

**Matrix 1a: Management strategies for HCP (excluding OESF)**

	<b>Alternative A No Action</b>	<b>Alternative B Proposed HCP</b>	<b>Alternative C</b>
<b>Spotted Owl</b>			
Nesting, Roosting, and Foraging (NRF) habitat	Within spotted owl site centers (1.8- or 2.7-mile radius), 40% of total acreage is maintained in suitable owl habitat. The remaining area will be harvested. No additional acreage will become habitat.	202,000 acres designated for NRF function in N. Puget, S. Puget, Columbia, Chelan, Yakima, and Klickitat planning units with at least 101,000 acres (50%) developed and maintained at any time.  On the west side, two 300-acre nest patches <sup>1</sup> per 5,000 acres (approximate) of NRF are identified and retained until knowledge is acquired allowing provision of adequate nesting structure while managing entire acreage. Balance of acreage may be sub-mature forests.	337,000 acres designated for NRF function in Straits, N. Puget, S. Puget, Columbia, Chelan, Yakima, and Klickitat planning units with 202,000 acres (60%) developed and maintained in a late-seral forest condition at any time.
Dispersal Habitat	No provision for dispersal habitat.	200,000 acres designated for dispersal function in Yakima, N. Puget, S. Puget, Klickitat, and Columbia planning units with at least 100,000 acres developed and maintained at any time.	172,000 acres designated for dispersal function in Yakima, N. Puget, S. Puget, Klickitat, and Columbia planning units with 86,000 acres developed and maintained at any time.

<sup>1</sup> See draft HCP for details of the nature and configuration of these areas for various planning units.

	Alternative A No Action	Alternative B Proposed HCP	Alternative C
<b>Spotted Owl (continued)</b>			
Experimental Areas	No provision for experimental areas.	No provision for experimental areas.	43,000 acres designated for experimental management in S. Coast Planning Unit.
<b>Marbled Murrelet</b>			
West-side units and OESF unit	Continuation of take-avoidance policy through deferral of most potentially suitable nesting habitat (no harvest of potential suitable habitat within 40 miles of marine waters and case-by-case review of sales involving potential habitat between 40 and 52.25 miles for indeterminate period of time). DNR would currently conduct habitat relationship studies.	Interim strategy that preserves options for consideration in long-term management plan while complying with the ESA and providing some interim relief to DNR: Step 1 - identify and defer harvest of any potentially suitable murrelet habitat within 50 miles of marine waters. Step 2 - conduct a 2-year habitat relationship study in each planning unit to determine the relative importance of various habitat types. Step 3 - marginal habitat types expected to contain a maximum of 5% of the occupied sites on DNR-managed lands within that planning unit available for harvest without survey for murrelets. No known occupied sites will be harvested. Step 4 - All acres of suitable habitat types not made available for harvest in Step 3 receive a protocol murrelet inventory survey to locate occupied sites. Surveyed, unoccupied habitat available for harvest. No known occupied sites will be harvested. (continued)	Same as Alternative B except additional options would be maintained for consideration in long-term management plan by the following additions: (1) no harvest of marginal habitat would occur until long-term plan is developed and approved; and, (2) no harvest of surveyed, unoccupied habitat would occur until long-term plan is developed and approved.

	Alternative A No Action	Alternative B Proposed HCP	Alternative C
<b>Marbled Murrelet (continued)</b>			
West-side units and OESF unit (continued)		Step 5 - All available information, including that collected in Steps 1-4, used to develop a long-term management plan for marbled murrelets.	
<b>Riparian</b>			
Riparian Protection Area (west-side planning units)	<p>Continued implementation of Forest Resource Plan; conservation strategies range from Forest Practices regulations minimums to substantial buffers applied on a site-specific basis. Review of 129 sales since implementation of FRP began shows no harvest riparian in management zones of following size on each side of stream:</p> <p>(1) Types 1 and 2 Waters, average riparian management zone width = approx. 196 feet, range = 0-350 feet.</p> <p>(2) Type 3 Waters, average riparian management zone width = approx. 85 feet, range = 0-300 feet.</p> <p>(3) Type 4 Waters, average riparian management zone width = approx. 55 (continued)</p>	<p>Riparian management zones (each side of stream) defined as:</p> <p>(a) Type 1, 2, and 3 Waters, width = height of site tree at age 100 years or 100 feet, whichever is greater,</p> <p>(b) Type 4 Waters, width = 100 feet; and,</p> <p>(c) Type 5 Waters are protected "where necessary" according to FRP.</p> <p>Wind buffers added on windward side of riparian management zone where there is at least a moderate potential for windthrow:</p> <p>(a) Type 1 and 2 Waters, wind buffer width = 100 feet;</p> <p>(b) Type 3 Waters that are greater than 5 feet wide, wind buffer width = 50 feet.</p> <p>Riparian management zone activities:</p> <p>(a) no harvest except for restoration within first 25 feet,</p> <p>(b) minimal harvest between 25 and 100 (continued)</p>	<p>Riparian management zone defined as:</p> <p>(1) riparian buffers on each side of Type 1 through 5 Waters - width = height of site tree at age 100 years or 100 feet, whichever is greater,</p> <p>(2) wind buffers added on both sides of riparian buffer:</p> <p>(a) Type 1 and 2 Waters, wind buffer width = 100 feet;</p> <p>(b) Type 3 Waters that are greater than 5 feet wide, wind buffer width = 50 feet, and</p> <p>(3) riparian buffer management activities:</p> <p>(a) no harvest within first 25 feet,</p> <p>(b) restoration activities allowed beyond 25 feet.</p>

	Alternative A No Action	Alternative B Proposed HCP	Alternative C
<b>Riparian (continued)</b>			
Riparian Protection Area (west-side planning units) (continued)	feet, range = 0-300 feet.  (4) Type 5 Waters, riparian management zones on 47% of streams, average riparian management zone width for those streams = 40 feet. Remaining 53% receive no riparian management zones. Range on all = 0-150 feet.	feet, (c) low harvest beyond 100 feet.	
Unstable Hill slopes and Mass Wasting	No timber harvest on unstable slopes unless and until it can be done with no increase in failure rate or severity.	Same as Alternative A.	Same as Alternative A.
Road Network Management	Implement Forest Resource Plan direction to develop and maintain a road system that integrates management needs and controls adverse environmental impacts on the forest environment.	Implement Forest Resource Plan direction to develop and maintain a road system that integrates management needs and controls adverse environmental impacts on the forest environment.  Minimize road density based on comprehensive road network management plan.	Same as Alternative B.
Hydrologic Maturity	Hydrologic maturity addressed as part of Forest Practices watershed analysis. This process completed for only a small percentage of DNR-managed land.  (continued)	Two-thirds of DNR-managed lands in the rain-on-snow zone, with some exceptions, to be hydrologically mature.	Same as Alternative B.

	Alternative A No Action	Alternative B Proposed HCP	Alternative C
<b>Riparian (continued)</b>			
Hydrologic Maturity (continued)	While not a specific requirement, hydrologic maturity is often considered when laying out harvest units, is included on the timber sale environmental checklist, and is part of the landscape planning process.		
Wetlands Protection	<p>Wetlands protected in the future through full implementation of FRP Policy No. 21- "no net loss of acreage or function." Could change if policy is replaced or modified.</p> <p>Buffers provided based on size of wetland:            (1) .25-1 acre wetlands, buffer width = 100 feet; and,            (2) wetlands larger than 1 acre, buffer width = height of site tree at age 100 or 100 feet whichever is greater.</p> <p>Buffer and forested wetland management activities:            (1) maintain at least 120 feet<sup>2</sup> of basal area in wind-firm trees with large root systems;            (2) no roading without on-site mitigation;            (3) natural surface and subsurface (continued)</p>	Same as Alternative A. and guaranteed for length of HCP.	<p>Same wetland buffers as in Alternatives A and B plus:            (1) bogs 0.1-0.25 acres receive 100-foot buffers;            (2) small wetlands that are inter-connected or connected to a typed water are buffered; and,            (3) wetlands within 200 feet upslope of unstable hill slopes have the buffer width increased by 50% on the half of the wetland closest to the unstable area.</p> <p>Management of forested wetlands and buffers around forested wetlands same as Alternative A plus:            (1) the required 120 feet<sup>2</sup> of basal area consists of the most wind-firm dominant and co-dominant trees;            (2) maintain a minimum of at least 75 trees per acre; and,            (3) no ground-based equipment operation (continued)</p>

	Alternative A No Action	Alternative B Proposed HCP	Alternative C
<b>Riparian (continued)</b>			
Wetlands Protection (continued)	drainage conditions must be maintained or restored; and, (4) ground-based equipment generally precluded.		within wetland or 50 feet of wetland edge.  Management of buffers around nonforested wetlands same as forested wetlands plus: (1) no harvest within 50 feet of wetland edge; and, (2) no ground-based equipment within 100 feet of bogs.
<b>Uncommon Habitats</b>			
West-side units	No specific provisions for uncommon habitats. Wildlife habitat objectives developed as required under FRP Policy No.22	Same as Alternative A with additional mitigation provided for: (1) talus fields larger than 1 acre: no harvest, 100-foot buffer with maximum harvest of 1/3 (vol.), yarding generally cannot physically disrupt talus, includes provision for mining of talus and road construction, (2) caves important to wildlife: 250-foot no-harvest buffer around entrance, 100-foot no-harvest buffer around passages that may be disturbed by surface activities, new caves explored and mapped prior to management; (3) cliffs: mining of rock from cliffs for road construction avoided when materials can otherwise be reasonably acquired, site-specific prescriptions developed;  (continued)	Same as Alternative B.

	Alternative A No Action	Alternative B Proposed HCP	Alternative C
<b>Uncommon Habitats (continued)</b>			
West-side units (continued)		<p>(4) oak woodlands: retention of large dominant oaks, maintenance of 25-50% canopy cover, encroaching conifers removed, dead and dying oaks retained, prescribed burns where appropriate; and,</p> <p>(5) very large, old trees: large trees will be specified for retention with preference given to wildlife trees; applicable safety standards will be followed; attempt will be made to retain at least 2 live trees per acre harvested and at least 1/2 of the trees retained from the largest diameter class available; leave trees may be clumped.</p>	
<b>Other Federally Listed Species</b>			
West-side units, east-side units, and OESF	Other federally listed species protected through meeting requirements of federal and state laws and the development of bald eagle site management plans.	<p>Other federally listed species protected through meeting requirements of federal and state laws and the development of bald eagle site management plans, plus spotted owl, marbled murrelet, and riparian conservation strategies and additional mitigation for:</p> <p>(1) peregrine falcon: site-specific protection with restricted access to lands within .5 mile of active aerie and protection of location information; (continued)</p>	Same as Alternative B.

	Alternative A No Action	Alternative B Proposed HCP	Alternative C
<b>Other Federally Listed Species (continued)</b>			
West-side units, east-side units, and OESF (continued)		(2) gray wolf: establish wolf habitat management area and develop plans to limit human disturbance for land within 8 miles of documented sightings; and, (3) grizzly bear: establish grizzly bear habitat management area and develop plans to limit human disturbance for land within 10 miles of documented sightings.	
<b>Unlisted Species</b>			
West-side units	<p>Protection will be provided according to state regulations.</p> <p>Additional protection may occur in DNR-designated Natural Area Preserves and Natural Resource Conservation Areas.</p> <p>No specific provisions for unlisted species except for the northwestern pond turtle, sandhill crane, and western grey squirrel under the Washington Forest Practices Act (WAC 222-16-080(1) Unlisted species may be protected through development of wildlife habitat objectives required under FRP Policy No. 22.</p>	<p>Protection will be provided according to state regulations.</p> <p>Additional protection may occur in DNR-designated Natural Area Preserves and Natural Resource Conservation Areas.</p> <p>Unlisted species protected through spotted owl, marbled murrelet, and riparian conservation strategies, protection of uncommon habitats, and additional mitigation for species of concern as follows: (1) harlequin duck: no activity allowed that would appreciably reduce likelihood of nesting success within 165 feet of a known active nest between May 1 and September 1;</p> <p>(continued)</p>	Same as Alternative B.

	Alternative A No Action	Alternative B Proposed HCP	Alternative C
<b>Unlisted Species (continued)</b>			
West-side units (continued)		<p>(2) northern goshawk: no activity allowed that would appreciably reduce likelihood of nesting success within 0.55 mile of a known active nest between April 1 and August 31;</p> <p>(3) common loon: no activity allowed that would appreciably reduce likelihood of nesting success within 500 feet of a known active nest between April 1 and September 1;</p> <p>(4) Vaux's swift: trees and snags known to be used as night roosts will not be harvested;</p> <p>(5) myotis bats: trees and snags known to be used as communal roosts or maternal colonies will not be harvested; and,</p> <p>(6) California wolverine and Pacific fisher: no activity allowed that would appreciably reduce likelihood of denning success within 0.5 miles of a known active den between January 1 and July 31 (for wolverine) or February 1 and July 31 (for fisher).</p>	

**Matrix 1b: Management strategies for alternatives related to the OESF Planning Unit**

	Alternative 1 No Action	Alternative 2 Unzoned Forest Proposed OESF	Alternative 3 Zoned Forest
<b>Spotted Owl</b>			
Nesting, Roosting, and Foraging (NRF) Habitat	<p>Two-year surveys conducted on proposed timber sales to collect/update information on owl sites (no surveys since 1993 in OESF).</p> <p>Within spotted owl site centers, no harvest of owl habitat if existing owl habitat in the (2.7 mile) circle is equal to or less than 40% of the total area.</p> <p>Management of non-habitat will result in maintaining these stands in a non-habitat condition.</p> <p>As owls move or survey information shows an owl activity circle has been abandoned, additional acres would be available for harvest (consistent with the regulatory and policy decertification guidelines currently available).</p> <p>15,000 acres of suitable habitat are</p> <p>(continued)</p>	<p>Emphasis on developing future habitat distributed across the entire 270,000-acre forest through integrated forest management consists of 2 phases:</p> <p>(1) initiate habitat recovery within each landscape until (a) old-forest habitat (NRF) exceeds 20% of the acres; and, (b) sub-mature and old-forest habitat (RF &amp; NRF), including the 20% above, exceeds 40%;</p> <p>(2) maintain and enhance a mosaic of habitat that shifts over time guided by analyses and plans for individual landscape planning units, working to achieve habitat goals at or greater than the 20% and 40% minimum standards.</p> <p>Near-term harvest of potential habitat is not limited by 40% threshold (this will not delay achieving the target since new acres acquire the structures), but is limited by riparian and murrelet</p> <p>(continued)</p>	<p>Emphasis on strategically located areas designated for owl habitat management.</p> <p>Prescriptions to be achieved within the designated areas over time:</p> <p>(1) Nest Grove: 100% old forest; each 200 acres in size (5,000 acres total)</p> <p>(2) Core Area: 50% sub-mature or better; each 2,000 acres in size (78,000 acres total)</p> <p>(3) Range Area: 40% young-forest marginal or better; each 14,000 acres (40,000 acres total)</p> <p>(4) Special Pair Areas: 40% habitat within 2.7 miles of five selected owl sites (40,000 acres)</p> <p><i>Interim provision:</i> Special pair areas will not be retained after range areas meet or exceed thresholds.</p>

	Alternative 1 No Action	Alternative 2 Unzoned Forest Proposed OESF	Alternative 3 Zoned Forest
<b>Spotted Owl (continued)</b>			
Nesting, Roosting, and Foraging (NRF) Habitat (continued)	being deferred until 2005. Criteria have not been developed for determining whether the deferral will end or be extended beyond year 2005. Initially this decision was expected to be linked with OESF research results, but that portion of the Commission on Old Growth Alternatives' recommendations was not implemented and is not part of No Action.	strategies and 20% old-forest habitat threshold. Guidelines provided for harvest of suitable owl habitat are linked to (a) riparian and marbled murrelet conservation, (b) old-forest habitat thresholds, (c) an emphasis on the harvest of habitat being a combination of young- and old-forest habitat scheduled somewhat evenly across the recovery period, and (d) opportunities to learn new silvicultural techniques for achieving habitat goals.  Known owl nests will not be disturbed during nesting season.	
Dispersal Habitat	No provision for dispersal habitat.	Provided within the landscape requirements for percentage of young-forest marginal and better habitat.	Provided within the nest, core, and range area requirements.
Experimental Areas	No provision for experimental areas.	Entire forest plays role in innovative experimental management, research and monitoring program.	Conduct limited research activities within zones designated to support clusters of spotted owl pairs.  Conduct limited second-growth research activities outside zones.
<b>Marbled Murrelet</b>			
Murrelet Conservation Strategy	Same as HCP Alternative A.	Same as HCP Alternative B.	Same as HCP Alternative C.

	<b>Alternative 1 No Action</b>	<b>Alternative 2 Unzoned Forest Proposed OESF</b>	<b>Alternative 3 Zoned Forest</b>
<b>Riparian</b>			
General strategy	Protection of unstable areas by Washington Forest Practices Rules, DNR Forest Resource Plan, and existing agreements (such as the Hoh Agreement regarding unstable slopes).	Resource protection and natural restoration with a long-term effort to find management and conservation solutions through experimentation and active resource management.  Laws of general applicability and existing policies and agreements continue to be in effect.	Same as Alternative 2.
Riparian protection	Protection of riparian areas ranges from the minimums allowed by Washington Forest Practices Rules to substantially greater protection to meet site-specific needs. Harvest restrictions range from minimal to maximum (no-harvest) in buffers.  Management activities can occur provided that they do not conflict with the Washington Forest Practices Rules and the resource protection objectives of the DNR Forest Resource Plan.	Relies on watershed-level assessments of physical and biological conditions of riparian forests for determining the level of protection over long term.  Interim management strategies and buffer-width guidelines provided while assessments are completed. Strategies remain in effect through interim phase landscape planning and implementation of landscape plans.  Harvest restrictions range from moderate (partial-cut) to maximum (no-harvest) in buffers.  Management activities can occur provided that primary conservation objectives are met.	Same as Alternative 2.

	Alternative 1 No Action	Alternative 2 Unzoned Forest Proposed OESF	Alternative 3 Zoned Forest
<b>Riparian (continued)</b>			
Interior-core buffers	<p>Current riparian management areas fall into two categories:</p> <p>(1) those that average 146 feet (slope distance) on Type 1 Waters, 136 feet on Type 2 Waters, 95 feet on Type 3 Waters, 96 feet on Type 4 Waters, and 105 feet on Type 5 Waters [totals approximately 55% of the riparian areas in the OESF]; and,</p> <p>(2) those that fall below these averages.</p> <p>Timber will be removed only when adequate protection can be provided to fish and other nontimber resources, as per Forest Resource Plan.</p>	<p>Interior-core buffers derived from statistical analysis of No Action buffer strategy.</p> <p>Interior-core buffers designed to minimize mass wasting and protect/aid natural restoration of physical and ecological riparian processes and functions.</p> <p>Harvest may occur if it promotes these primary objectives.</p> <p>All Type 1 through 4 Waters and most but not all Type 5 Waters will have interior-core buffers. (Buffers expected to average 150 feet on Type 1 and 2 Waters; 100 feet on Type 3 and 4 Waters; Type 5 Waters will be highly variable.)</p> <p>Working hypothesis is that buffers designed to reduce mass wasting will be wide enough to protect and sustain ecological functions of streams and streamside forest</p>	Same as Alternative 2.

	Alternative 1 No Action	Alternative 2 Unzoned Forest Proposed OESF	Alternative 3 Zoned Forest
<b>Riparian (continued)</b>			
Exterior buffers	No provision for exterior buffers.	Exterior-core buffers designed experimentally to protect the integrity of the interior-core buffer from damaging wind disturbances.  Initial experimental hypothesis about average widths: Type 1 through 3 Waters = 150 feet; Type 4 and 5 Waters = 50 feet; however, may range from zero to a few hundred.  Light partial cutting and experimental harvest allowed.	Same as Alternative 2.
Unstable Hillslopes and Mass wasting	Protected by Forest Resource Plan policies, including landscape planning, and Forest Practices Rules (Class IV-Special).	See interior-core buffer strategies above.	Same as Alternative 2.
Road Network Management	Implement Forest Resource Plan direction to develop and maintain road system that integrates management needs and controls adverse environmental impacts on the forest environment.	Implement Forest Resource Plan direction to minimize adverse environmental impacts from roads.  Develop comprehensive road maintenance plans, that include annual inventories of road conditions, aggressive maintenance, stabilization, and access control to minimize management and environmental problems; and controls on (continued)	Same as Alternative 2.

	Alternative 1 No Action	Alternative 2 Unzoned Forest Proposed OESF	Alternative 3 Zoned Forest
<b>Riparian (continued)</b>			
Road Network Management (continued)		expansion of road network densities.  Consistently apply and, when appropriate, update standards for quality new road construction and appropriate placement based on current and new knowledge and technology.	
Hydrologic Maturity	Forest Practices rain-on-snow regulations are in effect until watershed analysis is conducted; hydrologic maturity issues also may be addressed through landscape planning.	Forest Practices regulations remain in effect. Hydrologic maturity also addressed through landscape planning.  Strategy promotes a more diverse mosaic of forest ages and composition across the landscape, for example, partial cuts and multi-age stands.  Knowledge gain through research.	Forest Practices regulations remain in effect. Hydrologic maturity also addressed through landscape planning.  Multi-age management less evenly applied across the landscape due to zoning older forests for owl habitat and riparian conservation and more intensively managed forests outside owl areas.  Knowledge gain through research.
Wetlands Protection	Wetlands will be protected through full implementation of FRP Policy No. 21 - "no net loss of acreage or function." Guidelines for implementation would contain the same protection measures as  (continued)	Buffer widths based on average site-potential tree heights. Average buffer widths expected to be 150 feet on forested wetlands greater than 5 acres and 100 feet on forested wetlands 0.25 to 5 acres.  Harvest allowed within forested wetlands and  (continued)	Same as Alternative 2.

	Alternative 1 No Action	Alternative 2 Unzoned Forest Proposed OESF	Alternative 3 Zoned Forest
<b>Riparian (continued)</b>			
Wetlands Protection (continued)	described in HCP Alternative B.	<p>buffers; will retain at least 120 feet<sup>2</sup> basal area and design buffers for windfirmness.</p> <p>No harvest within 50 feet of non-forested wetland's edge. Harvest within remaining buffer will be designed to maintain windfirmness. Leave trees will be representative of dominant and co-dominant species in the wetland's intact forest edge.</p> <p>Conservation strategy to be integrated with research and monitoring strategies.</p>	
<b>Research and Monitoring</b>			
Research and Monitoring	Current level of research activities consistent with FRP Policy No. 40 without special emphasis in OESF. No concentrated effort to integrate commodity production with conservation or to integrate other unique aspects of the OESF.	<p>Initiate innovative program of experimental management, research, and habitat restoration activities throughout 11 landscape units.</p> <p>Initiate clearly defined, structured decision-making process for adapting management in response to new, validated information.</p>	<p>Initiate experimental management, research, and restoration activities across majority of DNR-managed lands in OESF. Conduct limited research activities within: (a) zones designated to support clusters of spotted owl pairs; (b) in riparian and marbled murrelet habitat; and, (c) second-growth stands outside owl zones. The full extent of this research has not been defined; program is assumed to be less than</p> <p>(continued)</p>

	Alternative 1 No Action	Alternative 2 Unzoned Forest Proposed OESF	Alternative 3 Zoned Forest
<b>Research and Monitoring (continued)</b>			
Research and Monitoring (continued)			Alternative 2 due to lower expected revenues. Initiate clearly defined, structured decision-making process for adapting management in response to new, validated information.
<b>Uncommon Habitats</b>			
Uncommon Habitats	No specific provisions for uncommon habitats, development of wildlife habitat objectives required under FRP Policy No. 22.	Same as HCP Alternative B treatment of cliffs, caves, talus fields, and very large, old trees, except greater latitude for experimentation related to integrating conservation and production.  Attention to protecting known nesting, denning and/or roosting sites, but no special surveys unless unique circumstances.  Combined riparian, marbled murrelet, and spotted owl strategies will increase the presence of large, old trees.	Same as Alternative 2.
<b>Other Federally Listed Species</b>			
Other Federally Listed Species	Other federally listed species protected through meeting requirements of federal and state laws, development of bald eagle site management plans  (continued)	Landscape-level management, built around riparian, spotted owl, and marbled murrelet conservation, provides primary protection for other federally listed species.  (continued)	Same as Alternative 2.

	Alternative 1 No Action	Alternative 2 Unzoned Forest Proposed OESF	Alternative 3 Zoned Forest
<b>Other Federally Listed Species (continued)</b>			
Other Federally Listed Species (continued)		Additional mitigation for: (1) bald eagle: continue nest-site-management process; and,  (2) peregrine falcon: site-specific protection; restricted access within 0.5 mile of aerie; protect location information.	
<b>Unlisted Species</b>			
Unlisted Species	<p>Protection will be provided according to state regulations.</p> <p>Additional protection may occur in DNR-designated Natural Area Preserves and Natural Resource Conservation Areas.</p> <p>No specific provisions for unlisted species. Unlisted species may be protected through development of wildlife habitat objectives required under FRP Policy No. 22.</p>	<p>Protection will be provided according to state regulations.</p> <p>Additional protection may occur in DNR-designated Natural Area Preserves and Natural Resource Conservation Areas.</p> <p>Unlisted species protected through spotted owl, marbled murrelet, and riparian conservation strategies, landscape-level management planning, and protection of uncommon habitats.</p> <p>Conservation primarily derives from integrated, ecosystem-oriented management, rather than directing the nature of that management.</p> <p>Additional mitigation: (1) Vaux's swift: trees and snags known to be</p> <p>(continued)</p>	<p>Protection will be provided according to state regulations.</p> <p>Additional protection may occur in DNR-designated Natural Area Preserves and Natural Resource Conservation Areas.</p> <p>Same as Alternative 2, except conservation of upland wildlife that are associated with older forests will be concentrated in the owl zones.</p>

	Alternative 1 No Action	Alternative 2 Unzoned Forest Proposed OESF	Alternative 3 Zoned Forest
<b>Unlisted Species (continued)</b>			
Unlisted Species (continued)		<p>used as nests or night roosts will not be harvested;</p> <p>(2) Myotis bats: trees and snags known to be used as communal roosts or maternal colonies will not be harvested; and,</p> <p>(3) Fisher: within 0.5 mile of a known active den between February 1 and July 3, no activity that would appreciably reduce likelihood of denning success.</p> <p>Exceptions to the additional mitigation restrictions related to nesting and roosting are limited to formal, experimental studies designed to address information needs related to integrating conservation and production or as other exceptional circumstances warrant.</p>	

**Matrix 2a: Summary of environmental consequences in western Washington (excluding OESF)**

Resource	Alternative A No Action	Alternative B - Proposed HCP	Alternative C
<b>FEDERALLY LISTED SPECIES' HABITATS</b>			
<b>Spotted Owl</b>			
Amount & distribution of NRF	<p>Managed on circle-by-circle basis with emphasis on present sites. No intentional creation of new habitat. High risk of loss over long term, with largest loss of potential owl habitat acres when modeled to year 2096.</p> <p>Distribution: dispersed, fragmented.</p>	<p>Owl habitat strategically located to more effectively support population. Some improvement of habitat quality, but potential loss of quality in some areas. Higher certainty than Alternative A of maintaining larger quantity over long term. Length of research phase uncertain. Strategy targets amount and configuration of nesting habitat that meets current research findings for stand and landscape-level needs. Lower reduction in acres of owl habitat than Alt A.</p> <p>Distribution: near federal reserves in western Cascades.</p>	<p>Owl habitat strategically located for effectiveness. Smallest loss of potential owl habitat acres when modeled to year 2096. Some improvement, and no loss, of habitat quality. Risk and potential benefits of designated experimental area.</p> <p>Distribution: near federal reserves in all planning units.</p>
Impacts to present & future sites	<p>No incidental take of current sites. Loss of some sites due to harvest behind shifting circles and natural disturbance. No new habitat created.</p>	<p>Highest potential for incidental take in short term, particularly outside NRF-management areas. Less risk than Alternative A over long term. Habitat conditions improve in areas not currently supporting owls and are maintained at a designated level. NRF areas expected to meet or exceed habitat goals by year 50.</p>	<p>Lower risk of incidental take than Alternative B; but higher than Alternative A. Potential for adding future sites.</p>
Dispersal habitat	<p>No specific provisions for dispersal habitat beyond what exists within owl circles and by coincidence outside.</p>	<p>Includes NRF management areas and Dispersal habitat management areas. Large blocks near and between federal reserves.</p>	<p>Similar to Alternative B, but providing nearly one-third more acreage.</p>

Resource	Alternative A No Action	Alternative B - Proposed HCP	Alternative C
<b>Spotted Owl (continued)</b>			
Demographic support	Individual spotted owl territories supported in less than optimal habitat conditions. Landscape-level habitat increasingly fragmented. Less contribution through time.	Higher long-term contribution and when compared to Alternative A; decreasing short-term contribution due to reduced habitat.	Highest level of contribution toward demographic support over the long term, despite lower contribution in short term.
Maintenance of species distribution	Maintains current range for short term. Range pulls back to near federal lands over long term. Low connectivity throughout.	Range pulls back to western Cascades near federal reserves. Maintains connectivity within western Cascades over the long term. Greater certainty than Alternative A that distribution will be maintained.	Range pulls back to western Cascades and Olympic Peninsula near federal reserves. Maintains connectivity near federal reserves over long term. Greater certainty of maintaining distribution than Alternative A.
<b>Marbled Murrelet</b>			
Protection of potential nesting habitat	Known occupied sites and potential habitat protected under takeavoidance policy; all future options available. Habitat relationship studies will advance knowledge. No guarantee as to future policies; no search for unknown sites. Risk of habitat loss due to disturbance.	More habitat lost in short-term than under Alternative A, but more certainty of long-term habitat protection. Habitat relationship studies advance knowledge. Long-term conservation plan at landscape level increases potential effectiveness of habitat locations. Provides greater certainty of adequate habitat and breeding site protection than Alternative A.	Similar to Alternative B, except retains all options until long-term plan developed. Highest potential for habitat replacement if loss due to natural disturbance. Highest potential for providing adequate habitat and breeding site protection.
Protection and/or enhancement of reproductive potential	High short-term protection of known sites. No certainty as to long-term protection. No effort to actively locate additional occupied sites beyond habitat relationship study. No effort to distribute habitat in meaningful way across the landscape. Overall, low likelihood of protecting or enhancing  (continued)	Maintains most options while collecting information needed to develop long-term plan. Intensive survey effort after habitat relationship study increases likelihood of locating breeding sites. Landscape-level planning increases likelihood of adequate protection of reproductive potential.	Similar to Alternative B, except maintains all options until long-term plan developed. Highest likelihood of successfully supporting reproductive potential.

Resource	Alternative A No Action	Alternative B - Proposed HCP	Alternative C
<b>Marbled Murrelet (continued)</b>			
Protection and/or enhancement of reproductive potential (continued)	reproductive potential at level required over long term.		
<b>OTHER FEDERALLY LISTED SPECIES' HABITAT</b>			
Oregon Silverspot Butterfly	Low risk.	Low risk; could benefit.	Low risk; could benefit.
Aleutian Canada Goose (peripheral due to rare occurrence)	General protection under FRP and Washington Forest Practices Rules; inconsistent habitat quality.	Higher protection due to more explicit riparian wetland conservation strategy.	Highest protection due to enhanced wetlands and riparian strategies.
Bald Eagle	Adequate protection of existing eagle habitat. Minimal emphasis on developing future habitat.	More substantial, widely distributed, and potentially effective protection through time due to riparian strategy and retaining very large, old trees.	Highest protection due to enhanced wetlands and riparian strategies.
Peregrine Falcon (peripheral because rarely associated directly w/ forests)	Riparian and wetland protections help maintain prey habitat. Little certainty for future and for undetected nest sites.	Could complement benefits of current practices through protection of cliff habitat and riparian strategy.	Greatest enhancement through riparian and wetlands strategies. Site access limitations and cliff habitat protection.
Columbian White-tailed Deer (not expected to affect unless range expands)	Should provide adequate protection of future deer.	Greater potential for benefits due to riparian strategy.	Highest certainty that future habitat would be provided.
Gray Wolf	No specific consideration given to gray wolf or public access in road strategy.	Improved wildlife and ecosystem conditions (shelter, denning, prey, and individual protection if sighted).	Similar to Alternative B, with stronger riparian contribution.

Resource	Alternative A No Action	Alternative B - Proposed HCP	Alternative C
<b>OTHER FEDERALLY LISTED SPECIES (continued)</b>			
Grizzly Bear (not significant percentage of N. Cascades Grizzly Bear Recovery Zone)	Minimal protection. Provides some protection of habitat important to foraging, travel, resting and hiding opportunities. Subject to disturbance along roads.	Higher occurrence of hiding, resting, and travel cover, shelter, and provisions for prey/forage habitat. Individual protection based on class 1 observations. Still subject to disturbance along roads.	Highest level and greatest certainty for conservation of bear habitat. Still subject to disturbance along roads.
<b>CANDIDATE, STATE LISTED, AND OTHER SPECIES OF CONCERN</b>			
<b>Arthropods</b>			
Beller's Ground Beetle, Long-horned Leaf Beetle, and Hatch's Click Beetle	Some protection to sphagnum bog habitat.	Greater protection of sphagnum bog habitat than Alternative A.	Greater protection of sphagnum bog habitat than Alternative A or Alternative B.
Columbia River Tiger Beetle	Not within planning area.	Not within planning area.	Not within planning area.
Fender's Soliperian Stonefly, Lynn's Clubtail	Not known within planning area; if occurs, some protection given under current riparian management.	Adequate protection.	Substantial protection.
<b>Molluscs</b>			
Newcomb's Littorine Snail	Known areas already protected inside Natural Area Preserves; if elsewhere, some protection of estuarine and wetland habitat.	If found outside NAP, adequate protection.	If found outside NAP, substantial protection.
California Floater, Great Columbia River Spire Snail	Not likely to occur in planning unit.	Not likely to occur in planning unit.	Not likely to occur in planning unit.
<b>Fish</b>			
Anadromous Salmonids	Ranges from low to high protection of various salmon habitat elements.	Moderate to high level of protection for salmon habitat.	High level of protection for salmon habitat.

<b>Resource</b>	<b>Alternative A No Action</b>	<b>Alternative B - Proposed HCP</b>	<b>Alternative C</b>
<b>Fish (continued)</b>			
Bull Trout, Olympic Mudminnow, Pacific Lamprey, River Lamprey	Some protection of spawning and rearing habitats used by these fish.	Adequate, guaranteed protection of spawning and rearing habitats used by these fish.	Substantial, guaranteed protection of spawning and rearing habitats used by these fish.
Green Sturgeon	Not in planning area.	Not in planning area.	Not in planning area.
<b>Amphibians and Reptiles</b>			
Larch Mountain Salamander	No provisions but some protection of talus being provided.	Adequate protection of talus fields expected; substantially more than Alternative A.	Higher protection than Alternative B.
Dunn's Salamander, Van Dyke's Salamander, and Tailed Frog	Some habitat protection provided.	Adequate protection of breeding, foraging, and resting habitats.	Higher protection than Alternative B.
Northern Red-legged Frog, Cascades Frog and, Spotted Frog	Protects some suitable breeding, foraging, and resting habitat.	Adequate protection of breeding, foraging, and resting habitats.	Higher protection than Alternative B.
Northwestern Pond Turtle	Substantial protection of known breeding, foraging, and resting sites.	Protection of both known and unknown sites.	Higher protection than Alternative B.
California Mountain Kingsnake	Currently not at risk since oak woodlands not being harvested; no guarantees.	Some guaranteed protection of breeding, foraging, and resting habitat.	Guaranteed protection of habitat.
<b>Birds</b>			
Harlequin Duck	At least some protection of breeding, foraging, and resting habitats.	Adequate protection of breeding, foraging, and resting habitats.	Substantial protection of breeding, foraging, and resting habitats.
Northern Goshawk	At least some protection of breeding, foraging, and resting habitats.	Should provide suitable breeding, foraging, and resting habitat.	Should provide substantially more habitat than Alternative A.
Sandhill Crane, Black Tern	Provides some suitable foraging and resting habitat for black tern and <i>foraging, resting, and breeding habitat for sandhill crane.</i>	Provides adequate foraging and resting habitat for black tern and foraging, resting and breeding habitat for sandhill crane.	Same as Alternative B.

Resource	Alternative A No Action	Alternative B - Proposed HCP	Alternative C
<b>Birds (continued)</b>			
Olive-sided Flycatcher	Limited habitat provided.	Should provide suitable forest conditions for breeding, foraging, and resting habitat.	Substantially more habitat provided than under Alternative A.
Little Willow Flycatcher	Provides some habitat; no guarantee long term.	Should provide breeding, foraging, and resting habitat.	Same as Alternative B.
Common Loon	Sufficient protection of nesting habitat; not guaranteed.	Substantially greater protection of seasonal nest sites.	Same as Alternative B.
Golden Eagle	Adequate protection of some habitat.	Greater certainty of protection of breeding, foraging, and resting habitat.	Same as Alternative B.
Vaux's Swift	Some suitable snag habitat provided.	Should provide breeding, foraging, and resting habitat; greater certainty and at higher level than Alternative A.	Same as Alternative B.
Lewis' Woodpecker	Small amount of incidental and temporary habitat provided.	Should provide breeding, foraging, and resting habitat; greater certainty and at higher level than Alternative A.	Same as Alternative B.
Pileated Woodpecker	Some suitable snag habitat.	Should provide breeding, foraging, and resting habitat; greater certainty and at higher level than Alternative A.	Same as Alternative B.
Purple Martin	Incidental and temporary provision of snags.	Should provide breeding, foraging and resting habitat; greater certainty and at higher level than Alternative A.	Same as Alternative B.
Western Bluebird	Provides foraging and resting habitat; provides some breeding habitat.	Should provide breeding, foraging and resting habitat.	Same as Alternative B.

Resource	Alternative A No Action	Alternative B - Proposed HCP	Alternative C
<b>Mammals</b>			
Myotis bats and Townsend's Big-eared Bat	Minimal protection of caves and talus.	Should protect breeding, foraging, and resting habitat.	Same as Alternative B.
Western Gray Squirrel	No specific conservation provisions.	Guarantees some protection of breeding, foraging, and resting habitat.	Same as Alternative B.
California Wolverine and Pacific Fisher	Little or no protection except where coincides with protected owl habitat.	Greater protection specific to wolverine habitat.	Same as Alternative B.
Lynx (small likelihood of occurrence)	Incidental protection of habitat.	Incidental protection of known active den sites.	Incidental protection of habitat.
California Bighorn Sheep	No effect expected.	Same as Alternative A.	Same as Alternative A.
<b>Plants</b>			
No special actions being taken for federally listed and proposed endangered and threatened plant taxa.	Very limited ranges, narrow habitat requirements and restricted to very small areas; anticipated they can be effectively managed while meeting other land management objectives through current database process. However, comprehensive inventories are lacking.	Same as Alternative A.	Same as Alternative A.
<b>HABITAT</b>			
<b>Conifer-dominated</b>			
Structurally complex forest	Likely to be provided (estimate 30 percent in 100 years); no guarantee as to amount or quality.	Targets 50 percent for complex forest in designated areas; owl strategy contributes none outside these areas. Additional, but uncertain amount provided from murrelet strategy and greater amount complex forest in riparian areas. (Overall estimate 30 percent in 100 years with some guarantee as to amount and quality.)	Similar to Alternative B, but with estimate of 34 percent complex forest in 100 years.

Resource	Alternative A No Action	Alternative B - Proposed HCP	Alternative C
<b>Conifer-dominated (continued)</b>			
Fully functional ("old")	No guarantee; potentially 16 percent of DNR-managed lands in this state.	Some in 300-acre patches, riparian, unstable slopes and murrelet habitat. (estimate 12 percent of DNR-managed lands, distributed among Dispersal habitat management areas and NRF management areas and in remaining areas.	Greater than 14 percent estimated.
Interior forest	Quantity uncertain; greatest potential in unstable slope areas associated with riparian areas.	Same as Alternative A, but with added potential for significant interior forest in 500-acre patches within NRF management areas.	Somewhat higher than Alternative B, due to no manipulation of older forest type.
Closed-canopy Forest	Ready supply for many decades; changes in rotation age could increase or decrease amount.	Greater certainty for continuing, although dynamic, amount of closed-canopy forests.	Difficult to predict actual quantity, but adequate amounts expected.
Dense-pole Forest	Sufficient quantities expected. Little variation among areas.	Same as Alternative A.	Same as Alternative A.
Regeneration Forest	Sufficient quantities expected. Little variation among areas.	Same as Alternative A.	Same as Alternative A.
Open Forest	Sufficient quantities expected. Some variation in distribution as result of riparian, unstable slopes, murrelet, owl habitat, etc.	Same as Alternative A.	Same as Alternative A.
Wildlife Trees (snags, large wildlife trees, cavities, and downed logs)	Will meet minimums under state regulations.	Adequate quantity expected to develop over time.	Larger quantity and better distribution expected to develop over time.

Resource	Alternative A No Action	Alternative B - Proposed HCP	Alternative C
<b>Riparian and Aquatic Systems</b>			
Detrital inputs	Sufficient riparian management zone widths on Type 1 & 2 Waters to provide detrital inputs. Riparian management zones on Type 3, 4 & 5 Waters may not provide adequate inputs in some places, due to varying widths and composition.	Sufficient riparian management zone widths on Type 1-4 Waters to provide detrital inputs. Type 5 Water width probably adequate on unstable slopes, but may not be on flat ground.	Sufficient riparian management zone widths on all water types to provide detrital inputs.
Large woody debris	Short-term LWD recruitment provided on Type 1 & 2 Waters in most situations; long term less certain due to windthrow and other elements of this strategy. No guarantee of LWD protection on Type 3-5 Waters, although provided in many cases.	Short-term LWD recruitment maintained on most streams; protection on Type 1 & 2 Waters more certain than Type 3-5 Waters. Reduced chance of compromising future recruitment, especially on Type 1, 2, and larger 3 Waters.	Short-term LWD protection provided on all water types. Even stronger protection against compromising future recruitment, especially on Type 1, 2, and larger 3 Waters.
Windthrow	High risk of windthrow (no buffers).	Reduced chance of windthrow on Type 1, 2 and larger Type 3 Waters (windward-side buffers).	Less chance of windthrow than either Alternative A or Alternative B on Type 1, 2 and larger Type 3 Waters (buffers on both sides). Increased chance of protecting fully functional riparian management zone.
Water temperature	Adequate shading provided on Type 1 & 2 Waters. Type 3, 4, and 5 Waters may be adequately shaded, but lack of minimum width means some will not (especially Type 5).	Greater certainty of adequate shading for Type 1, 2, 3, and 4 Waters. Type 5 on unstable grounds probably have adequate shading; those on flat are less certain.	Shading should be adequate on all water types.
Sediment	Riparian Management zones on Type 1 & 2 Waters provide adequate sediment filtering. Type 3-5 Waters have no minimum width and may not always provide adequate sediment filtering.	High likelihood of providing adequate sediment filtering. Ground-based harvest activity in forested wetlands buffer may compromise wetlands filtering.	High likelihood of providing adequate sediment filtering.

Resource	Alternative A No Action	Alternative B - Proposed HCP	Alternative C
<b>Riparian and Aquatic Systems (continued)</b>			
Sediment (continued)	Potential for high road sediment runoff without comprehensive road management plans. Forested wetland sediment filtering may be compromised by ground-based harvest activity in buffers.		
Stream bank stability	Adequate bank protection likely on Type 1 & 2 Waters. Protection on Type 3, 4, and 5 will vary due to lack of minimum riparian management zone widths.	Adequate bank protection on Type 1-4 Waters, particularly with added wind buffer. Adequate bank protection on Type 5 Waters on unstable slopes, but may not always be adequate on flat ground.	Greater certainty of adequate bank protection on all water types.
Stream flow	Although watershed analysis may result in adequate forest management activity planning related to stream flow over the long term, this is still uncertain and not guaranteed.	Stream flow impacts are more likely to be minimized due to strategies for hydrologic maturity, road management plans, unstable slopes, and riparian management zone widths.	Highest likelihood that stream flow moderation and augmentation will benefit from the combined elements of the riparian strategy.
<b>Less Common Habitat Types</b>			
Oak woodlands	Not currently harvesting these, but no specific provisions about management.	Adequate retention and restoration of existing oak woodlands expected.	Same as Alternative B.
Prairies	No apparent risk, even though no specific provisions.	Same as Alternative A.	Same as Alternative B.
Subalpine and alpine	Little or none that are timbered and/or not already protected.	Same as Alternative A, although potential road management in some of these areas would benefit grizzlies.	Same as Alternative B.
<b>Uncommon Habitat Types</b>			
Caves	No specific protection.	Significant protection of cave habitat.	Same as Alternative B.
Cliffs	No specific protection.	Slightly more protection; potential for some impact to cliff-dependent species.	Same as Alternative B.

<b>Resource</b>	<b>Alternative A No Action</b>	<b>Alternative B - Proposed HCP</b>	<b>Alternative C</b>
<b>Uncommon Habitat Types (continued)</b>			
Very large, old trees	Washington Forest Practices Rules.	Specific retention provision.	Same as Alternative B.
Talus	No specific protection.	Somewhat greater protection than Alternative A; long-term effectiveness of measures uncertain.	Same as Alternative B.
Snags	Washington Forest Practices Rules.	Same as Alternative A.	Same as Alternative A.
<b>Other Resources</b>			
Soil	See Section 4.6.	See Section 4.6.	See Section 4.6.
Air Quality	See Section 4.7	See Section 4.7	See Section 4.7
Water Quality	See Section 4.8	See Section 4.8	See Section 4.8
Cultural Resources	See Section 4.9	See Section 4.9	See Section 4.9
<b>Socio-economic</b>			
Human Resources	See Section 4.10	See Section 4.10	See Section 4.10

**Matrix 2b: Summary of environmental consequences in eastern Washington (within HCP planning area)**

Resource	Alternative A - No Action	Alternative B Proposed HCP	Alternative C
<b>FEDERALLY LISTED SPECIES' HABITAT</b>			
Spotted Owl	Likely to maintain larger proportion of existing owl habitat and site centers over the short term; but high risk of loss over the long term.	Greater short-term risk to the owl population than Alternative A, but lower long-term risk. Stronger support to owl clusters on federal lands.	Highest certainty to enhance survival and recovery of spotted owls in Eastern Washington Cascades Province.
Amount & Distribution of NRF Habitat	Retains more of the currently existing owl habitat; low certainty as to long-term spatial arrangement and habitat retention.	Removes more of the current habitat, but the spatial arrangement of remaining and future habitat is known. Higher certainty of long-term habitat development and greater chance that the habitat will support territorial owls.	Results in least reduction of current spotted owl habitat. Highest certainty of long-term habitat development and that habitat will support territorial owls.
Impacts to spotted owl site centers	No incidental take. Impacts expected to occur over long term, with losses and no gains to replace.	Impacts expected to occur during first decade. Then habitat development supports remaining sites.	Should cause fewer significant adverse impacts to owl nesting sites over long term.
Future impacts to owl site centers	Contributes little to persistence of owl clusters on federal reserves over long term.	Results in various levels of projected incidental take, but should increase the persistence of owl clusters.	Provides more nesting habitat than Alternative B. Results in various levels of projected incidental take, but should increase the persistence of owl clusters.
Amount and distribution of owl dispersal habitat	No provision for dispersal habitat beyond what exists in nesting habitat inside owl circles.	Greater certainty for long-term maintenance, density and geographic location of dispersal habitat.	Like Alternative B, except more acres provided.
Amount	Low long-term certainty.	High long-term certainty.	High long-term certainty.
Distribution	Widely distributed; high fragmentation.	Narrowly distributed; low fragmentation.	Widely distributed; low fragmentation.

Resource	Alternative A - No Action	Alternative B Proposed HCP	Alternative C
<b>Spotted Owl (continued)</b>			
Demographic support of population on federal lands	Manages for individual site centers.	Supports owl clusters on federal reserves.	Short-term and long-term support is greater than Alternative A or Alternative B.
Maintenance of species distribution	Maintains owls over greater proportion of range in short term (than Alternative B), but less certain this will be maintained over long term.	Greater short-term risk than Alternative A, but greater long-term certainty associated with the geographic range designed to be maintained.	Guarantees maintenance of owl habitat over widest part of owls' current geographic range.
Impact on range	Moderate short-term range reduction.  Large long-term range reduction.	Large short-term, range reduction.  Large long-term range reduction.	Small short-term range reduction.  Small long-term range reduction.
Risk of catastrophic disturbance	High risk of habitat loss. No replacement of habitat due to natural or human-caused disturbance.	High risk of habitat loss. Guaranteed habitat replacement when loss due to natural or human-caused disturbance.	Same as Alternative B.
<b>Marbled Murrelet</b>			
Conservation Strategy	Does not apply to east side.	Does not apply to east-side.	Does not apply to east-side.
<b>Fish</b>			
No new riparian strategies proposed for eastern Washington.	No change from Forest Resource Plan.	Owl strategy will change spatial distribution and management of late-successional forests, which may affect fish habitat, particularly on Type 5 streams. Forest Resource Plan policy guidance should result in no significant net change from Alternative A.	Same as Alternative B.
<b>OTHER FEDERALLY LISTED SPECIES</b>			
	<i>See Matrix 2a.</i>	<i>See Matrix 2a.</i>	<i>See Matrix 2a.</i>
<b>CANDIDATE, STATE LISTED AND OTHER SPECIES OF CONCERN</b>			
Spotted bat	Incidental protection only.	Marginally better than Alternative A.	Same as Alternative B.

Resource	Alternative A - No Action	Alternative B Proposed HCP	Alternative C
<b>CANDIDATE, STATE LISTED AND OTHER SPECIES OF CONCERN (continued)</b>			
Other species	<i>See Matrix 2a.</i>	<i>See Matrix 2a.</i>	<i>See Matrix 2a.</i>
<b>Plants</b>			
No special actions being taken for federally listed and proposed endangered and threatened plant taxa.	Very limited ranges; narrow habitat requirements; restricted to very small areas. Expect plants can be effectively managed through current database process while meeting other objectives. Lack comprehensive inventories.	Same as Alternative A.	Same as Alternative A.
<b>HABITAT</b>			
<b>Conifer-dominated</b>			
Structurally complex forest	Difficult with current data to determine complexity. Estimate 17 percent NRF habitat by year 2096.	Estimate 9 percent NRF by year 2096 (difficult to estimate); greater certainty of amount and distribution than Alternative A.	Greater amounts and better distribution of complex forest than Alternative B and greater certainty than Alternative A.
Fully functional	Some provided and well-distributed in short term. Over long term, entries and harvest over time may allow removal of most structures required to be fully functional as older forest. Less difference between complex and fully functional than on west side.	Less well-distributed than in Alternative A, but more certain in long term. However, still not guaranteed.	Likely to be more provided, well-distributed, and more certain. However, still not guaranteed.
Interior forest	Some provided within regulatory owl circles although probably not large patches.	Additional interior forest expected beyond what would occur under Alternative A; probably concentrated toward NRF-management areas. May be insufficient for some species across the larger landscape.	Same as Alternative B.
Closed-canopy forest	Expected to provide adequate thermal and hiding cover and other habitat needs.	Basically same as Alternative A.	Basically same as Alternative A.

Resource	Alternative A - No Action	Alternative B Proposed HCP	Alternative C
<b>Conifer-dominated (continued)</b>			
Open, multi-aged stands (more an east-side habitat than west-side)	Relatively common.	Same as Alternative A, though distribution may differ.	Same as Alternative A, though distribution may differ.
Dense-pole forest	Relatively common.	Same as Alternative A.	Same as Alternative A.
Regeneration forest	Difficult to assess the quantity. However, adequate open areas expected.	Same as Alternative A.	Same as Alternative A.
Open forest	Less common where uneven-age management predominates; some expected but difficult to assess potential quantity. Potential loss of quality due to herbicide application.	Same as Alternative A.	Same as Alternative A.
Wildlife trees (snags, large trees, cavities, and downed logs)	Will meet minimums under state law.	Similar quantity as Alternative A, but higher quality.	Same as Alternative B..
<b>Riparian and Aquatic Systems (including wetlands)</b>			
Riparian and Aquatic Systems (including wetlands)	No change proposed in riparian strategies.  No change from Forest Resource Plan.	No change proposed in riparian strategies.  Owl strategy will change spatial distribution and management of late-successional forests, which may affect fish habitat, particularly on Type 5 streams. Forest Resource Plan policy guidance should result in no significant net change over Alternative 1.	Same as Alternative B.

Resource	Alternative A - No Action	Alternative B Proposed HCP	Alternative C
<b>Less Common Habitat Types</b>			
Oak Woodlands; Prairies	No specific provisions.	No specific provisions.	No specific provisions.
Subalpine and alpine habitats	Little or no DNR-managed lands in these areas that are timbered; where exists, are in protected status or no harvest planned.	Same as Alternative A.	Same as Alternative B.
<b>Uncommon Habitat Types</b>			
caves, cliffs, talus	No specific provisions.	No specific provisions.	No specific provisions.
<b>OTHER RESOURCES</b>			
Soil	See Section 4.6.	See Section 4.6.	See Section 4.6.
Air Quality	See Section 4.7	See Section 4.7	See Section 4.7
Water Quality	See Section 4.8	See Section 4.8	See Section 4.8
Cultural Resources	See Section 4.9	See Section 4.9	See Section 4.9
<b>Socio-Economic</b>			
Human resources	See Section 4.10	See Section 4.10	See Section 4.10

**Matrix 2c: Summary of environmental consequences in Olympic Experimental State Forest**

Resource	Alternative 1 - No Action	Alternative 2 - Unzoned forest (Proposed OESF)	Alternative 3 - Zoned Forest
<b>FEDERALLY LISTED SPECIES HABITAT</b>			
<b>Northern Spotted Owl</b>			
Northern Spotted Owl	Habitat in the OESF area (all ownerships) is predicted to support increasingly more resident owls than currently present. No change in geographic and ecological distribution of owls and their habitat.	Greatest support for owls. Rates of habitat development significantly exceed rates of harvest of habitat. Contributes to broadest geographic and ecological distribution of owls and their habitat. Greatest contribution to overall habitat capability. Some risk of habitat loss from windthrow; trade-off with aggressive effort to expand range and experiment with novel silvicultural prescriptions. Greater potential to gain new knowledge and improve techniques.	Greater support for owls than Alternative 1. Rate of habitat development significantly exceed rates of harvest of habitat. Contributes to broader geographic and ecological distribution of owls and their habitat relative to Alternative 1. Contribution to overall habitat capability, primarily in lower elevation, coastal plain forests in OESF. Greater than three-fold increase in habitat capability on DNR-managed lands.
Abundance and distribution of habitats	Habitat capability declines on DNR-managed lands next 100 years as habitat is redistributed (but it increases across ownerships). No appreciable change in spatial distribution of suitable sites.	Habitat quality and quantity increase on DNR-managed land. Overall habitat capability within OESF improves (state and federal); more abundant sites. Expands distribution of suitable sites west and northwest from federal core.	Habitat quality increased on DNR-managed land. Overall habitat capability within OESF improves (within zones and on federal lands) and number of suitable sites increases, although less than under Alternative 2.
Population trends	Forest conditions result in declining population until year 60; begins to climb again as habitat develops on federal lands. None of the alternatives predicted to effect overall size of Olympic Peninsula sub-population in the future.	Current forest conditions result in declining population under all the alternatives until year 60. Stronger recovery in habitat quality after 60 years. Stepwise increase in habitat quality and quantity becomes most significant at 60 years (see habitat evaluations above).	Current forest conditions result in declining population under all the alternatives until year 60. Strongest recovery in habitat quality after 60 years.

Resource	Alternative 1 - No Action	Alternative 2 - Unzoned forest (Proposed OESF)	Alternative 3 - Zoned Forest
<b>Northern Spotted Owl (continued)</b>			
Risk for incidental take of spotted owl sites	<p>Known sites: Technically, no incidental take. But loss of habitat over time and low capability of some existing sites to support pairs long term.</p> <p>Unknown sites: Lowest in the near-term.</p> <p>Future owls: same for all three alternatives (number and location unknown so hard to predict).</p>	<p>Known sites: Landscape-based management allows some harvest of habitat in anticipation of habitat development in landscapes. Higher risk of incidental take during first 60 years than Alternative 3. However, habitat capability increases over life of HCP, stabilizing at higher level than currently exists and providing greater support to owls than Alternative 3. Unknown sites: highest in near term.</p>	<p>Known sites: Potential for low level of take during first 40-60 years. Overall level of take lower into future due to greater habitat capability and management within zones.</p> <p>Unknown sites: slightly greater than Alternative 1.</p>
<b>Marbled Murrelet</b>			
Protection of potential nesting habitat	<p>Known occupied sites and potential habitat protected under take avoidance policy; keeps all future options available. Habitat relationship studies will advance knowledge. No guarantee as to future policies regarding habitat without known sites. No long-term provision to locate new sites. Risk of habitat loss due to disturbance.</p>	<p>Although more habitat lost in short-term than under Alternative 1, there is greater certainty of long-term habitat protection. Habitat relationship studies advance knowledge. Developing long-term conservation plan at landscape-level increases potential effectiveness of habitat locations. Provides greater certain of adequate habitat and breeding site protection than A.</p>	<p>Similar to Alternative 2, except retains all options until long-term plan developed. Highest potential for habitat replacement if loss due to natural disturbance. Highest potential for providing adequate habitat and breeding site protection.</p>
Protection and/or enhancement of reproductive potential	<p>High short-term protection of known sites. No certainty as to long-term protection. No effort to actively locate additional occupied sites beyond habitat relationship study. No effort to distribute habitat in meaningful way across the landscape. Overall, low likelihood of protecting or enhancing reproductive potential at level required over long term.</p>	<p>Maintains most options while collecting information needed to develop long-term plan. Intensive survey effort after habitat relationship study increases likelihood of locating breeding sites. Landscape-level planning increases likelihood of adequate protection of reproductive potential.</p>	<p>Similar to Alternative B, except maintains all options until long-term plan developed. Highest likelihood of successfully supporting reproductive potential.</p>

Resource	Alternative 1 - No Action	Alternative 2 - Unzoned forest (Proposed OESF)	Alternative 3 - Zoned Forest
<b>Other Federally Listed Species</b>			
Aleutian Canada Goose	General protection under FRP and Washington Forest Practices Rules; although inconsistent habitat quality.	Higher protection due to riparian and wetlands strategy.	Same as Alternative 2
Bald Eagle	Adequate protection of existing eagle habitat. Minimal emphasis on developing future habitat.	Higher level of protection and expanded geographic and ecological distribution on the peninsula due to riparian strategy and retention of very large, old trees.	Same as Alternative 2
Peregrine Falcon	Riparian and wetland protections help maintain prey habitat. Little certainty for future and for undetected nest sites.	Increased protection of potential aerie sites and prey habitat.	Same as Alternative 2
Oregon Silverspot Butterfly; Columbian White-tailed Deer; Gray Wolf; Grizzly Bear	Does not apply within OESF planning unit.	Does not apply within OESF Planning Unit.	Does not apply within OESF Planning Unit
<b>CANDIDATE, STATE LISTED, OTHER SPECIES OF CONCERN</b>			
<b>Arthropods</b>			
Arthropods	None of the arthropods discussed are likely to occur in the OESF Planning Units. If Fender's Soliperian Stonefly or Lynn's Clubtail are found, No Action provides adequate protection.	None of the arthropods discussed are likely to occur in the OESF Planning Units. If Fender's Soliperian Stonefly or Lynn's Clubtail are found, Alternative 2 provides substantial protection.  Johnson's Hairstreak.	Same as Alternative 2.
<b>Molluscs</b>			
Molluscs	None of the molluscs discussed are likely to occur in the OESF Planning Unit.	None of the molluscs discussed are likely to occur in the OESF Planning Unit.	None of the molluscs discussed are likely to occur in the OESF Planning Unit.

<b>Resource</b>	<b>Alternative 1 - No Action</b>	<b>Alternative 2 - Unzoned forest (Proposed OESF)</b>	<b>Alternative 3 - Zoned Forest</b>
<b>Fish</b>			
Salmon	Moderate to moderately high protection of salmon habitat; low for some elements in some locations.	Moderate to high short-term; high protection long-term as recovery allowed to occur.	Same as Alternative 2.
Bull Trout, Olympic Mudminnow, Pacific Lamprey, River Lamprey	Adequate protection of spawning and rearing habitats used by these fish.	Same as Alternative 1.	Same as Alternative 2.
Green Sturgeon	Doesn't occur in OESF Planning Unit.	Doesn't occur in OESF Planning Unit.	Doesn't occur in OESF Planning Unit.
<b>Amphibians and Reptiles</b>			
Van Dyke's Salamander; Tailed Frog; Northern Red-legged Frog; Cascades Frog	At least some protection of breeding, foraging, and resting habitat for these species.	Expect substantial protection of breeding, foraging and resting habitat.	Same as Alternative 2.
Larch Mountain and Dnn's Salamander; Spotted Frog; Northwestern Pond Turtle; California Mountain Kingsnake	Not found in the OESF.	Not found in the OESF.	Not found in the OESF.
<b>Birds</b>			
Harlequin Duck	At least some protection of breeding, foraging, and resting habitat for these species.	Expect substantial protection of breeding, foraging and resting habitat; greater certainty as well.	Same as Alternative 2.
Northern Goshawk; Olive-sided Flycatcher	At least some protection of breeding, foraging, and resting habitat for these species.	Additional protection from riparian strategy and emphasis on building older forest component.	Additional protection but more concentrated in specific areas rather than distributed throughout.

Resource	Alternative 1 - No Action	Alternative 2 - Unzoned forest (Proposed OESF)	Alternative 3 - Zoned Forest
<b>Birds (continued)</b>			
Sandhill Crane, Black Tern	Do not occur in the OESF.	Do not occur in the OESF.	Do not occur in the OESF.
Little Willow Flycatcher	At least some protection of breeding, foraging, and resting habitat for these species.	Additional protection of breeding, foraging, and resting habitat due to riparian strategy.	Same as Alternative 2.
Common Loon	Uncommon in the OESF.  Adequate nesting and foraging habitat protected.	Uncommon in the OESF.	Uncommon in the OESF.  Same as Alternative 2.
Golden Eagle	Provides at least some breeding, foraging and resting habitat.	Provides habitat for all life requisites of the golden eagle; substantially greater than Alternative 1.	Same as Alternative 2.
Vaux's Swift	Will probably leave snags suitable for roosting and nesting.	Provides substantially greater volume of habitat and with greater certainty.	Similar to Alternative 2, although habitat may be less well distributed across the landscape.
Pileated Woodpecker	Incidental and temporary provision of habitat.	Substantially greater provision of habitat and with greater certainty.	Similar to Alternative 2, although habitat may be less well distributed across the landscape.
Western Bluebird and Purple Martin	Uncommon in the OESF.  Will likely provide suitable breeding and resting habitat.	Uncommon in the OESF.	Uncommon in the OESF.  Same as Alternative 2.
<b>Mammals</b>			
Myotis Bats; Townsend's Big-eared Bats	Minimal protection of bat habitat.	Higher likelihood of providing adequate, protected bat habitat.	Similar to Alternative 2.
Pacific Fisher	Some minimal protection of fisher habitat where it coincides with owl habitat and riparian areas; not guaranteed.	Protection and maintenance of potential fisher habitat more certain and at substantially higher level.	Same as Alternative 2, with somewhat different distribution of habitat.

Resource	Alternative 1 - No Action	Alternative 2 - Unzoned forest (Proposed OESF)	Alternative 3 - Zoned Forest
<b>Mammals (continued)</b>			
Spotted Bat; Western Gray Squirrels; Lynx; California Wolverine and California Bighorn Sheep	Do not occur in the OESF.	Do not occur in the OESF.	Do not occur in the OESF.
<b>Plants</b>			
No special actions being taken for federally listed and proposed endangered and threatened plant taxa.	Very limited ranges, narrow habitat requirements and restricted to very small areas; expected plants can be effectively managed through current database process while meeting other objectives. Lack comprehensive inventories.	Same as Alternative 1.	Same as Alternative 1.
<b>FOREST ECOSYSTEM</b>			
<b>Conifer-dominated</b>			
Structurally complex forest	Estimated 40-50 percent DNR-managed lands will be structurally complex at year 2096.	Estimate 60-70 percent in complex forest by year 2096; well-distributed by landscape planning unit. Greater certainty of quantities than under Alternative 1.	Estimate 60-70 percent structurally complex by year 2096. Concentrated in designated owl zones rather than distributed across landscapes. Greater certainty of quantities than under Alternative 1.
Fully functional	Potential for fully functional forests over age 100 and age 200 that have never been unharvested; no guarantees.  Estimate 40-50% over 100 years and 10-15% over 200 years by the year 2096.	Well-distributed across all landscapes. More certain presence than in Alternative 1. Estimate 50-60 percent older forest by year 2096 and 10-15% over 200; some of these natural stands have never been harvested.	Some additional interior forest likely to occur beyond what is expected under Alternative 1; amount uncertain. Estimate 60-70% forest over 100 years, 15 percent over 200 years in 2096. Likely concentrated around strategic locations regarding owls and unstable slope areas.

Resource	Alternative 1 - No Action	Alternative 2 - Unzoned forest (Proposed OESF)	Alternative 3 - Zoned Forest
<b>Conifer-dominated (continued)</b>			
Interior forest	Quantity uncertain; greatest potential in unstable slope areas associated with riparian areas.	Potential for highest amount of interior forest due to development of habitat across the landscape as part of unzoned forest strategy; although actual quantity still uncertain.	Somewhat less quantity than Alternative 2 but more than Alternative 1. Amount determined by relationship of nest groves and owl zones.
Closed-canopy forest	Levels will fluctuate with silvicultural activities and natural disturbance. Adequate supply expected short and long term.  Effectiveness will depend on distribution across the landscape.  2096 ~ 30-35%.	Adequate supply, though substantially smaller percentage of the landscape than under Alternative 1.  Effectiveness will depend on distribution across the landscape.  2096 ~ 5-10%	Similar to Alternative 2, although this alternative provides lowest percentage of closed-canopy forest over the long term.  2096 ~ about 5%.
Dense-pole forest	Quantity decreases over time, retaining about 20 percent of the land in this stage by year 2096. Adequate supply expected.	Greater reduction than Alternative 1, down to about 5-10 percent of the forest mix. Still adequate supply.	Same as Alternative 2.
Regeneration forest	By year 2096, only about 5% or less in this condition.	Retains higher amount of the forest (about 10%) in this condition across the landscape by year 2096.	Same as Alternative 2.
Open forest	No Action will provide about 5% or less open stage at year 2096. Could be loss of quality due to herbicide, though not commonly used now.	About 10-15 percent expected to be in open stage at year 2096.	Same as Alternative 2.
Wildlife Trees (snags, large wildlife trees, cavities, and downed logs)	Will meet minimum protection under state regulations.	Adequate quantity expected. Greater increase in quality than quantity over Alternative 1. Some experimentation to learn more about this component.	Same as Alternative 2.

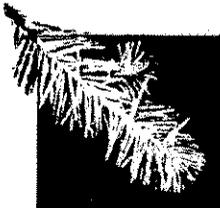
Resource	Alternative 1 - No Action	Alternative 2 - Unzoned forest (Proposed OESF)	Alternative 3 - Zoned Forest
<b>Riparian and Aquatic (including wetlands)</b>			
Mass wasting and channel-bank instability	Moderate to moderately high level of protection for mass-wasting sites. Lower certainty that interior-core buffers will serve intended purpose.	Same or greater protection than Alternative 1. Greater protection against windthrow. Greater potential for research and monitoring to improve understanding of systems and strengthen management strategies.	Same as Alternative 2.
Windthrow	Variable protection from wind disturbances, ranging from adequate to none.	Greater protection of windthrow-prone riparian areas. Forestry-windthrow interactions will be part of research and monitoring program, creating a potential trade-off in loss of buffer effectiveness for increased knowledge and potential benefits.	Same as Alternative 2
Coarse, woody debris	Potentially sufficient short- and long-term sources of coarse woody debris for streams when FRP fully implemented. Moderate to high protection for long-term recruitment to the floodplain and riparian-forest floor.	Similar to Alternative 1 for interior-core contribution. Increased certainty of adequate supply due to exterior-core buffer. More certain supply of coarse woody debris to riparian floodplain and forest floor over time.	Same as Alternative 2.
Sediment and roads	Moderate level of protection to streams from sedimentation (from mass wasting and road erosion). Hydrologic regime altered by permanent roads.	Moderate to high level of protection to streams from sedimentation (from mass wasting and road erosion). Greater potential for regulating frequency and volume of sediment delivery to streams.	Same as Alternative 2.
Temperature	Potentially adequate shading, although variable due to inconsistent riparian management zone widths.	Increased certainty of adequate shading due to exterior-core buffers in wind-prone areas and emphasis on enhancing conifer component in riparian management zone.	Same as Alternative 2.

Resource	Alternative 1 - No Action	Alternative 2 - Unzoned forest (Proposed OESF)	Alternative 3 - Zoned Forest
<b>Riparian and Aquatic (continued)</b>			
Stream flow	Low potential for regulating road-drainage volumes or water yields associated with timber harvest.	Greatest potential for regulating quantity and timing of surface runoff to streams and for minimizing road-related stream-flow impacts and regulating hydrologic maturity. Potential for new knowledge through monitoring and research.	Greater regulation of water volumes and discharge rates than Alternative 1, but less than Alternative 2.
Nutrient productivity	Expected to provide adequate detrital nutrients to stream channels via the interior-core buffer.	Increased chance to provide adequate detrital nutrients by addition of exterior-core buffers in wind-prone locations and emphasis on enhancing future biodiversity of riparian forests.	Same as Alternative 2.
Microclimate	Inadequate in some areas. Expected to provide at least some of the key parameters on up to at least 94 percent of the streams over time, as current policies become fully implemented.	Increased certainty of providing microclimate parameters due to addition of exterior-core buffer and knowledge from experimental designs.	Same as Alternative 2.
Riparian system functions	Moderate level of protection in most cases.	Greater potential for protection due to more systematic and interdisciplinary approach to designing conservation measures.	Same as Alternative 2.
<b>Less Common Habitat Types</b>			
Oak woodlands; natural prairies	Do not occur in OESF.	Do not occur in OESF.	Do not occur in OESF.
Subalpine and alpine habitats	Little or no timbered DNR-managed lands in subalpine and alpine; no significant impacts expected.	Same as Alternative 1.	Same as Alternative 2.

Resource	Alternative 1 - No Action	Alternative 2 - Unzoned forest (Proposed OESF)	Alternative 3 - Zoned Forest
<b>Uncommon Habitat Types</b>			
Caves	No specific provisions.	Significantly more protection of cave habitats.	Same as Alternative 2.
Cliffs	No specific provisions.	Slightly more protection of cliffs (although cliffs not common in OESF)	Same as Alternative 2.
Talus	No specific provisions.	Somewhat greater protection than Alternative 1; long-term effectiveness of measures uncertain.	Same as Alternative 2.
Very large, old trees	No specific provision.	Significant protection.	Same as Alternative 2.
Snags	Will meet minimum protection under state regulations.	Will meet minimum protection under state regulations.	Will meet minimum protection under state regulations.
<b>Other Resources</b>			
Soil	See Section 4.6.	See Section 4.6.	See Section 4.6.
Air Quality	See Section 4.7	See Section 4.7	See Section 4.7
Water Quality	See Section 4.8	See Section 4.8	See Section 4.8
Cultural Resources	See Section 4.9	See Section 4.9	See Section 4.9
<b>Socio-Economic</b>			
Human Resources	See Section 4.10	See Section 4.10	See Section 4.10







## **3. Environmental Setting**

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### **3.1 Summary of DNR-Managed Lands**

DNR manages more than 5-million acres of state-owned lands, including aquatic lands and uplands. Tidelands and beds of marine waters and navigable lakes and streams make up the 2.1 million acres of aquatic lands managed by the department. The 2.9 million acres of uplands primarily consist of lands granted to the state by the federal government at the time of statehood, tax-delinquent timberlands that had reverted to the counties and were transferred to the state, and timberlands purchased to be managed as state forests. These uplands are managed, in trust, for the various beneficiaries. Income is derived from these uplands through leases and the sale of minerals and renewable resources. In addition, DNR manages uplands for Natural Area Preserves, Natural Resource Conservation Areas, Community College Reserves, administrative sites, and recreation areas.

#### **3.1.1 Land Covered by the Proposal**

The defined range of the northern spotted owl in Washington State includes lands on the east slopes of the Cascades as well as all of western Washington. The proposed action described in this draft EIS covers DNR-managed uplands within the range of the owl except urban and agricultural lands. Included are federal grant lands, Forest Board lands and Community College Reserves, totaling approximately 1,632,000 acres. Table 3.1.1 indicates the approximate acreage for each category of trust land covered by the proposed draft HCP.

**Table 3.1.1: Approximate acreage covered by the HCP by trust category**

Trust Category	Acres
Common School	702,000
Agricultural	33,000
Charitable	35,000
University (original)	3,000
University (transferred)	46,000
Normal Schools	46,000
Scientific School	64,000
Capitol	88,000
Transfer	535,000
Purchase	77,000
Community College Forest Reserve Lands	3,000

The lands managed by DNR vary from scattered separate parcels of less than 40 acres to large contiguous blocks in excess of 110,000 acres. Although these lands are distributed throughout the plan area, many parcels are adjacent to or near large blocks of federal ownership along the Cascade and Olympic mountain ranges. The major exception to this pattern occurs in southwestern Washington, where DNR manages more than 250,000 acres that are not near federal ownership.

### 3.1.2 Land Use

As described earlier, the plan area encompasses federal grant lands, Forest Board lands and Community College Reserves managed by DNR, but it excludes urban and agricultural lands. All but approximately 49,000 acres of DNR-managed land within the proposed HCP planning area are forested. Nonforested land within the plan area includes natural features such as wetlands, ponds, exposed rock and soil, and perennial snowfields. Other land is maintained in a nonforested condition for specific uses such as utility and road rights of way and communication sites. Of 1,583,000 acres of forested land covered by the HCP, approximately 1,520,000 acres are in timber production. Other uses of forested land include old-growth research areas and gene pool reserves that the department has deferred from harvest, riparian management zones that are managed to protect nontimber resources, and recreation sites.

In order to plan efficiently and to consider regional variation, the HCP planning area is divided into nine planning units. These planning units are delineated by clustering water

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resource inventory areas (as defined by the Washington Department of Ecology and commonly referred to as WRIAs) that drain to common water bodies (see draft HCP p. I.12 and Maps I-5 - I-13).

The five planning units west of the Cascade crest are referred to as the west-side planning area (see Map 3). Because of the unique history and role of the Olympic Experimental State Forest Planning Unit, it has different alternatives under consideration (see Map 4). The three east-side planning units form the east-side planning area and are included only in the conservation strategies and mitigation for the spotted owl and other federally listed species (see Map 5). The marbled murrelet is not known to cross the Cascade crest into the east-side planning area, and the unlisted species including salmon are not covered by this draft HCP in the east-side planning area.

### **3.1.3 Adjacent Ownership**

DNR-managed lands covered by the draft HCP are interspersed among a variety of other ownerships. The ownership map (see draft HCP) shows the distribution of this land. The following table summarizes the approximate acreage held by various landowners.

**Table 3.1.2: Acreage by ownerships within the HCP plan vicinity**

(Source - DNR GIS Major Public Lands coverage)

Landowner/Manager/Use	Acres	Percent of plan area
U.S. Bureau of Land Management	5,000	> 0.1
U.S. Department of Defense	123,000	0.6
WA Department of Natural Resources	1,777,000 <sup>1</sup>	8.3
WA Department of Fish and Wildlife	100,000	0.5
U.S. Fish and Wildlife Service	19,000	>0.1
U.S. Forest Service Wilderness	2,297,000	10.8
Municipal watershed	101,000	0.5
U.S. National Forest	4,463,000	20.9
U.S. National Park/Rec/Monument	1,919,000	9.0
Other Washington State	10,000	> 0.1
Washington State Parks & Recreation Commission	41,000	0.2
Tribal Lands	1,015,000	4.7
Other (private)	9,488,000	44.4

The pattern of ownership has varied since statehood. An active DNR exchange program has consolidated many scattered parcels of state forest land into larger, more manageable blocks. Exchanges are expected to continue into the future to position assets to benefit the trusts.

### 3.2 Climate

Washington's climate is controlled by three factors: (1) location on the windward coast of the Pacific Ocean; (2) the north-south Cascade mountain range, which runs through the center of the state; and, (3) the semi-permanent high- and low-pressure regions located over the north Pacific Ocean. These factors combine to produce dramatically different

<sup>1</sup>Approximately 1,632,000 acres of this total are covered by the draft HCP.

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conditions within short distances. The Cascade Range, for instance, blocks the initial thrust of Pacific storms into eastern Washington while protecting western Washington from the polar-continental influence. Thus, western Washington has a marine climate and eastern Washington a marine-continental climate.

Successive moisture-laden storms move into the Pacific Northwest during late fall, winter, and early spring. They are intercepted first by coastal ranges (the Olympic Mountains and Willapa Hills) and then by the Cascade mountains, leaving most of eastern Washington in a rain shadow with an almost desert-like climate. From late spring to early fall, the Pacific high pressure area moves progressively farther north, weakening storms and limiting rainfall.

Annual precipitation ranges from 75 inches along the coast to 175 inches along the western slopes of the Olympic Mountains and nearly 100 inches in the Willapa Hills. The rain shadow effect of the Olympic Mountains results in only 16-25 inches of rain on the northeast part of the Olympic Peninsula and in parts of the San Juan Islands. From the Puget Sound lowlands south to the Columbia River, the mean annual precipitation is 40-60 inches. Precipitation increases along the west slopes of the Cascades, reaching 120 inches annually in some places. Striking gradations in precipitation totals are also noted on the eastern slopes of the Cascades, decreasing to an annual mean of 12 inches 40 miles from the crest and down to only 8 inches in the southern part of the central basin.

Prevailing winds are generally southwesterly over the state from late fall to early spring and northwesterly and lighter during the rest of the year. The most intense storms take place in late fall and early winter. Wind velocities range from 50-70 miles per hour or higher along the coast almost every winter. Speeds approaching or exceeding 100 miles per hour have been observed occasionally on coastal ridges. Wind speeds inland are lower during these storms but have been observed at 50-60 miles per hour.

Western Washington has 10-12 lightning storms each year, mostly along the western slopes of the Cascades. Rain usually accompanies lightning storms. There are about 25 lightning storms each year in eastern Washington, usually accompanied by less rain. An outbreak of "dry lightning" typically occurs two to three times each year in eastern Washington and on rare occasions in western Washington.

In western Washington, the sun shines about 24 percent of the time in December. In July, the figure is typically about 61 percent. In eastern Washington, the sun shines 25-30 percent of the time in December and January, but to 80-85 percent in July and August. Frost-free days in western Washington begin in late April and continue to early November, while in eastern Washington the frost-free period begins in late May and ends in late September.

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### **3.3 Forest Disturbance on DNR-Managed Lands**

Major disturbance events, both natural and human caused, have defined the current condition of DNR-managed forests within the planning area. Windstorms, which create

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chaotic patterns of broken and windthrown trees, have shaped Washington forests throughout the centuries. Examples of notable historic windstorms are the 1921 storm on the western Olympic Peninsula and the Columbus Day storm of 1962, which blew down thousands of acres of mature timber in western Washington. Major ice storms, such as the 1955 freeze, have also changed the structure of stands all over western Washington. Today, numerous timber stands containing trees with crooked boles and forked tops serve as reminders of the millions of treetops killed by this freeze. Fire, both natural and caused by humans, has historically been one of the great shapers of forest composition in both eastern and western Washington. As an example, parts of the 94,055-acre Yacolt Burn State Forest in southwest Washington burned several times between 1902 and 1952. Today, this area is forested with young Douglas-fir trees and a few old remnant trees in riparian areas and ravines.

The control of forest fire this century has played a key role in defining the existing conditions. Fire has been minimized in many areas that formerly burned naturally at fairly regular intervals. In many places this has significantly changed the species in and structural composition of forests. For example, frequent, low-intensity fires once maintained large areas of ponderosa pine. The thick bark of the pine protected it from significant damage while less fire-tolerant trees were killed. By nearly eliminating fire from these areas, species such as grand fir developed dense understories that have excluded pine regeneration. These new stands are more structurally diverse, but their multi-layered canopies are more susceptible to catastrophic fires. These dense stands of relatively low value timber are also susceptible to insects and disease.

Timber harvest is probably the greatest human influence on most forest land in the state. Most DNR-managed forest land has been logged at least once in the last 100 years. Much of the land in the HCP planning area was clearcut logged in the 1920s and 1930s and abandoned in an unreforested state. Remnants of logging railroads and abandoned truck roads are scattered on state land in western Washington and bear witness to the intensity of logging in the early 20th century. Fire scars on residual trees and charred old-growth stumps show the effect of frequent fires in the early 1900s that followed the first logging. Large parts of these forests seeded back naturally from trees that survived the fires and from the hardwoods and other species in unburned riparian areas. After the fires, alder flourished in landscapes once dominated by old-growth conifers. The presence of large conifer stumps in alder stands shows this vegetation change.

Since the 1960s DNR has been using a sustainable harvest approach in managing forest lands. Designated areas are harvested and regenerated each year. Most early regeneration efforts concentrated on establishing Douglas-fir in recently clearcut areas. Today, a mix of species is typically prescribed to conform to the environmental characteristics of a site.

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### **3.4 General Stand Conditions**

The majority of the forest on DNR-managed lands covered by the HCP is conifer. Less than 10 percent of the even-aged stands are in hardwood. Approximately 85,000 acres of timber older than 200 years remain on state-managed forest land. Of this, less than

40,000 acres contain forests of the large diameter (4-8 foot) Douglas-fir, western redcedar, and western hemlock that come to mind when thinking about old growth. As noted previously, most DNR-managed lands have been logged at least once in the last 100 years.

DNR categorizes its forest lands as even-aged or uneven-aged (see Map 6). In general, even-aged stands are located in western Washington and are categorized in terms of the dominant age class of trees within a stand. Eastern Washington forest lands are generally categorized in terms of uneven-aged stands and are categorized by the dominant size class, diameter in inches. However, the reader should note that while a dominant age or size class is determined, any acre of an individual stand will contain a mix of age and/or size of trees, just as a mix of tree species will be present within the vast majority of stands.

On the west side, about one-fourth of the even-aged stands are 20 years old or less. More than half of the even-aged stands are 60 years old or less. Table 3.4.1 summarizes by age group the even-aged forests managed by DNR.

**Table 3.4.1: DNR-managed lands by age class for even-aged stands**

(Source - DNR GIS Land Use Land Coverage data)

Stand Age (years)	Acres	Percent
1-50	760,000	53.5
51-100	518,000	36.4
101-150	50,000	3.5
151+	93,000	6.6
Total Acres	1,421,000	100

On the east side of the Cascade crest, DNR-managed forest lands are categorized by size, using the diameter in inches of the majority of the trees found per acre. Currently available information for uneven-aged stands describes the volume or number of trees in each of four size classes. Although most uneven-aged stands have trees in more than one size class, Table 3.4.2 summarizes stands by the dominant size class for each stand.

**Table 3.4.2: DNR-managed lands by dominant size class for uneven-aged stands**

(Source - DNR GIS Land Use Cover data)

Size class (diameter in inches)	Acres	Percent
0-6	22,000	14.2
6-9	11,000	7.1
10-18	71,000	45.8
20+	51,000	32.9
Total Acres	155,000	100

Appendix B provides additional information about the natural features found on DNR-managed lands within the planning area. Soils, vegetative zones, associated plant species and seral stages are described. Chapter 4 of this draft EIS contains detailed information about the existing conditions (also referred to as "affected environment") of the key resources for which impacts of this proposed action are assessed.