APPENDIX E

MANAGEMENT PROCEDURES

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Management of Forest Stand Cohorts (Westside)
PR 14-006-090 Date: January, 2007

Application: All forested state trust lands west of the Cascade Crest.

DISCUSSION

Forest stand "cohorts" are forest stand components whose management objectives make them statistically distinct. For example, legacy cohorts such as live wildlife reserve trees, snags, and down dead logs, are statistically distinct because statutes, regulations, and the Department's HCP require their management and retention beyond a single rotation. These multi-rotational cohorts co-exist with one or more rotational, commercial cohorts within the same forest management unit (FMU). Legacy cohorts are managed to achieve environmental FMU objectives (such as wildlife and mycorrhizal habitats). One or more commercial cohorts within the same FMU are managed to achieve economic FMU objectives by generating revenue for the trusts.

The purpose of this procedure is to provide unified direction for management of forest stand cohorts. This procedure will result in a structured silvicultural approach that reaches beyond uniformly applied classical even-aged—clearcut, seed tree, and shelterwood—and uneven-aged silvicultural systems. This approach, cohort management, synchronizes with site-specific silvicultural prescriptions that simultaneously manage distinct cohorts to achieve rotational and multi-rotational social, environmental, and economic FMU objectives. The department will include provisions of this procedure in its training program.

Action

Safety regulations pre-empt all other requirements and should be assessed to maintain worker safety while also ascertaining that other resources and objectives are addressed. See also TK 14-006-093, *Forest Worker Safety and Operational Considerations for Leave Tree Locations*.

Cohort management shall integrate relevant social, environmental, and economic FMU objectives into site-specific, rotational silvicultural prescriptions that are optimal bio-diversity pathways for each particular situation. Cohorts may serve multiple FMU objectives. Stand-level silvicultural prescriptions provide the means to realize broader landscape objectives.

At least one commercial cohort shall be managed, generally on a rotational basis, for maximum benefit to trust beneficiaries, consistent with other FMU and landscape objectives.

Multi-rotational (legacy) cohorts shall be managed to levels directed in the table below.

Legacy Cohort Management Guidelines*

Legacy Cohort	Average /Acre	Dimensions	Proximity
Very Large Diameter, Structurally Unique Conifers (when present, may be used in lieu of wildlife trees, snag recruits, and snags—listed below)	≥ 8/acre (the BNR will be notified (per the Old-Growth Timber Harvest Deferral [Westside] procedure) if any very large diameter, structurally unique conifers are harvested	Native conifer species Generally ≥ 60" DBH Large strong limbs Open crown Hollow trunk Broken top and limbs Deeply furrowed bark	NA
Large, Structurally Unique Green Trees Suited for Wildlife	≥ 2 trees	• ≥ 1 tree, from largest diameter class • ≥ 1 tree, from dominant crown class	At least 1 clump per 5 acres, or generally 400 feet or less from any point in the FMU to a green leave tree; leave trees should be toward FMU interior, except as needed for ecological objectives
Snag Recruits	≥ 3 trees	• Intermediate to dominant crown class • ≥ 10 inches DBH, ≥ 30 feet in height, and ≥ 33 percent live crown ratio • Select larger diameter trees first, preferably those with structural deformities and cavities	
Snags (standing dead trees suitable for wildlife)	≥ 3 snags (safety requirements shall be met)	• ≥15 inches DBH, ≥ 30 feet tall, if available • Select largest diameter class cavity trees first • If snags cannot be left safely, replace with suitable live trees	Leave snags as consistent with safety requirements
Down dead wood	≥ 2 logs	• Small end diameter ≥ 12 inches, length ≥ 20 feet • Select larger diameter logs first	None

*** Table Notes:**

1. Very large diameter, structurally unique conifers, if present, supersede the requirements for the next three categories (i.e., large structurally unique trees, snag recruits, and snags).

2. The table minimums originate from WACs or the HCP; they may be modified for safety reasons as specified in TK 14-006-093, *Forest Worker Safety and Operational Considerations for Leave Tree Locations*.

3. Acre-by-acre densities are variable—to include clumping—so long as proximity criteria are followed and FMU averages meet or exceed minimum requirements. FMU-specific objectives may dictate higher—but not lower—retention levels, particularly when managing for habitat objectives and combined effects of social, environmental, and economic landscape and FMU objectives. --Scatter leave trees in clumps or individually, depending on specific habitat objectives for that area, throughout the management unit where practicable. For example, trees may be clumped to improve wildlife habitat and/or to protect trees from severe weather conditions. Where practicable, the density of clumps will not be less than one clump per five acres unless done to meet a specific ecological objective.

4. Leave tree clumps may be created of sufficient size to safely accommodate hazardous wildlife trees or snags.

5. Retain additional live trees if fewer than three snags per acre are available prior to harvest, or if fewer that three snags per acre can be left due to safety concerns. The average total number of stems per acre retained after harvest is at least eight.

6. Priority for retention will be given to tree species with propensity to develop cavities. Choose large trees with structural characteristics important to wildlife (e.g., large limbs, open crowns, runners, broken tops, etc) and those considered to be old growth remnants.

7. Legacy tree species in the stand after harvest should be generally representative of the legacy species diversity prior to harvest.

8. Land Management Division Manager may approve alternate leave tree levels provided that legal, regulatory, and HCP intent remains.

Assessing Hydrologic Maturity

Date: August, 1999

Application: All west-side forested ecosystems covered by the Habitat Conservation Plan, excluding the Olympic Experimental State Forest Planning Unit

DISCUSSION

This procedure defines DNR's approved method to evaluate stands for Habitat conservation Plan (HCP) hydrologic maturity requirements. (Hydrologic maturity is defined as a well stocked conifer stand over the age of 25 years, with a relative density (RD) of at least 25.) These requirements are designed to minimize adverse impacts caused by rain-on-snow events to ecosystems that support salmonids. Hydrologic maturity is accomplished by maintaining an adequate amount of forest land within rain-on-snow zones in forests that are hydrologically mature with respect to rain-on-snow events.

The department intends to provide a standard level of protection as described below except in those basins where watershed analysis has been conducted. In those basins the drainage basin prescriptions developed by applying the Hydrologic Change Module of Watershed Analysis may be used.

Action

(1) Determine if the sub-basin has previously been evaluated under HCP guidelines for rain-on-snow.

(a) End the procedure if the sub-basin has been evaluated for rain-on-snow and it has been determined that rain-on-snow guidelines do not apply.

(2) Generate a sub-basin work map that includes Watershed Administrative Unit (WAU) boundaries, topography, ownership (DNR and other), stand age, roads, natural non-forested areas, streams, rain-on-snow area boundaries.

(a) Identify and mark the downstream ends of all Type 1, 2, and 3 waters on the work map.This identifies the downstream boundary of the sub-basins.

(b) Starting from the upper end of the WAU, determine the size of each sub-basin.

i.) If the sub-basin is smaller than 1,000 acres:

•combine sub-basins with the next logical downstream sub-basin(s) to create a basin greater than 1,000 acres.

•retain as a small basin if the sub-basin flows into sensitive water such as large lakes, reservoirs, or fish hatcheries. Sub- basins that are less than 500 acres in size will normally not be analyzed. The state lands assistant will determine if sub-basins less than 500 acres will need to be managed to meet HCP hydrologic maturity requirements.

(c) Mark areas that are "permanent" mature forest land (e.g., national parks, federal Late-successional Reserves, Natural Area Preserves (NAPs), Natural

Resource Conservation Areas (NRCAs), gene pool reserves, etc.), and permanent non-forest land (rock outcrops, talus slope, bolds etc.).

(3) Determine which sub-basins will not be managed to meet HCP hydrologic maturity requirements and submit that information for Geographic Information System (GIS) input. Do not manage sub-basins to meet HCP hydrologic maturity requirements when:

(a) less than one-third of the sub-basin's area is within the rain-on-snow and snow-dominated zones combined.

(b) at least two-thirds of the sub-basin's area is within the rain-on-snow and snow dominated zones combined, is covered by hydrologically mature forests, and there is a reasonable assurance that it will remain in that condition (e.g., national parks, federal Late-successional Reserves, NAPs, NRCAs, gene pool reserves, etc.).

(c) less than one-half of the sub-basin's area is within the rain-on-snow and snow dominated zones combined, is DNR-managed, and there is no reasonable assurance (e.g., via an HCP or other land management plan) that other landowners will contribute to hydrologically mature forests (i.e., other land owners may manage on a 40 year rotation, or have agricultural or developed lands).

(4) Evaluate the remaining sub-basins that will be managed to meet HCP hydrologic maturity requirements.

(a) Determine the number of acres within the sub-basin that are managed by DNR and that are within the rain-on-snow and snow dominated zones combined. Determine the target (two-thirds) that needs to be maintained in a hydrologically mature status.

i.) Evaluate DNR-managed stands for hydrologic maturity. A stand must:

- Have a conifer relative density of at least 25 to be considered well-stocked, and
- Be 25-years old or older.

(5) Determine whether the sub-basin has a surplus (more than two-thirds) or a deficit (less than two-thirds) of hydrologically mature stands. Proceed with management activities that remove hydrologically mature stands only if a surplus exists.

(6) Obtain region manager approval for road construction in sub-basins where the amount of hydrologically mature stands does not meet the threshold.

Identifying and Protecting Riparian and Wetland Management Zones in The West-Side HCP Planning Units, Excluding The OESF (August 1999)

Cancels: PR 14-004-150 IDENTIFYING AND PROTECTING RIPARIAN AND WETLAND MANAGEMENT ZONES IN THE WESTSIDE HCP PLANNING UNITS, EXCLUDING THE OESF (August 1999).

Date: April, 2006

Application: Westside HCP Planning Units, Excluding the OESF Planning Unit

DISCUSSION

The riparian strategy for west side planning units, excluding the OESF, has a two-fold objective of:

(1) Maintaining or restoring freshwater habitat for salmonid species; and

(2) Contributing to the conservation of other species that are dependent upon aquatic and riparian areas. This is accomplished by identifying riparian and wetland areas and ensuring that management activities within those areas adequately protect riparian function.

Riparian function can be viewed from both societal and ecological perspectives. From a societal perspective, riparian function includes production of commodities and other services for human benefit. Salmon, wildlife, and timber are examples of the commodities produced by riparian ecosystems. The delivery of high quality water, flood control, and recreation are examples of services provided by riparian ecosystems. From an ecological perspective, riparian function can be viewed as providing habitat for numerous plant and animal species including clean water, shade, large woody debris and detrital nutrients for salmon habitat, damp soil and logs for terrestrial amphibian habitat, snags for cavity nesting birds, etc.

The Implementation Procedures for the Riparian Forest Restoration Strategy will be followed to identify and manage riparian and wetland zones. The riparian management zone consists of a managed riparian buffer and, where appropriate, a wind buffer to protect the integrity of the managed riparian buffer. The riparian buffer has been designated to maintain/restore riparian processes that influence the quality of salmonid freshwater habitat and contribute to the conservation and restoration of other aquatic and riparian obligate species. Consideration has been given to water temperature, stream bank integrity, sediment and detrital nutrient load, and large woody debris.

Action

1.The first step in implementing the Riparian Forest Restoration Strategy is to verify the accuracy of water-type information for all waters currently designated as Type 4 or 5 and are located within the boundary of the proposed activity. Among others, either or both of the following two methods may be used:

(a) Water type may be verified through consultation with fisheries biologists from DNR, tribes, or other agencies.

(b) Water type information may be verified by certified and/or trained personnel using the protocol specified in WAC 222-16-030, Washington Forest Practices Board Emergency Rules (stream typing), November 1996 and the Forest Practices Board Manual.

This stream typing system will now be officially referenced as the "Water Typing System for Forested State Trust Lands". The "water typing System for Forested State Trust Lands" complete provisions are in the table below:

Type 1

Type 1 Water means all waters, within their ordinary high-water mark, as inventoried as "shorelines of the state" under chapter 90.58 RCW and the rules promulgated pursuant to chapter 90.58 RCW, but not including those waters' associated wetlands as defined in chapter 90.58 RCW.

Type 2

Type 2 Water shall mean segments of natural waters that are not classified as Type 1 Water and have a high fish, wildlife, or human use. These are segments of natural waters and periodically inundated areas of their associated wetlands, which:

(a) Are diverted for domestic use by more than 100 residential or camping units or by a public accommodation facility licensed to serve more than 100 persons, where such diversion is determined by the department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type 2 Water upstream from the point of such diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less;

(b) Are diverted for use by federal, state, tribal or private fish hatcheries. Such waters shall be considered Type 2 Water upstream from the point of diversion for 1,500 feet including tributaries if highly significant for protection of downstream water quality. The department may allow additional harvest beyond the requirements of Type 2 Water designation provided the department determines after a landowner-requested on-site assessment by the department of fish and wildlife, department of ecology, the affected tribes and the interested parties that:

i)The management practices proposed by the landowner will adequately protect water quality for the fish hatchery; and

ii) Such additional harvest meets the requirements of the water type designation that would apply in the absence of the hatchery;

(c) Are within a federal, state, local, or private campground having more than 30 camping units: Provided, That the water shall not be considered to enter a

campground until it reaches the boundary of the park lands available for public use and comes within 100 feet of a camping unit, trail or other park improvement;

(d) Are used by substantial numbers of anadromous or resident game fish for spawning, rearing or migration. Waters having the following characteristics are presumed to have highly significant fish populations:

i) Stream segments having a defined channel 20 feet or greater in width between the ordinary high-water marks and having a gradient of less than 4 percent.

ii) Lakes, ponds, or impoundments having a surface area of 1 acre or greater at seasonal low water.

(e) Are used by salmonids for off-channel habitat. These areas are critical to the maintenance of optimum survival of juvenile salmonids. This habitat shall be identified based on the following criteria:

i) The site must be connected to a stream bearing salmonids and accessible during some period of the year; and

ii) The off-channel water must be accessible to juvenile salmonids through a drainage with less than a 5% gradient.

Type 3

Type 3 Water shall mean segments of natural waters that are not classified as Type 1 or 2 Water and have a moderate to slight fish, wildlife, and human use. These are segments of natural waters and periodically inundated areas of their associated wetlands which:

(a) Are diverted for domestic use by more than 10 residential or camping units or by a public accommodation facility licensed to serve more than 10 persons, which such diversion is determined by the department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type 3 Water upstream from the point of diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less;

(b) Are used by significant numbers of anadromous or resident game fish for spawning, rearing or migration. Guidelines for determining fish use for the purpose of typing waters are described in Appendix 3. If fish use has not been determined:

i) Waters having the following characteristics are presumed to have significant anadromous or resident game fish use:

(A) Stream segments having a defined channel of 2 feet or greater in width between the ordinary high-water marks in Western Washington and having a gradient 16 percent or less;

(B) Stream segments having a defined channel of 2 feet or greater in width between the ordinary high-water marks in Western Washington and having a gradient greater than 16 percent and less than or equal to 20 percent; and having greater than 50 acres in contributing basin size in Western Washington;

ii) The department shall waive or modify the characteristics in (i) above where:

(A) Waters are confirmed, long term, naturally occurring water quality parameters incapable of supporting anadromous or resident game fish;

(B) Snowmelt streams have short flow cycles that do not support successful life history phases of anadromous or resident game fish. These streams typically have no flow in the winter months and discontinue flow by June 1; or

(C) Sufficient information about a geographic region is available to support a departure from the characteristics in (i), as determined in consultation with the department of fish and wildlife, department of ecology, affected tribes and interested parties.

iii) Ponds or impoundments having a surface area of less than 1 acre at seasonal low water and having an outlet to an anadromous fish stream.

iv) For resident game fish ponds or impoundments having a surface are greater than 0.5 acre at seasonal low water.

(c) Are highly significant for protection of downstream water quality. Tributaries which contribute greater than 20 percent of the flow to a Type 1 or 2 Water are presumed to be significant for 1,500 feet from their confluence with the Type 1 or 2 Water or until their drainage area is less than 50 percent of their drainage area at the point of confluence, whichever is less.

Type 4

Type 4 Water classification shall be applied to segments of natural waters which are not classified as Type 1, 2 or 3, and for the purpose of protecting water quality downstream are classified as Type 4 Water upstream until the channel width becomes less than 2 feet in width between the ordinary high-water marks. Their significance lies in their influence on water quality downstream in Type 1, 2, and 3 Waters. These may be perennial or intermittent.

Type 5

Type 5 Water classification shall be applied to all natural waters not classified as Type 1, 2, 3, or 4; including streams with or without well-defined channels, areas of perennial or

intermittent seepage, ponds, natural sinks and drainage ways having short periods of spring or storm runoff.

2. After verification of water type information, or the decision to manage Type 4 or 5 Waters as Type 3, Step 2 in implementing the Implementation Procedures for the RFRS is to determine the boundary of the riparian management zones for the proposed activity. This step has 3 parts. First, the 100-year flood plain must be identified for all Types 1, 2, 3, and 4 Waters; it is from the outer edge of this area that the riparian buffer is measured. Second, the appropriate riparian buffer must be identified. Third, the need for a wind buffer must be evaluated and, if needed, located.

(a) Identify the 100-year flood plain for each Type 1, 2, 3, and 4 Water. Among others, any, or a combination, of the following methods may be used:

i) Identify the 100-year flood plain using information from FEMA (Federal Emergency Management Agency) or insurance rate maps.

ii) Identify the 100-year flood plain. One method that may be used is the following field location method, a modification of the of the information contained in the Forest Practices Board manual's The Standard Methods for Measuring Physical Parameters of a Stream (dated 7/95). Using this method, averages for stream reaches may be determined by:

A. Establish the ordinary high water mark (OHWM) using vegetation or historical evidence.

B. Divide the OHWM channel width into at least 4 equal sections.

C. At the edge of each section, measure the depth from the elevation of the OWHM to the stream bottom.

D. Calculate the average depth by adding all of the depths measured in C. above together, the dividing the total by the number of measurements.

E. Calculate the 100-year flood plain elevation by adding the value calculated in D. above for the average depth of the elevation of the OHWM (doubles the average channel depth).

F. Field locate the intersection of the 100-year flood plain with each side of the channel bank using hand levels and level rods, or clinometers and measuring tapes.

OR

G. By calculating the distance from the OHWM to the 100-year flood-level intersection using ground slope measurements taken in the field. (Example: For channel with bank slopes of 10% on each side and an average depth to OHWM of 1.2 feet, the distance is equal to rise over run, so divide 1.2 feet by .1 to yield a horizontal distance of 12 feet from the OHWM to the 100-year flood plain.

(b) Next, identify and measure the riparian buffer, using horizontal distance, from the outer edge of the 100-year flood plain or the boundary of the wetland (wetlands identified using the Forest Practices Board manual's guidelines for Wetland Delineation, dated 6/93).The appropriate buffer width is dependent upon water type for streams, size for wetlands, and the site index of conifer stands one would expect to develop in the area.

i) For Type 1, 2, and 3 Waters, and for all wetlands that are greater than 1 acre in size, the average width of the riparian buffer will be equal to or greater than the average height an adjoining conifer stand would be expected to reach at 100 years of age (using the site index, which may be determined by using one or more of the following methods: State Soil Survey data, Forest Resource Inventory System data (FRIS), on-site calculation from fixed or variable radius plots taken every 660 feet on a transect that parallels the stream with at least two dominant conifer trees per plot and site calculated using site table or DNR Intensive Management Planning System (DNRIMPS) or other appropriate growth and yield model). Regardless of site index, the average width of the buffer will also be no less than 100 feet.

ii) For Type 4 Waters, and for all wetlands between .25 and 1 acre in size, the width of the riparian buffer will be 100 feet.

(c)The final step in identifying the riparian management zone is to evaluate the need and, if needed, the appropriate width and location for wind buffers to protect the integrity of the riparian management zone.

i) Determine if at least a moderate risk of windthrow exists for all Type 1 and 2 Waters, and for Type 3 Waters equal to or greater than 5-feet wide. Moderate is defined as 45 percent or more blowdown after 5 years and it is determined using local knowledge, the Buffer Strip Survival Rate Worksheet (from Steinblums, Froehlich, and Lyons, Designing Stable Buffer Strips For Stream Protection), or other model approved by the State Lands Assistant. Where at least a moderate risk exists, apply a 100-foot (horizontal distance) wind buffer on Type 1 and 2 Waters, and a 50-foot wind buffer on Type 3 streams greater than 5-feet wide. The buffer shall be located on the windward side of the stream.

ii) Type 2 Waters less than 5 feet wide, and Type 4 and 5 Waters will not have a wind buffer. Wetlands will not receive a wind buffer, except for those that meet the description of "off-channel habitat" as discussed in WAC 222-16-030 (dated 6/93), page 16-10 under (2) "Type 2 Water," which will be treated as Type 2 Waters.

3. Once the riparian management zone, and wetlands and their associated buffers, has been identified, proposed management activities will be evaluated based on section 2 of

the Implementation Procedures for the Habitat Conservation Plan Riparian Forest restoration Strategy, attached.

Identifying and Protecting Cultural Resources

Cancels: PR 14-004-030, IDENTIFYING HISTORIC SITES (July 1992).

Date: April, 2007

Application: All forested state trust lands

DISCUSSION

The Policy for Sustainable Forests mandates identification and protection of significant cultural resources. Department policy is to:

- Identify historic and archaeological sites and protect those that are significant, consistent with state and federal law
- Proactively collaborate with Tribes and interested stakeholders to address culturally significant areas
- Consider transferring historic, archaeological, and cultural sites out of trust status when consistent with best interest of the trusts and adequate compensation is secured

"Cultural resources" is therefore divided into traditional places, historic sites, and archaeological resources.

Traditional places are landscapes, sites, places, legendary areas, and objects identified by affected tribes in Washington State as being important for the maintenance and perpetuation of their traditional values and practices.

Historic sites are locations, generally 50 years old or older, where native or non-native events and activities have taken place since the arrival of Euro-Americans. Historic sites often have written records that document the events and activities that occurred at a particular location.

Archaeological resources are the material remains of cultures in context or in place, including artifacts and features left on the landscape. Artifacts are the physical tools and implements of a culture (i.e., manufactured, human-altered items). Features are physical alterations in the natural environment. An archaeological site is a geographic location in which archaeological resources are present. These sites may reflect spatial and/or temporal land use.

The department intends to give special consideration to historical and cultural concerns of the Tribes. The department recognizes that Native Americans have a special interest

in forested state trust lands. Where possible, DNR intends to work with the tribes to protect their heritage.

The department intends to pursue a long-range cultural resources strategy, consistent with budget and fiscal responsibilities. Cultural resources will be identified and protected as appropriate.

Action

1. Identification (Training)

Selected field personnel will receive training to identify, recognize, and report cultural resources. Training will be consistent with applicable laws, regulations/rules, policies, and other imperatives as determined by the Land management Division manage and will be updated as laws, regulations/rules, policies, and other imperatives change.

Pre-Field Research for Ground Disturbance Activities

Pre-field research by selected field personnel will include but not be limited to:

1. Checking the Department of Archaeology and Historic Preservation (DAHP) database or TRAX for *Known State Recorded* sites.

2. Contacting, as appropriate, tribal Cultural Resource personnel to identify any *Known Tribally Recorded* sites.

3. Checking the Cultural Resource layer in the State Uplands Viewing Tool and the Government Land Office Maps for *Known Not Recorded* sites

4. For *Unknown Unrecorded* sites, checking USGS or DNR hydrological and topographical layers for high probability areas such as flat areas near permanent water, ridges, saddles, springs, and artificial landscape alterations (buildings, cemeteries, fields, roads, etc.)

5. Checking the State Uplands Viewing Tool or other readily available sources for predictive models for the project area.

2. Field Evaluation and Protection

If Cultural Resources are indicated above, the District Cultural Resource Technician or the State Lands Archaeologist will investigate the area. Survey methodology and reporting should meet standards established by DAHP.

These personnel will design evaluation methodology and protection measures that should meet professional standards established by DAHP. Field staff will conduct forest management and related activities in accordance with these protection measures.

Visual Management

Cancels: PR 14-004-080 VISUAL MANAGEMENT, August 2006

Date: April, 2008

Application: All Forested State Trust Lands.

DISCUSSION

The purpose of this procedure is to establish a process that integrates visual with financial and other important policy objectives in managing forested state trust lands. An important social concern is aesthetics. This concern creates a need for outcome-based landscape perspectives supported by silvicultural prescriptions that together balance management of aesthetics and other imperatives (such as certain wildlife habitats and forest health). Thus, when aesthetic concerns exist, the following process shall be put into action.

Action

BNR policy requires the department to first consider whether visual impacts of management activities are of local significance or have wider public impacts, such as melding with other already established visually sensitive areas (e.g., on nearby federal lands or along major travel routes). For local impacts, mitigation would generally be through FMU design alterations. For wider impacts, the department will use the Forest Land Planning Process. This process will assess visual impacts, appropriate mitigation measures (in light of known public concerns), and the resulting cost-benefit.

The resulting visual management process shall incorporate the following major steps. Regions may perform this process incrementally or as a part of the Forest Land Planning Process, as warranted by emerging visual issues.

Step 1 – Recognize Potential Viewshed: Delineate a potential viewshed, generally through public input. A viewshed should have a size and shape that includes the viewable area (i.e., reverse slopes of hills that are not seen from vantage points or trails should be excluded), and should distinguish local from wider implications. Viewsheds, particularly those with wider implications, should be recorded in GIS.

Step 2 – Determine Objectives for the Viewshed: Develop visual FMU objectives per PR 14-005-010 that are based on viewshed-landscape considerations. As Forest Land Planning is implemented, landscape-level objectives will be refined to include how large a portion of a viewshed must meet a specified visual stand condition at any point in time.

Step 3 – Consider Altering the Silvicultural Prescription: Meeting viewshed objectives should first be attempted through manipulation of FMU shape and size as well as placement and number of required leave trees. Target the leave tree arrangements to

detract no more than approximately 25 percent from first decade uninhibited growth potential for species prescribed for reforestation (equivalent to a Curtis' RD for leave tree legacies of less than 7.5 if the reforested cohort is Douglas-fir) and to ensure negligible impact on survival. However, leave tree arrangements should otherwise be responsive to visual issues such as nearness to viewpoints (roads, trails, vistas, etc.). The Forest Land Planning process is anticipated to account for cost/benefits to the trusts of landscape level mitigation strategies.

Step 4 – Validate: Once potential viewsheds and objectives are developed, they shall be recorded in a department-approved database.

In summary, local visual impacts are addressed through FMU configurations and/or scheduling, while visual issues with wider implications are dealt with through the Forest Land Planning process. Resulting FMU objectives and viewsheds shall be recorded in a department-approved database. In devising silvicultural prescriptions for viewshed FMUs, understory species shall be selected for potential future value and their ability to grow under the circumstances created, which must provide for generally unimpeded and sustained vigor.

Assessing Slope Stability

Date: August, 1999

Application: All forest ecosystems managed under the direction of the Forest Resources Division, excluding the Olympic Experimental State Forest Planning Unit.

DISCUSSION

In order to protect water quality and riparian ecosystem functions, and to minimize adverse impacts to salmonid fisheries habitat, DNR restricts management activities on unstable slopes. Information regarding slope stability is valuable when making landscape management decisions. Use the following procedure to properly identify unstable slopes.

Action

(1) Identify areas of potential instability.

(a) On the westside:

- use the Shaw/Johnson model to produce a map that indicates potential areas of slope instability. Field-verify, using qualified staff as designated by the region manager, the potential areas of instability.

OR

- have a qualified specialist (i.e., a trained hydrologist, geologist, geomorphologist, or soil scientist) locate and map unstable slope areas or verify potential unstable slope areas that have been field-located by staff.

(b) On the eastside, have a qualified specialist (i.e., a trained hydrologist, geologist, geomorphologist, or soil scientist) locate and map unstable slope areas or verify potential unstable slope areas that have been field-located by staff.

(2) Locate, design, and construct necessary roads in areas with a high potential for mass-wasting to minimize, to the fullest extent practicable, risks from mass-wasting events. A comprehensive landscape-based road management system will be used to determine road layout. The Engineering Division is developing road management procedures.

(3) Management activities, other than required roads, that have the potential to increase the frequency or severity of mass-wasting events, will be prohibited on areas of instability.

Identifying and Managing Structurally Complex Forests to Meet Older Forest Targets (Westside)

Date: January, 2007

Application: All forested state trust lands west of the Cascade crest.

DISCUSSION

The Board of Natural Resources General Silvicultural Strategy policy includes direction on older forests for Western Washington and states:

- The department will target 10 to 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 and are not old growth may be considered for harvest activities. Old growth is addressed in the Old-Growth Stands in Western Washington policy (PO 14-008).

The department intends to actively manage suitable structurally complex forests (fully functional, niche diversification, and botanically diverse stand development stages) to meet older forest targets. Older forests are represented by the niche diversification and fully functional stages of stand development. (See Policy for Sustainable Forests Final EIS p. 3-177) Stand structural complexity begins notably in the botanically diverse stage but is significantly functional only in the niche diversification and fully functional stages of stand development (see Final Environmental Impact Statement on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington, July 2004, section 4, for a description of these stages).

The goal is to achieve functional older forest structures across 10 to 15 percent of each Western Washington HCP planning unit within 70 to 100 years.

The HCP planning unit landscape context of a structurally complex stand determines its suitability to be managed to meet older forest targets. The percentage of the planning unit in a structurally complex condition, the location and size of these stands, their 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. (See Policy for Sustainable Forests Final EIS p. 3-177).

The identification and review of landscape level management strategies to achieve the 10 to 15 percent older forest target will be completed during the forest land planning process that will be conducted for each HCP planning unit. However, until that time, the following programmatic guidance to aid in identifying appropriate stands to manage to meet older forest targets must be followed.

Prior to development of a forest land plan, proposed harvest activities in FMUs that are considered structurally complex forests must be accompanied by the following information: a) an assessment of forest conditions using readily available information, b) an analysis of the known landscape management strategies and, c) role of the structurally complex stand in meeting older forest targets. For the actions listed below, the Land Management Division has sources of information it will make available.

Action

• If a proposed forest management unit is determined to be in one of the three structurally complex stages, assess and describe the landscape conditions. Information provided by Land Management Division may be helpful. Field verification may determine different conditions than the provided datasets. Identify acres of existing structurally complex stands managed for older forest conditions. Those are:

- Old-growth stands.
- Structurally complex stands located in special ecological management areas (i.e., designated northern spotted owl NRF or Dispersal Management Areas, riparian management zones, natural areas, gene pool reserves, etc.). Structurally complex stands that are currently meeting targets for various HCP conservation strategies and not identified above, such as suitable northern spotted owl NRF habitat outside of designated NRF and Dispersal Management areas (i.e., high quality nesting habitat, Type A, Type B, and sub-mature habitat).
- Suitable marbled murrelet nesting habitat and designated marbled murrelet occupied sites.
- Riparian areas that are currently meeting the Riparian Desired Forest Condition (RDFC).

• Based on the assessment above determine if 10 to 15 percent or more of the HCP planning unit contains structurally complex forest prioritized to meet older forest targets. If yes, stands managed for structural complexity will be designated in a department lands data base. Structurally complex forests in addition to the amount identified and designated may be subject to harvest activities designed to meet other objectives. If no, proceed to the next bullet, below.

• If less than 10 percent of the HCP planning unit contains structurally complex forests prioritized to meet older forest targets based on the assessment, designate in a department lands database additional suitable structurally complex forest stands or acreage to equal 10 to 15 percent of the HCP planning unit managed for older forest targets. Once those stands designated as suitable constitute at least 10 percent of the HCP planning unit, other (not otherwise withdrawn) stands are available for the full spectrum of timber harvests. Determine suitability based on a landscape context, considering such things as:

- Stand size.
- Proximity to old growth or other structurally complex forest stands in the ownership block, landscape or watershed.
- Scarcity of other structurally complex stands in the ownership block, landscape or watershed.
- Future strategic plans for the stand within the ownership block, landscape or watershed.
- Information gathered in the previous steps should be included in the State Environmental Policy Act (SEPA) checklist for the proposed harvest activity for public review.
- The Land Management Division Manager may approve variances to this procedure.

Management Considerations:

• The department will defer from final harvest older forest and other structurally complex stands designated as suitable to meet older forest targets.

• Harvest activities in older forest and other structurally complex stands designated as suitable to meet older forest targets must enhance the older forest condition.

APPROVED BY: Gretchen Nicholas, Manager

Land Management Division

January, 2007

Identifying and Protecting Riparian and Wetland Management Zones in The West-Side HCP Planning Units, Excluding The OESF (August 1999). Effective Immediately.

Cancels: PR 14-004-150 IDENTIFYING AND PROTECTING RIPARIAN AND WETLAND MANAGEMENT ZONES IN THE WESTSIDE HCP PLANNING UNITS, EXCLUDING THE OESF (August 1999). Effective immediately

Date: April, 2006

Application: Westside HCP Planning Units, Excluding the OESF Planning Unit

DISCUSSION

The riparian strategy for west side planning units, excluding the OESF, has a two fold objective of:

(1) maintaining or restoring freshwater habitat for salmonid species; and

(2) contributing to the conservation of other species that are dependent upon aquatic and riparian areas. This is accomplished by identifying riparian and wetland areas and ensuring that management activities within those areas adequately protect riparian function.

Riparian function can be viewed from both societal and ecological perspectives. From a societal perspective, riparian function includes production of commodities and other services for human benefit. Salmon, wildlife, and timber are examples of the commodities produced by riparian ecosystems. The delivery of high quality water, flood control, and recreation are examples of services provided by riparian ecosystems. From an ecological perspective, riparian function can be viewed as providing habitat for numerous plant and animal species including clean water, shade, large woody debris and detrital nutrients from salmon habitat, damp soil and logs for terrestrial amphibian habitat, snags for cavity nesting birds, etc.

The Implementation Procedures for the Riparian Forest Restoration Strategy will be followed to identify and manage riparian and wetland zones. The riparian management zone consists of a managed riparian buffer and, where appropriate, a wind buffer to protect the integrity of the managed riparian buffer. The riparian buffer has been designated to maintain/restore riparian processes that influence the quality of salmonid freshwater habitat and contribute to the conservation and restoration of other aquatic and riparian obligate species. Consideration has been given to water temperature, stream bank integrity, sediment and detrital nutrient load, and large woody debris.

Action

1. The first step in implementing the Riparian Forest Restoration Strategy is to verify the accuracy of water-type information for all waters currently designated as Type 4 or 5 and are located within the boundary of the proposed activity. Among others, either or both of the following two methods may be used:

a. Water type may be verified through consultation with fisheries biologists from DNR, tribes, or other agencies.

b. Water type information may be verified by certified and/or trained personnel using the protocol specified in WAC 222-16-030, Washington Forest Practices Board Emergency Rules (stream typing), November 1996 and the Forest Practices Board Manual.

This stream typing system will now be officially referenced as the "Water Typing System for Forested State Trust Lands". The "water typing System for Forested State Trust Lands" complete provisions are in the table below:

Type 1

Type 1 Water means all waters, within their ordinary high-water mark, as inventoried as "shorelines of the state" under chapter 90.58 RCW and the rules promulgated pursuant to chapter 90.58 RCW, but not including those waters' associated wetlands as defined in chapter 90.58 RCW.

Type 2

Type 2 Water shall mean segments of natural waters that are not classified as Type 1 Water and have a high fish, wildlife, or human use. These are segments of natural waters and periodically inundated areas of their associated wetlands, which:

(a) Are diverted for domestic use by more than 100 residential or camping units or by a public accommodation facility licensed to serve more than 100 persons, where such diversion is determined by the department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type 2 Water upstream from the point of such diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less;

(b) Are diverted for use by federal, state, tribal or private fish hatcheries. Such waters shall be considered Type 2 Water upstream from the point of diversion for 1,500 feet including tributaries if highly significant for protection of downstream water quality. The department may allow additional harvest beyond the requirements of Type 2 Water designation provided the department determines after a landowner-requested on-site assessment by the department of fish and wildlife, department of ecology, the affected tribes and the interested parties that:

(i) The management practices proposed by the landowner will adequately protect water quality for the fish hatchery; and

(ii) Such additional harvest meets the requirements of the water type designation that would apply in the absence of the hatchery;

(c) Are within a federal, state, local, or private campground having more than 30 camping units: Provided, That the water shall not be considered to enter a campground until it reaches the boundary of the park lands available for public use and comes within 100 feet of a camping unit, trail or other park improvement;

(d) Are used by substantial numbers of anadromous or resident game fish for spawning, rearing or migration. Waters having the following characteristics are presumed to have highly significant fish populations:

(i) Stream segments having a defined channel 20 feet or greater in width between the ordinary high-water marks and having a gradient of less than 4 percent.

(ii) Lakes, ponds, or impoundments having a surface area of 1 acre or greater at seasonal low water.

(e) Are used by salmonids for off-channel habitat. These areas are critical to the maintenance of optimum survival of juvenile salmonids. This habitat shall be identified based on the following criteria:

(i) The site must be connected to a stream bearing salmonids and accessible during some period of the year; and

(ii) The off-channel water must be accessible to juvenile salmonids through a drainage with less than a 5% gradient.

Type 3

Type 3 Water shall mean segments of natural waters that are not classified as Type 1 or 2 Water and have a moderate to slight fish, wildlife, and human use. These are segments of natural waters and periodically inundated areas of their associated wetlands which:

(a) Are diverted for domestic use by more than 10 residential or camping units or by a public accommodation facility licensed to serve more than 10 persons, which such diversion is determined by the department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be

Type 3 Water upstream from the point of diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less;

(b) Are used by significant numbers of anadromous or resident game fish for spawning, rearing or migration. Guidelines for determining fish use for the purpose of typing waters are described in Appendix 3. If fish use has not been determined:

(i) Waters having the following characteristics are presumed to have significant anadromous or resident game fish use:

(A) Stream segments having a defined channel of 2 feet or greater in width between the ordinary high-water marks in Western Washington and having a gradient 16 percent or less;

(B) Stream segments having a defined channel of 2 feet or greater in width between the ordinary high-water marks in Western Washington and having a gradient greater than 16 percent and less than or equal to 20 percent; and having greater than 50 acres in contributing basin size in Western Washington;

(ii) The department shall waive or modify the characteristics in (i) above where:

(A) Waters are confirmed, long term, naturally occurring water quality parameters incapable of supporting anadromous or resident game fish;

(B) Snowmelt streams have short flow cycles that do not support successful life history phases of anadromous or resident game fish. These streams typically have no flow in the winter months and discontinue flow by June 1; or

(C) Sufficient information about a geographic region is available to support a departure from the characteristics in (i), as determined in consultation with the department of fish and wildlife, department of ecology, affected tribes and interested parties.

(iii) Ponds or impoundments having a surface area of less than 1 acre at seasonal low water and having an outlet to an anadromous fish stream.

(iv) For resident game fish ponds or impoundments having a surface are greater than 0.5 acre at seasonal low water.

(c) Are highly significant for protection of downstream water quality. Tributaries which contribute greater than 20 percent of the flow to a Type 1 or 2 Water are presumed to be significant for 1,500 feet from their confluence with the Type 1 or 2 Water or until their drainage area is less than 50 percent of their drainage area at the point of confluence, whichever is less.

Type 4

Type 4 Water classification shall be applied to segments of natural waters which are not classified as Type 1, 2 or 3, and for the purpose of protecting water quality downstream are classified as Type 4 Water upstream until the channel width becomes less than 2 feet in width between the ordinary high-water marks. Their significance lies in their influence on water quality downstream in Type 1, 2, and 3 Waters. These may be perennial or intermittent.

Type 5

Type 5 Water classification shall be applied to all natural waters not classified as Type 1, 2, 3, or 4; including streams with or without well-defined channels, areas of perennial or intermittent seepage, ponds, natural sinks and drainage ways having short periods of spring or storm runoff.

2. After verification of water type information, or the decision to manage Type 4 or 5 Waters as Type 3, Step 2 in implementing the Implementation Procedures for the RFRS is to determine the boundary of the riparian management zones for the proposed activity. This step has 3 parts. First, the 100-year flood plain must be identified for all Types 1, 2, 3, and 4 Waters; it is from the outer edge of this area that the riparian buffer is measured. Second, the appropriate riparian buffer must be identified. Third, the need for a wind buffer must be evaluated and, if needed, located.

    a. Identify the 100-year flood plain for each Type 1, 2, 3, and 4 Water. Among others, any, or a combination, of the following methods may be used:

        i. Identify the 100-year flood plain using information from FEMA (Federal Emergency Management Agency) or insurance rate maps.

        ii. Identify the 100-year flood plain. One method that may be used is the following field location method, a modification of the of the information contained in the Forest Practices Board manual's The Standard Methods for Measuring Physical Parameters of a Stream (dated 7/95). Using this method, averages for stream reaches may be determined by:

            A. Establish the ordinary high water mark (OHWM) using vegetation or historical evidence.

            B. Divide the OHWM channel width into at least 4 equal sections.

C. At the edge of each section, measure the depth from the elevation of the OWHM to the stream bottom.

D. Calculate the average depth by adding all of the depths measured in C. above together, the dividing the total by the number of measurements.

E. Calculate the 100-year flood plain elevation by adding the value calculated in D. above for the average depth of the elevation of the OHWM (doubles the average channel depth).

F. Field locate the intersection of the 100-year flood plain with each side of the channel bank using hand levels and level rods, or clinometers and measuring tapes.

OR

G. By calculating the distance from the OHWM to the 100-year flood-level intersection using ground slope measurements taken in the field. (Example: For channel with bank slopes of 10% on each side and an average depth to OHWM of 1.2 feet, the distance is equal to rise over run, so divide 1.2 feet by .1 to yield a horizontal distance of 12 feet from the OHWM to the 100-year flood plain.

b. Next, identify and measure the riparian buffer, using horizontal distance, from the outer edge of the 100-year flood plain or the boundary of the wetland (wetlands identified using the Forest Practices Board manual's guidelines for Wetland Delineation, dated 6/93). The appropriate buffer width is dependent upon water type for streams, size for wetlands, and the site index of conifer stands one would expect to develop in the area.

i. For Type 1, 2, and 3 Waters, and for all wetlands that are greater than 1 acre in size, the average width of the riparian buffer will be equal to or greater than the average height an adjoining conifer stand would be expected to reach at 100 years of age (using the site index, which may be determined byusing one or more of the following methods: State Soil Survey data, Forest Resource Inventory System data (FRIS), on-site calculation from fixed or variable radius plots taken every 660 feet on a transect that parallels the stream with at least two dominant conifer trees per plot and site calculated using site table or DNR Intensive Management Planning System (DNRIMPS) or other appropriate growth and yield model). Regardless of site index, the average width of the buffer will also be no less than 100 feet.

ii. For Type 4 Waters, and for all wetlands between .25 and 1 acre in size, the width of the riparian buffer will be 100 feet.

c. The final step in identifying the riparian management zone is to evaluate the need and, if needed, the appropriate width and location for wind buffers to protect the integrity of the riparian management zone.

i. Determine if at least a moderate risk of windthrow exists for all Type 1 and 2 Waters, and for Type 3 Waters equal to or greater than 5-feet wide. Moderate is defined as 45 percent or more blowdown after 5 years and it is determined using local knowledge, the Buffer Strip Survival Rate Worksheet (from Steinblums, Froehlich, and Lyons, Designing Stable Buffer Strips For Stream Protection), or other model approved by the State Lands Assistant. Where at least a moderate risk exists, apply a 100-foot (horizontal distance) wind buffer on Type 1 and 2 Waters, and a 50-foot wind buffer on Type 3 streams greater than 5-feet wide. The buffer shall be located on the windward side of the stream.

ii. Type 2 Waters less than 5 feet wide, and Type 4 and 5 Waters will not have a wind buffer. Wetlands will not receive a wind buffer, except for those that meet the description of "off-channel habitat" as discussed in WAC 222-16-030 (dated 6/93), page 16-10 under (2) "Type 2 Water," which will be treated as Type 2 Waters.

3. Once the riparian management zone, and wetlands and their associated buffers, has been identified, proposed management activities will be evaluated based on section 2 of the Implementation Procedures for the Habitat Conservation Plan Riparian Forest restoration Strategy, attached.

End Procedure

APPROVED BY: Gretchen Nicholas, Division Manager

Land Management Division

April 20, 2006

SEE ALSO:

DNR Habitat Conservation Plan, 1997

Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy (April 2006)

Maximum Size for Even-Aged Final Harvest Units

Cancels: TK 14-001-010 Maintaining Mature Forest Components (Sept 2004)

Date: August, 2006

Application: All forested state trust lands designated for timber harvest.

DISCUSSION

This procedure outlines how to apply the department's intent to generally limit even-aged final harvest unit size to a maximum of 100 acres, or the legally required unit size of 40 acres in size when located on islands, per WAC 222-30-110, Timber Harvesting on Islands.

"Even-aged final harvest" means that there is a residual stand, meant to last through the next rotation, of fewer than 20 trees per acre that are 10 inches DBH or larger.

Even-aged final harvest units larger than 100 acres may be evaluated when there are special needs (e.g., timber salvage, forest health, land transaction, or environmental protection reasons).

Even-aged final harvest units may only be considered as single units for purposes of size determination if they are separated from adjacent openings as directed in WAC 222-30-025, Harvest Size and Timing.

Action

1. Determine the size of the proposed even-aged final harvest unit.

   a. If the even-aged final harvest unit is less than 100 acres, or less than 40 acres on an island proceed with your timber harvest plans.

   b. Even–age final harvest units (Clearcut) located on an island cannot exceed 40 acres per WAC 222-30-110, Timber Harvesting on Islands.

   c. If the even-aged final harvest unit is greater than 100 acres and the majority of timber is sold for salvage, forest health, land sale or purchase, land exchange or environmental protection reasons, seek region manager approval before including it in the timber sale harvest schedule.

      i. If region manager approves: end this procedure.

      ii. If region manager disapproves: reduce the size of the proposed even-aged final harvest unit so that it does not exceed 100 acres.

APPROVED BY: Gretchen Nicholas, Manager

Land Management Division

August, 2006

A Strategy for Northern Spotted Owl Dispersal Habitat in the South Puget HCP Planning Unit

Tami Miketa and Allen Estep

September 21, 2009

DISCUSSION

The South Puget HCP Planning Unit Forest Land Plan uses adaptive management to implement and modify the existing HCP conservation strategy for managing dispersal habitat for the northern spotted owl. Based on a collaborative working process with wildlife biologists from the U.S. Fish and Wildlife Service, WA Dept. of Fish and Wildlife and WA Dept. of Natural Resources, an agreement regarding habitat needs for dispersing spotted owls has been reached and an improved strategy developed to meet these needs. This strategy modifies the current dispersal habitat definition and includes a threshold requirement for the creation and maintenance of higher quality northern spotted owl habitat that includes important elements of structure, such as snags, coarse woody debris and canopy diversification. It also changes the spatial unit used to account for habitat thresholds from a watershed to landscape scale. The dispersal landscapes are aggregated watershed scale units called Spotted Owl Management Units (SOMU). Appendix A shows the aggregation of SOMU's into dispersal landscapes.

The current HCP Dispersal habitat definition is as follows:

<u>1997 HCP Dispersal Habitat Definition (Westside) (HCP page IV.12):</u>

- Canopy cover at least 70 percent
- Quadratic mean diameter of 11 inches dbh for 100 largest trees per acre in a stand
- Top height of at least 85 feet (top height is the average height of the 40 largest diameter trees per acre)
- At least four trees per acre from the largest size class retained for future snag and cavity tree recruitment

When the HCP was written, it recognized the lack of data relating actual stand conditions and landscape patterns to successful spotted owl dispersal. For the purposes of the HCP, the definition listed above was identified as "interim" and would be replaced as better data became available (HCP page IV.18).

Buchanan (2004) identified five factors that affect the success of dispersing northern spotted owls: 1) amelioration of heat stress, 2) prey abundance, 3) prey availability, 4) predation risk, and 5) ecological adaptation. These factors affect the three dispersing activities of northern spotted owls:

1. Movement – the ability for a spotted owl to fly through a stand or from one patch of habitat to another. Stand canopies that benefit movement must be closed enough to protect spotted owls from predation and allow for thermal regulation, but not too closed to inhibit flying.
2. Roosting – the ability for a spotted owl to perch for resting and heat regulation. Forest stands that provide roosting opportunities generally have adequate tree height and multiple layers or deep tree crowns for owls to move up and down in the canopy.
3. Foraging – the ability for dispersing spotted owls to hunt for adequate food. Forest stands that are likely to provide abundant prey species have been associated with specific forest structural characteristics: e.g. medium to large snags and coarse woody debris (Carey 1995, Carey and Johnson 1995).

The adaptive management component of the HCP is an important tool for ongoing modifications of DNR's conservation strategies in order to respond to monitoring information and new scientific developments. The refinement of the definition of northern spotted owl dispersal habitat is one such example of the use of adaptive management to successfully implement the conservation objectives outlined in the HCP.

Since the signing of the HCP, new scientific information was published on habitat use by dispersing spotted owls (Miler et al. 1997), spotted owl demography during the dispersal phase (Forsman et al. 2002), and deficiencies of dispersal habitat definitions in Washington in meeting life requirements of dispersing owls (Buchanan 2004). Based on this increase in scientific knowledge and understanding of northern spotted owl dispersal requirements, as well as DNR assessments of habitat conditions in stands that meet the HCP dispersal definition, the question was posed whether DNR could improve northern spotted owl conservation efforts through an amendment of the HCP dispersal strategy.

A modified strategy for northern spotted owl dispersal management areas in the South Puget HCP Planning Unit incorporates the species' life history requirements for movement, roosting, and foraging. The strategy still requires attaining and maintaining 50 percent northern spotted owl habitat on DNR-managed lands that are selected for a dispersal role as required by the HCP. However, the stand characteristics that constitute such habitat have changed. There is now a targeted percentage requirement of higher quality habitat within the 50 percent threshold. In addition, the strategy changes the spatial unit used to account for the 50 percent habitat threshold from a watershed to a landscape scale.

Each Landscape in Dispersal Management Areas within the South Puget HCP Planning Unit will be managed to meet the following two objectives:

1. The desired future condition of the designated dispersal landscape is to have at least 50 percent of DNR-managed forest lands targeted to attain

and maintain a combination of South Puget Movement northern spotted owl habitat and higher quality habitat that will incorporate movement, roosting and foraging components necessary for dispersing owls.

2. Within this 50 percent desired future condition of the northern spotted owl habitat, the target is to have 70 percent MoRF (Movement, Roosting and Foraging) or higher quality northern spotted owl habitat and 30 percent South Puget Movement or higher quality habitat by 2067 or earlier.

In other words, at least 35% of the dispersal landscape will be in MoRF or higher quality and 15% will be in South Puget Movement or higher quality habitat adding up to a 50% landscape habitat threshold target.

Following are the new spotted owl Habitat definitions in the South Puget HCP Planning Unit:

South Puget Movement Habitat Definition:

Wildlife stand-level attributes	**Forest Inventory parameter threshold**[1]
▪ Forest community dominated by conifers with at least 30 percent conifers (measured as stems per acre dominant, co-dominant, and intermediate trees)	▪ 30 percent conifer species by trees per acre for trees greater than or equal to 3.5 inches dbh
▪ Canopy closure at least 70 percent	▪ Curtis' Relative Density 48 or greater for trees greater than or equal to 3.5 inches dbh
▪ Quadratic mean diameter of 11 inches dbh for the 100 largest trees greater than or equal to 3.5 inches dbh	▪ Quadratic mean diameter of 11 inches dbh for the 100 largest trees greater than or equal to 3.5 inches dbh (if less than 100 trees ≥ 3.5 inches dbh then all trees count)
▪ Tree density no more than 280 trees per acre greater than or equal to 3.5 inches dbh	▪ Tree density no more than 280 trees per acre greater than or equal to 3.5 inches dbh
▪ Dominant and co-dominant trees at	▪ Top height of at least 85

[1] Forest inventory parameter thresholds may be changed over time based on new information or improved data gathering methods.

Wildlife stand-level attributes	Forest Inventory parameter threshold[1]
least 85 feet tall	feet (top height is the average height of the 40 largest diameter trees per acre)
▪ At least four trees per acre from the largest size class retained for future snag and cavity tree recruitment	▪ Not Applicable

MoRF (Movement, Roosting and Foraging) Habitat Definition:

Wildlife stand-level attributes	Forest Inventory parameter threshold
▪ Forest community dominated by conifers with at least 30 percent conifers (measured as stems per acre dominant, co-dominant, and intermediate trees)	▪ 30 percent conifer species by trees per acre for trees greater than or equal to 3.5 inches dbh
▪ Canopy closure at least 70 percent	▪ Curtis' Relative Density 48 or greater for trees greater than or equal to 3.5 inches dbh
▪ Tree density of between 115 and 280 trees greater than or equal to 3.5 inches dbh per acre	▪ Tree density no more than 280 and no less than 115 trees per acre greater than or equal to 3.5 inches dbh
▪ Dominant and co-dominant trees at least 85 feet tall	▪ Top height of at least 85 feet (top height is the average height of the 40 largest diameter trees per acre)
▪ At least five percent coverage of down woody debris	▪ Greater than or equal to 2400 cubic feet per acre of coarse woody debris
▪ At least three snags or cavity trees per acre that are at least 15 inches dbh	▪ Greater than or equal to three snags or cavity trees per acre that are greater than or equal to 15 inches dbh and greater than or equal to 16 feet in height
▪ At least two canopy layers	▪ Canopy layers are determined using an algorithm in an extension for the USDA Forest Vegetation Simulator (Dixon 2003). "The canopy strata are initially defined by naturally

Wildlife stand-level attributes	Forest Inventory parameter threshold
	occurring gaps in the distribution of tree heights. The gaps are found when the heights of two trees [base-to-live-crown height and not crown top height is used] in a list sorted by height differ by more than [15] percent of the height of the taller and at least [20] feet. The two largest gaps define three potential strata. If there is only one gap, two potential strata are defined and if there are no gaps, one potential stratum is defined. Trees in the sorted list that have very small sampling probability are skipped until the sum of the skipped trees' sampling probability accounts for over two trees per acre. Initially defined strata must have over 5 percent canopy cover or they are rejected"(Crookston and Stage 1999). Square brackets indicates the DNR value replacing the default.

Within the South Puget HCP Planning Unit, northern spotted owl habitat is classified using DNR State Lands Forest Inventory System (FRIS) and associated sample data. Where FRIS data does not exist for an area, the stand habitat conditions will be assessed through field verification following the FRIS Field Procedures manual. These and other update procedures are described in the "Northern Spotted Owl Habitat Layer Organization and Update Process."

ACTION

a) Landscapes within the South Puget Planning Unit designated to be managed as part of the 1997 State Lands HCP Northern Spotted Owl Dispersal Conservation Strategy shall be mapped identifying the northern spotted owl habitat classes described in the HCP and the SPPU Forest Land Plan: High quality nesting habitat (HQNH), Type A, Type B, MoRF, Sub-mature, young forest marginal and South Puget Movment habitat.

Definitions for these classes are provided in Appendix B. These maps will be consistent with the "Northern Spotted Owl Habitat Layer Organization and Update Process" and developed using the following steps:

i) Land Management Division (LMD) will develop a query of the State Lands Forest Resource Inventory System (FRIS) data. This query will use the following data sources:
   (1) Live trees will be the 2004[2] grown and updated inventory data unless newer sample plot data is available
   (2) Snags and down woody debris will be the sample year data
   (3) Harvest activities will be updated with Planning and Tracking (P&T) data. Harvest data will reset the habitat class to non-habitat or maintain it according to the Forest Management Unit objective

ii) LMD will update these spotted owl habitat maps when:
   (1) New forest inventory data becomes available
   (2) New harvest activity information becomes available
   (3) Other update triggers as described in the Land Management Division's "Northern Spotted Owl Habitat Layer Organization and Update Process"

b) For landscapes that have not attained the habitat threshold requirements listed above, Region field staff (i.e., Forester and Wildlife Biologist) shall map the following[3] areas to determine candidate stands for "Next Best" habitat:

i) Forest areas (identified here as forest inventory units) that are non- habitat or unknown but meet one or more of the northern spotted owl habitat threshold criteria (see Appendix B)

ii) Forest stands (identified here as forest inventory units) that are most likely to contribute to meeting the 50 percent landscape target in the future so that the landscape objective may be met as soon as possible

c) From the candidate stands mapped in b.i. and ii., select the required area to achieve the 50 percent northern spotted owl habitat threshold of the landscape. These selected non-habitat stands will be labeled as "Next Best" and will be managed for the Forest Management Unit rotational objective of spotted owl habitat. The mapping of "Next Best" will be a dynamic process and will be updated on an annual or biennial basis in conjunction with the development of a harvest schedule for the landscape.

d) Activities within "Next Best" stands must demonstrate that actions will maintain or accelerate the trajectory of the landscape towards achievement of the habitat threshold

[2] The FRIS 2004 is the reference dataset to be consistent with the dataset used to develop the northern spotted owl habitat class maps as part of the *DNR vs. WEC* Settlement Agreement. FRIS grown and updated data system use a growth model that has a stochastic function and therefore, there are small differences between datasets that are not explained due to growth.
[3] Areas mapped as "Next Best" will be reviewed and approved by Ecosystem Services Section.

targets. The sum of acres currently in habitat and "Next Best" must equal at least 50 percent of the Dispersal Management landscape.

i) After identification and mapping of the forest area into northern spotted owl habitat, "Next Best" habitat, and non habitat, the district shall develop and maintain a harvest schedule. This harvest schedule will incorporate landscape habitat objectives and ensure that habitat can be achieved in desirable locations. The schedule will be posted in the Planning and Tracking database.

Allowable forest management activities in northern spotted owl habitat before landscape threshold targets are met:

Northern Spotted Owl Habitat Class (see definitions - HCP IV. 11-12) and Appendix B)	**Allowable Forest Management Activities**
HCP Dispersal	Full range of management
"Next Best"	Actions will maintain or accelerate the trajectory of the landscape towards achievement of the habitat threshold targets
South Puget Movement, Young Forest Marginal, MoRF, Sub-mature habitats	Only thinning that maintains habitat definition components
Type A and B and high quality nesting habitats	No management activities allowed

Monitoring

Two types of NSO monitoring are described in the HCP for the Westside planning units – implementation and effectiveness (validation monitoring will not be undertaken for spotted owl dispersal habitat).The proposed strategy follows the HCP and should to be monitored according to the following objectives:

1) to determine whether this strategy is being implemented as written; and
2) to determine whether implementation of this strategy results in the anticipated habitat conditions.

DNR success in creating and maintaining dispersal habitat through active management will be assessed by monitoring the effects on forest stand structure, habitat distribution at landscape level, and spotted owl prey populations.

GIS data sources:

Landscapes are recorded at GIS data source: SHARED_LM.SOMU and are available on the State Uplands Viewing Tool and through ArcGIS in the Quick Data Loader. Current habitat levels are recorded within the landscape layer. Querying of each landscape polygon will display current habitat levels per landscape.

Current stand habitat conditions including Next Best stands are recorded on the NSO Habitat Classes layer. It is recorded at GIS data source and is also available on the State Uplands Viewing Tool and ArcGIS Quick Data Loader.

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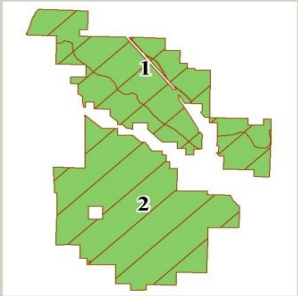
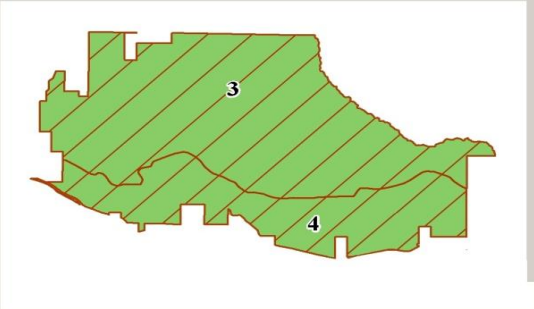
Appendix A

Aggregation of SOMU's into Dispersal Landscapes in the South Puget Planning



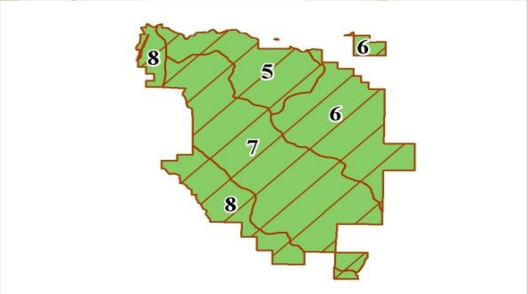
Black Diamond Dispersal Landscape

1. North Fork Green SOMU (7,916 acres)
2. Grass Mountain SOMU (19,849 acres)



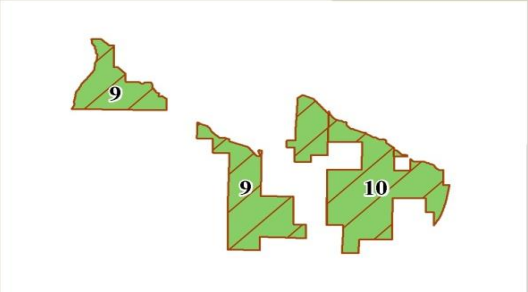
Elbe Hills Dispersal Landscape

3. Busy Wild SOMU (15,333 acres)
4. Ashford SOMU(8,288 acres)



Tahoma Dispersal Landscape

5. Reese Creek SOMU (4,823 acres)
6. Big Catt Creek SOMU (7,636 acres)
7. North Fork Mineral Creek SOMU (13,551 acres)
8. Mineral Creek SOMU (4,672 acres)



Pleasant Valley Dispersal/NRF Landscapes

9. Pleasant Valley Nesting, Roosting, and Foraging (NRF) (Not included in dispersal calculations) (1,851 acres)
10. Pleasant Valley SOMU (1,440 acres)

*The SOMU's for this map were clipped to only include dispersal management areas.

Appendix B Northern Spotted Owl Habitat Definitions and Inventory Attributes

	HIGH QUALITY NESTING	TYPE "A" SPOTTED OWL	TYPE "B" SPOTTED OWL	MOVEMENT ROOSTING AND FORAGING	SUB-MATURE	YOUNG FOREST MARGINAL	SOUTH PUGET Movement
LIVE TREES							
Species Requirement	None	Multi-species *(2nd Species: 20.0+% Trees/Ac)*	Multi-species *(2nd Species: 20.0+% Trees/Ac)*	30.0+% Conifer, Trees/Ac	30.0+% Conifer, Trees/Ac	30.0+% Conifer, Trees/Ac	30.0+% Conifer, Trees/Ac
Layers Requirement	None	2+	2+	2+	None	None	None
Canopy Closure or Canopy cover Requirement	70+% *(Curtis's Relative Density >= 48)*	70+% *(Curtis's Relative Density >= 48)*	70+% *(Curtis's Relative Density >= 48)*	70+% *(Curtis's Relative Density >= 48)*	70+% *(Curtis's Relative Density >= 48)*	70+% *(Curtis's Relative Density >= 48)*	70+% *(Curtis's Relative Density >= 48)*
Deformity Requirement (3)	At least 3 tress with broken Tops: 31 in. DBH class, 3.0+ Trees/Ac	· High incidence of of large trees with various deformities Broken Tops: 21 in. DBH Class, 3.0+ Trees/Ac)	·Some trees with various deformities Broken Tops: 21 in. DBH Class, 3.0+ Trees/Ac)	None	None	None	None
LIVE TREES							
Min. Top Height (ft.) (40 Largest Trees)	None	None	None	85.0	85.0	85.0	85.0

	HIGH QUALITY NESTING	TYPE "A" SPOTTED OWL	TYPE "B" SPOTTED OWL	MOVEMENT ROOSTING AND FORAGING	SUB-MATURE	YOUNG FOREST MARGINAL	SOUTH PUGET Movement
Min. QMD (in.) (100 Largest Trees)	None	None	None	None	None	None	11.0
LIVE TREES (#1)							
Min. DBH Class	21	30	20				
Min. Stems/Ac	31.0+	15.0	75.0	115.0	115.0	115.0	None
Max. Stems/Ac	-none-	75.0	100.0	280.0	280.0	280.0	280.0
LIVE TREES (#2)							
Min. DBH Class	31						
Min. Stems/Ac	15.0+	None	None	None	None	None	None
Max. Stems/Ac	-none-						
SNAGS							
Min. DBH Class	21	30	20	15	20	20	None
Min. Stems/Ac	12.0+	2.5+	1.0+	3.0+	3.0+	3.0+	None
DOWN WOOD							

	HIGH QUALITY NESTING	TYPE "A" SPOTTED OWL	TYPE "B" SPOTTED OWL	MOVEMENT ROOSTING AND FORAGING	SUB-MATURE	YOUNG FOREST MARGINAL	SOUTH PUGET Movement
Percent Ground Covered ***(Cu. Ft. / Ac)***	5.0+ % (*2400 $ft^{3/acre}$*)	· Large accumulations of fallen trees (*2400 $ft^{3/acre}$*)	· Accumulations of fallen trees (*2400 $ft^{3/acre}$*)	5.0+ % (*2400 $ft^{3/acre}$*)	5.0+ % (*2400 $ft^{3/acre}$*)	10.0+ % (*4800 $ft^{3/acre}$*)	None

Notes: (1) Minimum DBH Class for all live trees is 4 inches (i.e. all trees greater than or equal to 3.5 inch diameter at breast height (dbh)

(2) Minimum tree diameter for live trees and snags is the nominal class value less 0.5 inches (e.g. 4-inch class minimum tree size is 3.5 inches).

(3) Deformity requirements are NOT applied at this time

(4) Items in red text are inferred parameters and/or values not directly found in Final Habitat Conservation Plan, Sept. 1997, Part IV, Habitat Definitions, p.11-19.

South Puget Management Strategy: Districts Even-flow Harvest Levels

Background

- Decades with low harvest volume removal followed by decades with three to four times' higher volume removal sets unrealistic public expectation for a low harvest level in each of the districts.
- With almost 75 percent of Washington State's population located in this planning unit a steady harvest level gives DNR the ability to keep a steady presence as a working forest.
- Assists the region in better staff planning

Objective

Maintain an even-flow of harvest volume and timber management activities in each district within the South Puget Region, while compiling with DNR's Policy for Sustainable Forests

Strategy

1. In determining the decadal harvest-level by district, the Region is permitted to manage each District with a long-term (50-100 years) even-flow of harvest volume (thousand board feet) if these even-flow harvest do not have any negative impact on DNR polices objectives: sustainable harvest unit volumes, maintenance of growing stock, long-term net present value, development of older forest and conservation objectives.
2. An even-flow of harvest means the harvest volume per decade from a district will be within 15% percent of an attainable first decade volume
3. The Land Steward or the Product Sales and Leasing Division Management may request an increase or decrease in the annual sales production volume, which the region shall attain. Changes in the harvest volume shall be reviewed in terms of the environmental impact at the watershed level. Levels of harvest activity at the watershed level that exceed the final EIS levels may warrant further analysis.
4. This strategy will be reviewed periodically by the Land Management Division and will be suspended if the strategy negatively impacts the attainment of any DNR policy objectives