needed, the department will recommend changes in policy to the Board of Natural Resources due to changes in law, scientific knowledge, new information or other circumstances.

At five-year intervals, the department will perform a substantive review of the *Policy for Sustainable Forests*. The *Policy for Sustainable Forests* will have no expiration date.

■ BOARD'S PREFERRED ALTERNATIVE

DISCUSSION

The Board's Preferred Alternative builds on Alternative 3 by adding an additional policy statement that directs DNR to ensure that information presented to the Board of Natural Resources is clear and succinct (Policy Objective 3).

The focus on a strong monitoring and adaptive management program for the *Policy for Sustainable Forests* should result in Board of Natural Resources policy remaining relevant and current. Therefore, there is no end date identified for the *Policy for Sustainable Forests*.

POLICY STATEMENTS

The department will employ a structured program to monitor implementation of the policies in the *Policy for Sustainable Forests*, and will report annually to the Board of Natural Resources on the implementation.

As needed, the department will recommend changes in policy to the Board of Natural Resources due to changes in law, scientific knowledge, new information or other circumstances.

At five-year intervals, the department will perform a substantive review of the *Policy for Sustainable Forests*.

In reporting to the Board of Natural Resources and the public, the department will present clear and succinct information on the *Policy for Sustainable Forests*.

■ ALTERNATIVES SUGGESTED BUT NOT ANALYZED

No other alternatives were introduced for discussion or analysis during scoping and the Draft EIS process.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

This range of alternatives is purely procedural. They contain no standards controlling the use or modification of the environment. As such, there are no environmental impacts. This discussion is intended to provide the public and the Board of Natural Resources an analysis of the effectiveness of the range of alternatives in meeting the Board of Natural Resources' policy objectives.

Alternative 1 envisioned an organized system that would implement key elements of the policies, within budget constraints. However, it did not identify milestones to evaluate the

level of implementation. It envisioned a monitoring system that would provide feedback information. The system was to be tied to landscape planning. It assumed that landscape plans would be developed, which would then form the geographic basis for monitoring the implementation of the policies. Currently, DNR has created large database systems, such as the Forest Resource Inventory System and the Planning and Tracking system to help DNR understand and analyze current forest conditions. DNR has also begun to develop new geographic information system tools that allow users to understand and evaluate forest management activities. The *Forest Resource Plan* identified the purpose of landscape planning as "to develop a pragmatic working tool for the professional forester that will show at any given time DNR's plans for a particular landscape." DNR has created geographic information system tools, the Forest Resource Inventory System and the Planning and Tracking system, which have helped make more informed decisions.

The HCP has a built-in and very well-defined monitoring and adaptive management system that not only establishes a monitoring program, but also provides a mechanism for comprehensive reviews and updates. While this is a strategic plan for DNR, it covers 1.6 million of the 2.1 million acres of forested state trust lands and is tailored to meet the Federal Services' needs.

Alternative 1 calls for monitoring to track the level and success of implementation of DNR policies, but different programs approach implementation and monitoring from a programmatic perspective, rather than a DNR-wide perspective. The *Forest Resource Plan* recognized that over time, new information would become available or changes in law might necessitate policy change, allowing DNR to react to the new information and/or public needs on a timely basis and to update the policies to reflect this. A consistent mechanism through which change would be evaluated and brought to the Board of Natural Resources has not been developed. Some of the plans, such as the HCP, have a built-in adaptive management process that evaluates new information and sets-up a mechanism for updates. Since the adoption of the *Forest Resource Plan*, many of the policies have been implemented as envisioned, with DNR having the flexibility to conduct business in a prudent manner. However, tracking the level of success in implementation from a centralized and comprehensive perspective and presenting this information on a periodic basis to the Board of Natural Resources has not occurred. While the programmatic approach may have been successful, it tends to retain information gained within the program.

Alternative 2 would provide structured monitoring and annual reports to the Board of Natural Resources on policy implementation. It would provide a mechanism for updates due to changes in law, scientific practice, new information or other circumstances and the *Policy for Sustainable Forests* would undergo substantive review after ten years, when it expires. Alternative 2 differs from Alternative 1 by establishing a program that monitors the intensity and success of implementation of policies and reports these to the Board of Natural Resources on an annual basis. Presentation of this information on a periodic basis keeps the Board of Natural Resources informed on the levels of success and also on the need for different approaches. This would assure that the Board of Natural Resources

remains current on the policy outcomes, how the policies are being implemented and be able to react to issues needing change or further direction.

A structured monitoring system under Alternative 2 will also help in harmonizing the requirements of DNR's strategic plans to assist in meeting both the requirements of the Board of Natural Resources and the Federal Services for the HCP. This approach also encourages the use of knowledge gained elsewhere to increase efficiency and to make the information more widely available. It will provide a similar benchmark that will facilitate comparison between and within programs, thus assuring a consistent approach in implementation. The monitoring and reporting program would not be tied to completion of other plans, such as landscape plans, hence the program's performance would not be hampered by delay in completing other plans, due to budget or any other constraints.

Alternative 2 directs DNR to have a structured monitoring and reporting function. However, Alternative 2 will provide a ten-year timeframe before any substantive review is undertaken and the *Policy for Sustainable Forests* would expire after ten years. A ten-year review process is onerous and requires substantial financial and staffing resources. Since Alternative 2 calls for changes only when needed, a risk exists for operating under policies that are not completely up-to-date. In this regard, Alternative 2 does not differ from Alternative 1.

Alternative 3 and the Board's Preferred Alternative are similar to Alternative 2, but it sets the substantive review at five-year intervals and has no expiration date. The substantive review after five years will allow updates to policies, ensure that the policy language is current and relevant and will provide the public with opportunities in the review and update process. Since the Board of Natural Resources will be continuously engaged during the annual reporting process, it will be able to provide more specific and timely direction on areas requiring a more in-depth review. With this more frequent timeline, the changes needed may not require such a significant amount of financial and staffing resources. The existing centralized monitoring and reporting program for the HCP will be used as a foundation for this review. The timely reviews will keep the policies current.

The Board's Preferred Alternative adds the intent that reports to the Board of Natural Resources will consist of clear and succinct information. This provision promises more efficient review by the public and the Board of Natural Resources.

CUMULATIVE IMPACTS

Implementation, reporting and modification assures that DNR policies within the framework of the *Policy for Sustainable Forests* are being implemented effectively and consistently. It also assures that there is a mechanism to inform the Board of Natural Resources about success of policy implementation and an adaptive management loop to respond to a changing environment. The cumulative impacts of implementing the individual policies in the *Policy for Sustainable Forests* have been considered under each of the policy subject areas in this Final EIS. There are no foreseen cumulative impacts to the environment that would result from the process of tracking implementation, reporting and modification of the adopted policies in the *Policy for Sustainable Forests*. Reporting to the Board of Natural Resources also provides an opportunity for public review.