INTRA-SERVICE CONCURRENCE MEMORANDUM
and
BIOLOGICAL OPINION

For the

WASHINGTON DEPARTMENT OF NATURAL RESOURCES' HABITAT CONSERVATION PLAN

January 27, 1997

United States Department of the Interior

FISH AND WILDLIFE SERVICE

BIOLOGICAL OPINION

for

Washington Department of Natural Resources
Habitat Conservation Plan

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United States Department of the Interior

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Memorandum January 27, 1997

To: Chief, Division of Consultation and Conservation Planning, Ecological Services, Portland, Oregon

From: Supervisor, North Pacific Coast Ecoregion, Western Washington Office, Olympia, Washington

Subject: Intra-FWS Concurrence Memorandum and Biological Opinion on the Proposed Issuance of an Incidental Take Permit (PRT- 812521) for Northern Spotted Owls, Marbled Murrelets, Gray Wolves, Grizzly Bears, Bald Eagles, Peregrine Falcons, Aleutian Canada Geese, Columbian White-tailed Deer, and Oregon Silverspot Butterflies, and the Approval of the Implementation Agreement for the Washington State Department of Natural Resources Habitat Conservation Plan (FWS Reference: 1-3-96-FW-594; X-Reference: 1-3-9-HCP-013)

This correspondence constitutes the U.S. Fish and Wildlife Service's (FWS) response to the internal FWS November 19, 1996, request for consultation pursuant to section 7 of the Endangered Species Act, as amended (16 U.S.C. 1531 et seq.)(Act). This document addresses the FWS's biological opinion of the impacts of the proposed Federal action on the species listed below. The Federal action is the proposed issuance of a section 10(a)(1)(B) incidental take permit to the Washington State Department of Natural Resources (DNR), for an agreement that contains provisions concerning both listed and unlisted species based upon their Habitat Conservation Plan (HCP).

This document addresses Federally listed species and designated critical habitats which occur in the action area and which might be impacted by the HCP. The concurrence section of this memorandum addresses designated spotted owl critical habitat and *Howellia aquatilis* (water howellia), which are not likely to be adversely affected by the HCP. The biological opinion addresses designated marbled murrelet critical habitat and Federally listed species which may be adversely affected by the HCP including northern spotted owls (*Strix occidentalis caurina*) (spotted owls), marbled murrelets (*Brachyramphus marmoratus marmoratus*), gray wolves (*Canis lupus*), grizzly bears (*Ursus arctos - U.a. horribilis*), bald eagles (*Haliaeetus leucocephalus*), peregrine falcons (*Falco peregrinus*), Aleutian Canada geese (*Branta canadensis leucopareia*), Columbian white-tailed deer (*Odocoileus virginianus leucurus*), and Oregon silverspot butterflies (*Speyeria zerene hippolyta*).

The National Marine Fisheries Service (NMFS) will complete a separate analysis of potential effects of the HCP on anadromous fish as required by the Act (NMFS in prep.). Potential effects of the HCP on additional critical habitats designated, or species proposed for listing in the future, should be analyzed at the time of designation, proposal, or listing.

CONSULTATION HISTORY

In October 1993, DNR formed a Science Team to prepare conservation recommendations on managing forest lands under an HCP for listed and unlisted species while maintaining DNR's Trust responsibility. The Science Team's recommendations served as a foundation for the HCP conservation strategies developed by DNR. A similar team was assembled for the Olympic Experimental State Forest (OESF). The FWS and NMFS provided technical assistance during the HCP and OESF development process.

Two public meetings were held regarding the OESF in December of 1993. During the development of the HCP and drafting of documents, it was decided to combine the HCP and OESF projects into a single project and single set of documents. To avoid duplication of effort, the FWS, NMFS, and DNR decided to prepare an Environmental Impact Statement (EIS) as co-lead agencies to fulfill both the State Environmental Policy Act (SEPA) and National Environmental Policy Act (NEPA) requirements. A notice of intent to prepare an EIS and announcement of Public Scoping meetings was published in the May 2, 1994, Federal Register (59 FR 22682) (USDI 1994a). Ten public meetings were held around the State in May and June regarding the HCP. Additional workshops and public scoping meetings were held regarding the OESF from February through April 1996.

Notice of receipt of a completed application package and notice of availability of the draft EIS were published in the April 5, 1996, Federal Register (61 FR 15297) (USDI 1996a). The draft HCP and draft Implementation Agreement (IA) released for public comment had not undergone FWS review. The application was assigned incidental take permit number PRT-812521. The comment period ended on May 20, 1996. During that time, 132 written comments were received and 41 comments were presented during five public hearings. Additional comments were received from several Native American Tribes following the close of the comment period.

Notice of Availability of a final EIS (FEIS) was published in the November 1, 1996, Federal Register (61 FR 56563) (USDI 1996b) with the 30-day waiting period ending on December 2, 1996. A November 19, 1996, FWS memorandum initiated consultation.

DISCUSSION

The following section is a discussion of potential effects of implementation of the HCP on listed species and critical habitat that are not likely to be adversely affected. Potential effects to spotted owl critical habitat and *Howellia aquatilis* are assessed.

Spotted Owl Critical Habitat

Critical habitat for spotted owls is unlikely to be adversely affected by the HCP. No DNR-managed lands have been designated as spotted owl critical habitat; therefore, none would be removed under HCP implementation. Removal of forest or suitable spotted owl habitats on DNR-managed lands adjacent to spotted owl critical habitat could potentially indirectly affect critical habitat. Potential effects include creation of edge effects in adjacent critical habitat and degradation of interior forest habitat. Edge impacts would not likely extend beyond 600 feet within critical habitat units. The scope or extent of these impacts is insignificant or discountable; less than 0.5 percent of critical habitat units or suitable habitat within critical habitat units could potentially be impacted if all suitable habitats on DNR-managed lands adjacent to critical habitat were removed. In addition, spotted owl nesting, roosting, and foraging habitat (NRF) Management Areas have been designated in proximity to Federal reserves (where most critical habitat units have been established) and these NRF Management Areas would be managed to support the objectives of maintaining spotted owls in those areas.

Howellia aquatilis

Water howellia is not known to occur on DNR-managed lands. The species requires specific hydrologic conditions. The plant flowers while submerged or at the water's surface. The dissemination of seed and germination of new plants occurs on the mud at the margin of wetlands where the water has receded or has evaporated during the summer. Suitable conditions for water howellia are found in small low-elevation, ephemeral wetlands. Wetlands supporting water howellia are designated as Type A and Type B nonforested wetlands by the Washington State Forest Practices Board (WAC 222, Forest Practices Act, RCW 76.09). Water howellia typically is found in wetlands surrounded by commercial timber species; however, the protection given these wetlands by the HCP would reduce overall effects because it offers better overall wetlands protection than the current Washington State Forest Practices Rules.

EFFECT DETERMINATIONS

In the November 19, 1996, memorandum initiating consultation, the FWS determined that the HCP is not likely to adversely affect spotted owl designated critical habitat, Oregon silverspot butterflies, Aleutian Canada geese, Columbian white-tailed deer, and *Howellia aquatilis*. The FWS determined that the HCP may adversely affect northern spotted owls, marbled murrelets, marbled murrelet designated critical habitat, gray wolves, grizzly bears, bald eagles, and peregrine falcons.

The DNR has requested an incidental take permit for all listed species that may be affected in the action area, including Aleutian Canada geese, Columbian white-tailed deer, and the Oregon silverspot butterflies. While the November 19, 1996, memorandum concluded that the HCP was not likely to adversely affect these three species, the FWS has determined that the issuance of an incidental take permit is likely to adversely affect these species. Thus, the FWS has analyzed the effects of the action on these species along with other listed species found in the action area.

CONCURRENCE

The FWS concurs that proposed DNR actions described in the HCP and IA are not likely to adversely affect spotted owl critical habitat and *Howellia aquatilis*. This concludes consultation for these species. Adverse effects of the HCP on northern spotted owls, marbled murrelets, marbled murrelet critical habitat, gray wolves, grizzly bears, bald eagles, peregrine falcons, Oregon silverspot butterflies, Aleutian Canada geese, and Columbian white-tailed deer are addressed in the following biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE HCP

Until such time that a final HCP is printed, the HCP referred to in this document is considered to be the March 1996 draft HCP submitted by DNR, Appendix 3 of the FEIS, the IA, and the permit application.

Action Area

For the purpose of this consultation, the action area has been defined as the range of the northern spotted owl within the State of Washington.

Covered Activities

The incidental take permit would authorize incidental take for management activities on 1.6 million acres of DNR-managed lands within the range of the northern spotted owl in the State of Washington including commercial forest management and nontimber resource activities. Commercial forest management includes administration and monitoring, road access, road building and maintenance, site preparation, planting, thinning, fertilizing, brush control, timber harvest, slash control, fire control, administrative and commercial use of roads, and gravel pits and rock quarries necessary for forest management. Forest management also includes research activities conducted in the OESF Planning Unit and other planning units to achieve the conservation objectives of the HCP and to meet other management goals. Aerial pesticide spraying may also be a covered forest management activity after review and approval of a site-specific plan by the FWS.

The incidental take permit would also authorize incidental take in connection with DNR management of nontimber resource activities which include granting rights-of-way on DNR-managed lands, harvesting of special forest products such as western greens and Christmas trees, extracting sand and gravel, prospecting and mining, exploration for oil and gas, grazing, establishing electronic sites, and maintaining recreational sites, including off-road vehicle (ORV) sites. DNR states in the HCP that, at the 1996 level of these activities, no take or insignificant take of the listed species is occurring.

DNR has committed to conducting these activities to ensure compatibility with the commitments of the HCP, and to ensure that any expansion in the level of these activities would not result in take beyond the 1996 level. Should the level of incidental take be expected to increase above the 1996 level, the FWS would require an amendment to the incidental take permit and consultation would be reinitiated.

Summary of HCP Actions

The HCP focuses on timber management as the primary landscape-influencing factor and the factor with the most influence on listed and unlisted fish and wildlife species. This HCP is a habitat-based, landscape level conservation plan that is applied to three planning units east of the Cascade crest and six planning units west of the Cascade crest, including an OESF Planning Unit (Figure 1 - All figures are located at the end of this document). Habitat would be protected and conserved through a spotted owl conservation strategy, a marbled murrelet conservation strategy, riparian and wetland conservation strategies, provisions to protect uncommon habitats, and species-specific conservation measures, which would be applicable to the five west-side and OESF Planning Units. Only the spotted owl conservation strategy and species-specific strategies for listed species would apply to the three East-side Planning Units. The spotted owl strategy would include a commitment to provide specified percentages of spotted owl habitats. The spotted owl conservation strategy for the OESF Planning Unit is different from the other planning units because of its geographic location, the quantity and quality of habitat remaining, and the emphasis on research on the Olympic Peninsula. The spotted owl, marbled murrelet, riparian, and wetland conservation strategies would provide the majority of the range of forest habitat types across the landscape. The spotted owl and marbled murrelet strategies ensure that older forests would be present throughout the landscape. The riparian and wetlands strategies would protect these ecosystems by leaving buffers that allow adjacent trees and vegetation to continue to develop into older forests throughout the term of the HCP. The provisions to protect uncommon habitats with forested buffers and to retain snags, large wildlife trees, and live trees for future snags ensure these structures would persist across the landscape over the term of the HCP. In addition, DNR's commitment to obtaining stand structural objectives would ensure that a diversity of forest stands are present on the landscape. The HCP does not contain silvicultural prescriptions outside of the snag and leave tree strategy, although allowable activities in the riparian management zones, wetlands buffers, and buffers around uncommon habitats have been described for specific distance intervals and would vary on a site-specific basis. Individual management units are not scheduled for harvest at any particular time in the HCP, and management and location of individual roads are not specified; however, all of DNR's activities would be consistent with the goals and objectives of the HCP. Under the HCP, DNR would be required to comply with all other State and Federal laws and regulations except where State law explicitly states that implementation of an HCP exempts DNR's forest-management activities (WAC 222-16-080).

DNR has developed mitigation measures that would avoid, minimize, and mitigate impacts to species addressed in the HCP. These measures are described in the HCP and include management actions, monitoring and assessment of impacts, and adaptive management based on monitoring results and new information. The HCP includes commitments to provide: (1) certain percentages and types of spotted owl habitats in designated areas, (2) certain percentages of stand structural

classes from open forest to fully functional complex forests, (3) riparian and wetland habitat that maintains or restores the riparian, aquatic, and wetlands ecosystems on the west-side, (4) a marbled murrelet protection strategy, (5) protection for uncommon habitats on the west-side, and (6) species-specific protection measures for listed species throughout the HCP area and for Federal species of concern on the west side. Timber harvest, road maintenance and construction, other commercial forest management related activities, and nontimber resource activities must be consistent with the goals and objectives of the HCP to develop and maintain these habitat types. Measures contained in the HCP to monitor, minimize, and mitigate for impacts to listed species, as well as unlisted species, are as follows:

Spotted Owl - the HCP would provide the conservation benefits described below:

1. Overall Spotted Owl Landscape Commitments

A. Under the HCP, DNR will meet forest stand structure objectives on the West-side Planning Units and the OESF. These objectives presented at year 100 are currently provided in Appendix 3 of the FEIS, p. A3-81. However, during the first year following approval of the HCP, DNR will provide projections at each decade (decadal projections) to the FWS.

B. A total of 402,000 acres of DNR-managed lands deemed most important to spotted owl conservation objectives would be managed to provide demographic support, maintain species distribution, and provide dispersal habitats in six of the planning units (three west-side and three East-side Planning Units). No lands were designated for a spotted owl role in the Straits and South Coast West-side Planning Units.

(1) Of the 402,000 acres above, a total of 202,000 acres (163,000 acres in three West-side Planning Units and 39,000 acres in the three East-side Planning Units) would be managed for a nesting, roosting, and foraging (NRF) habitat role to meet NRF habitat goals determined on a landscape scale for DNR-managed lands. These are NRF Management Areas.

(2) Of the 402,000 acres above, a total of 200,000 acres (116,000 acres in three West-side Planning Units and 84,000 acres in three East-side Planning Units) would be managed for a dispersal habitat role to meet dispersal habitat goals determined on a landscape scale for DNR-managed lands. These are Dispersal Management Areas.

C. In the OESF Planning Unit, 11 landscape planning units were established to be managed to maintain or restore threshold proportions of potential habitats, i.e., 40 percent suitable habitat.

(1) At least 20 percent of DNR-managed lands within each landscape planning unit would be in understory-reinitiation to old-growth stages that are potential old-forest habitats.

(2) At least 40 percent of DNR-managed lands within each landscape planning unit would be in the stem-exclusion to old-growth forest stages that are potential old-forest, sub-mature, or young-forest marginal spotted owl habitat types, including the 20 percent old-forest habitat.

2. West-side Planning Units Spotted Owl Conservation Strategy

A. Owl nesting habitat provided by the HCP is defined below and is to be maintained as an average condition over a 300-acre nesting habitat patch:

(1) At least 31 trees per acre (tpa) greater than or equal to 21 inches diameter at breast height (dbh) with at least 15 tpa greater than or equal to 31 inches dbh;

(2) At least three trees in the above group of 31 trees with broken tops;

(3) At least 12 snags per acre greater than 21 inches dbh;

(4) A minimum of 70 percent canopy closure; and,

(5) A minimum of 5 percent ground cover of large woody debris.

B. Sub-mature habitat for the owl to be provided by the HCP is defined below and is to be maintained as average stand conditions:

(1) Forest community dominated by conifers, or mixed conifer/hardwood forest; the community composed of at least 30 percent conifers;

(2) Tree density of between 115 and 280 tpa greater than 4 inches dbh;

(3) Dominant and co-dominant trees at least 85 feet tall;

(4) A minimum of 70 percent canopy closure;

(5) At least three snags or cavity trees per acre greater than or equal to 20 inches dbh; and,

(6) A minimum of 5 percent ground cover of large woody debris.

C. Owl dispersal habitat provided by the HCP is defined below:

(1) Quadratic mean diameter of 11 inch dbh for 100 largest trees in a stand;

(2) Top height of at least 85 feet which is the average height of the 40 largest diameter trees per acre;

(3) A minimum of 70 percent canopy closure; and,

(4) Retention of at least four tpa from the largest size class for future snag and cavity tree recruitment.

D. A total of approximately 68 nest patches encompassing a total of 20,400 acres would be provided under the HCP as follows: in DNR NRF Management Areas, two 300-acre nest patches of high quality spotted owl NRF habitat would be provided for every 5,000 acres in each Watershed Administrative Unit (WAU); an additional 200 acres of sub-mature or better habitat must be contiguous with the nest patch; all 500 acres must be within 0.7-mile radius.

E. Fifty percent of NRF Management Areas, totaling approximately 80,000 acres, would be managed under the HCP for sub-mature habitat or better on a Watershed Administrative Unit basis, most of which would be distributed north to south throughout the central portion of the North Puget Planning Unit. The remainder of the habitat would be in one small block at the southern end and one section at the eastern edge of the South Puget Planning Unit, and two large blocks and two individual sections in the Columbia Planning Unit.

F. Fifty percent of Dispersal Management Areas, totaling approximately 58,000 acres, would be maintained on a Watershed Administrative Unit basis as owl dispersal habitat under the HCP. This habitat would be in four large blocks in the North Puget, South Puget, and Columbia Planning Units.

G. Under the HCP, within 0.7 mile of known spotted owl nest sites in NRF Management Areas, DNR will apply seasonal restrictions to all forest management activities with the potential to disturb spotted owls. Outside of NRF Management Areas, DNR will apply such restrictions within a 70-acre core surrounding known spotted owl nest sites.

3. East-side Planning Units Spotted Owl Conservation Strategy

A. Under the HCP, old-growth and Type A habitat represents the high quality nesting habitat. Type A habitat provided by the HCP is defined below:

(1) Multi-layered, multi-species canopy dominated by overstory trees that exceed 20 inches dbh (typically 35 to 100 tpa);

(2) At least 75 percent canopy closure;

(3) Some dominant trees with mistletoe brooms, cavities, or broken tops; and,

(4) Down woody debris greater than or equal to 20 inches dbh plus accumulations of other woody debris.

B. Under the HCP, sub-mature forest represents the minimum standard for nesting habitat. Sub-mature forest provided by the HCP is defined below:

(1) Forest community composed of at least 40 percent Douglas-fir or grand fir;

(2) Canopy closure of at least 70 percent;

(3) Tree density of between 110 and 260 tpa;

(4) Either tree height or vertical diversity present as follows: dominant and co-dominant trees at least 90 feet tall or two or more canopy layers with numerous intermediate trees and low perches;

(5) Snags, cavity trees, or mistletoe infection present as follows: three or more snags or cavity trees per acre greater than or equal to 20 inches dbh, or a moderate to high infection of mistletoe; and,

(6) An average of 5 percent ground cover of dead and down wood in a stand.

C. Under the HCP, owl dispersal habitat is defined below:

(1) Overstory tree density of at least 40 tpa that are at least 11 inches dbh;

(2) Top height of at least 60 feet;

(3) A minimum of 50 percent canopy closure; and,

(4) Retention of four tpa from the largest size class for future snag and cavity tree recruitment.

D. Fifty percent of DNR-managed lands in designated NRF Management Areas, totaling approximately 20,000 acres, would be managed under the HCP for sub-mature habitat or better on a Watershed Administrative Unit basis, all of which is considered nesting habitat. Most of this habitat would be in the Klickitat Planning Unit and the remainder would be located primarily in scattered sections in the Yakima and Chelan Planning Units.

E. Fifty percent of DNR-managed lands in designated Dispersal Management Areas, totaling approximately 43,000 acres, would be maintained under the HCP as dispersal habitat on a quarter township basis. This habitat would be located in two large blocks in the Klickitat Planning Unit and one small block and a few scattered sections in the Yakima Planning Unit.

F. Under the HCP, within 0.7 mile of known spotted owl nest sites in NRF Management Areas, DNR will apply seasonal restrictions to all forest management activities with the potential to disturb spotted owls. Outside of NRF Management Areas, DNR will apply such restrictions within a 70-acre core surrounding known spotted owl nest sites.

4. OESF Planning Unit Spotted Owl Conservation Strategy

A. Management of the OESF includes a research component to develop, implement, test, and refine management techniques at the forest stand level that integrate older forest ecosystem values, including spotted owl NRF and dispersal habitat, with commercial objectives, and at the landscape level that support a wide range of forest ecosystem values in commercial forest, including occupancy by reproducing spotted owls.

B. Spotted owl habitats in the OESF under the HCP include old-forest, sub-mature, and young forest marginal stand conditions defined below:

(1) Old-forest is comprised of stands 100 years old or older or are mature and old-growth stands;

(2) Sub-mature in the OESF is the same as sub-mature in other West-side Planning Unit Units described above;

(3) Young forest marginal has tree densities from between 115 and 280 tpa greater than or equal to 4 inches dbh, dominant and co-dominant trees greater than or equal to 85 feet tall, canopy closure greater than or equal to 70 percent, more than two snags/cavity trees per acre greater than or equal to 20 inches dbh, and more than 10 percent ground cover; and,

(4) Spotted owl habitat would be provided by maintenance of old-forest habitat at or above 20 percent of DNR-managed land in each of 11 OESF Landscape Planning Units.

C. Under the HCP, at least 40 percent of DNR-managed lands in each OESF Landscape Planning Unit would be young forest marginal or better, including the 20 percent old-forest habitat.

Marbled Murrelet - the HCP would provide the conservation benefits described below:

The marbled murrelet conservation strategy can be thought of as consisting of three phases: (1) the habitat relationship study phase, (2) inventory study phase, and (3) the adaptive management phase. On DNR-managed lands within the range of the marbled murrelet, these would occur consecutively in a planning unit.

1. Phase 1

   A. Under the HCP, DNR would conduct a 2-year marbled murrelet habitat relationship study within 50 miles of the coast on each west-side planning unit. These studies will identify murrelet habitat as either marginal habitat or higher quality habitat types.

   B. Under the HCP, DNR would identify and defer from harvest any suitable marbled murrelet habitat while conducting the 2-year habitat relationship study.

2. Phase 2

   A. All high quality marbled murrelet habitat as identified by the 2-year habitat relationship study in each planning unit, expected to contain 95 percent of occupied sites, would be surveyed to protocol to locate and protect occupied sites. No known occupied sites would be harvested.

   B. Marginal marbled murrelet habitat types as identified by the 2-year habitat relationship study that would be expected to contain a maximum of 5 percent of the potentially occupied sites on DNR-managed lands within each west-side planning unit and the OESF Planning Unit would be harvested. No known occupied sites would be harvested.

   C. Outside of southwest Washington, surveyed, unoccupied marbled murrelet habitat would not be harvested if it is within 0.5 mile of a known occupied site or if, after harvest, less than 50 percent of the suitable marbled murrelet habitat on DNR-managed lands in that Watershed Administrative Unit would be left.

   D. Within southwest Washington, surveyed, suitable but unoccupied marbled murrelet habitat would not be harvested until the adaptive management phase for the planning unit is complete, or at least 12 months have passed since the start of negotiations on the adaptive management phase. This would be about 4 years or later from the signing of the permit.

3. Phase 3

   A. The third phase is an adaptive management phase which has not been developed and is not evaluated in this biological opinion. This third phase of the marbled murrelet strategy is referred to in the HCP as the long-term plan. Information gathered during the habitat relationship study and the inventory survey phases of the HCP will be used to develop this long-term plan.

Grizzly Bear - the HCP would provide the conservation benefits described below:

1. Timber harvest and related activities conducted under the HCP would be restricted within 1 mile of a known active den site between October 1 and May 30 or within 0.25 miles of a den at other times of the year.

2. Within the North Cascades Grizzly Bear Recovery Zone, within 10 miles of a Class 1 grizzly bear observation, site-specific plans for DNR-managed lands to limit human disturbance would be established under the HCP in coordination with the FWS. Limits on disturbance would remain in effect until 5 years after the last Class 1 grizzly bear observation.

3. Under the HCP, additional habitat such as security cover and travel corridors for grizzly bears would be provided by the riparian and marbled murrelet conservation strategies in the West-side Planning Units, and NRF and dispersal habitat in all planning units.

Gray Wolf - the HCP would provide the conservation benefits described below:

1. Timber harvest and related activities conducted under the HCP would be restricted within 1 mile of a known active den or rendezvous site between March 15 and July 30 or within 0.25 miles of a den or rendezvous site at other times of the year.

2. Within 8 miles of a Class 1 gray wolf observation, site-specific plans for DNR-managed lands to limit human disturbance to den and rendezvous sites would be established under the HCP in coordination with the FWS. Limits on disturbance would remain in effect until 5 years after the last Class 1 gray wolf observation.

3. Under the HCP, DNR would implement road closures cooperatively with other agencies to restrict vehicular activity and reduce human disturbance to gray wolves and their prey.

4. Under the HCP, to the extent practicable, DNR would restrict disturbance to gray wolves by scheduling forest management activities at times of the year when gray wolves are least likely to be present on ungulate fawning/calving grounds and wintering areas.

5. Under the HCP, additional habitat such as security cover and travel corridors for gray wolves would be provided by the riparian and marbled murrelet conservation strategies in the West-side Planning Units, and NRF and dispersal habitat in all planning units.

Bald Eagle - the HCP would provide the conservation benefits described below:

1. Site management plans would be developed for known nest sites and winter roosts in all planning units in accordance with State wildlife regulations.

2. When developing site management plans, DNR would, where appropriate, protect perch trees and foraging areas associated with nesting sites, winter roost trees and winter feeding concentration areas, in addition to protecting nest trees in the immediate vicinity.

3. West of the Cascade crest, DNR's HCP leave tree strategy would provide for the retention of large trees with certain structural characteristics important to wildlife, and would leave one tree from the largest diameter class of living tree to function as potential nest trees.

4. West of the Cascade crest, DNR's riparian strategy would enhance salmonid populations and protect large trees in proximity to rivers and streams which would provide eagle foraging opportunities and potential nest trees, respectively.

Peregrine Falcon - the HCP would provide the conservation benefits described below:

1. Under the HCP, DNR would protect peregrine falcon nest sites by restricting forest management activities within 0.5 mile of a known active nest site between March 1 and July 30 or within 0.25 mile of a nest at other times of the year.

2. Under the HCP, DNR would protect peregrine falcon aeries by reviewing and, where necessary, manage public access to DNR-managed lands to restrict human disturbance within 0.5 mile of a known peregrine falcon aerie. DNR would also maintain the confidentiality of peregrine falcon aerie locations.

3. Under the HCP, DNR would conduct field reviews of all cliffs in excess of 150 feet and conduct surveys for peregrine falcon aeries at cliffs judged to have a likely potential for use. If peregrine falcons are found, protection would be implemented as described above.

4. DNR would protect ledges on cliffs judged suitable for aeries and retain trees along the base and top of suitable aerie cliffs, especially perch trees, to protect potential peregrine falcon aeries.

5. West of the Cascade crest, DNR would implement site specific protection of cliffs to protect potential peregrine falcon aeries.

Oregon Silverspot Butterfly - the HCP would provide the conservation benefits described below:

Under the HCP, DNR would protect silverspot butterfly habitat and prevent disturbance by restricting forest management activities within 0.25 mile of an occurrence of an individual butterfly.

Aleutian Canada Goose - the HCP would provide the conservation benefits described below:

Under the HCP, DNR would protect Aleutian Canada goose foraging and resting habitat by implementing the riparian and wetlands conservation strategies, which protects streams and wetlands.

Columbian White-tailed Deer - the HCP would provide the conservation benefits described below:

Under the HCP, DNR would protect riparian and tidal forests that are potential deer habitat by implementing the riparian conservation strategy.

Federally Listed Plant Species - the HCP would provide the conservation benefits described below:

No Federally listed plants are known to occur on DNR-managed lands. Under the HCP, no specific protection would be provided for these plants. However, should they occur on DNR-managed lands in the HCP area, they likely would benefit from the riparian and wetlands protection.

Other Species - the HCP would provide the conservation benefits described below:

Under the HCP, conservation benefits for other species in the west-side and OESF Planning Units would be provided as a result of implementation of the habitat protection measures in the owl, murrelet, riparian, wetland, snag and leave tree, and uncommon habitats conservation strategies. These strategies and DNR's commitment to obtaining stand structure objectives, ensure a landscape that provides the full range of upland forest stand structures as habitat. In addition, the HCP would provide the following species-specific protection measures:

1. Harlequin Duck - Known active harlequin duck nest sites would be protected by prohibiting activities within 165 feet of a nest between May 1 and September 1, where such activities would appreciably reduce the likelihood of nesting success.

2. Goshawk - Known active northern goshawk nest sites would be protected by prohibiting activities within 0.5 mile of a nest located in a NRF Management Area between April 1 and August 31 where such activities would appreciably reduce the likelihood of nesting success.

3. Pileated Woodpecker - Known and historic nest sites (trees or snags) would be protected from harvest to retain these structures for future use as nests.

4. Common Loon - Known active common loon nest sites would be protected by prohibiting activities within 500 feet of a nest between April 1 and September 1 where such activities would appreciably reduce the likelihood of nesting success.

5. Vaux's Swift - Live trees and snags known to be used by Vaux's swifts as night roosts would be protected from harvest by retaining these structures for current and future use.

6. Myotis Bats - Live trees and snags known to be used by myotis bat species as communal roosts or maternity colonies would be protected from harvest by retaining these structures for current and future use.

7. California Wolverine - Known active wolverine den sites would be protected by prohibiting activities within 0.5 mile of a den located in a spotted owl NRF Management Area between January 1 and July 31 where such activities would appreciably reduce the likelihood of denning success.

8. Pacific Fisher - Known active fisher den sites would be protected by prohibiting activities within 0.5 mile of a den located in a spotted owl NRF Management Area between February 1 and July 31 where such activities would appreciably reduce the likelihood of denning success.

Riparian Management

Under the HCP, riparian management zones would be established on Type 1 through Type 4 Waters, defined in Washington Forest Practices Rules (WAC 222-16-030) (WDNR 1995a). Type 1 Waters are typically large rivers and are defined by DNR as "shorelines of the state." Type 4 Waters are upstream of Type 2 and Type 3 Waters, are greater than or equal to 2 feet in width between the ordinary high-water marks, and may be perennial or intermittent streams. Riparian management zones consist of riparian buffers (interior-core buffers in the OESF Planning Unit) and, where applicable, wind buffers (exterior-core buffers in the OESF Planning Unit). These zones protect habitat and provide the structures and vegetation necessary to maintain a healthy riparian ecosystem and to provide an adequate amount of habitat for species that require riparian and aquatic habitat. Such habitat includes large woody debris for in-stream fish habitat, trees and vegetation for shading and moisture retention to maintain amphibian and fish habitat, a broad zone of trees and vegetation to filter sediments for maintenance of aquatic habitat, large trees for use as roosts and nests by bats and birds, and travel corridors and foraging opportunities for most species that inhabit the HCP area.

1. West-side Planning Units Riparian Strategy

   A. Riparian management zones would be established that consist of riparian buffers of one site potential tree or 100 feet, whichever is greater, measured on the horizontal, which would be applied to both sides of Types 1, 2 and 3 Waters. These buffers are expected to average 150 to160 feet.

B. Forest-management activities in riparian management zones (100-year floodplain as the inner margin) would be limited as follows: (1) 25-foot (horizontal distance) no-harvest area (ecosystem restoration activities are allowed); (2) next 75 feet would be a minimal-harvest area for ecosystem restoration and/or selective single tree removal; (3) remaining portion of riparian buffer would be a low-harvest area for selective removal of single trees or groups of trees and thinning and salvage operations.

C. Riparian buffers of 100 feet measured on the horizontal, would be applied to both sides of Type 4 Waters.

D. All Type 4 and Type 5 Waters classified prior to January 1, 1992, would be verified in the field or assumed to be Type 3 Waters and would be buffered accordingly.

E. Type 5 Waters would be protected by buffering for steep and unstable slopes, where applicable. These buffers are expected to be applied to approximately 50 percent of Type 5 Waters.

F. In addition to the riparian buffers described above, Type 1 and Type 2 Waters would receive a 100-foot wind buffer along the windward side, and Type 3 Waters wider than 5 feet would receive a 50-foot buffer along the windward side, where there is at least a moderate potential for windthrow.

G. Harvest activity within the wind buffer would be on a site-specific basis that may include activities such as single tree or group selection and thinning and salvage operations.

2. OESF Planning Unit Riparian Strategy

A. All Type 1 through Type 4 Waters would be protected with interior-core buffers on each side; Type 5 Waters would receive site-specific protection necessary to protect identifiable channels and unstable ground.

B. Interior-core buffers on Type 1 and Type 2 Waters would average 150 feet on each side; interior-core buffers on Type 3 and Type 4 Waters would average 100 feet on each side.

C. Type 1 through Type 4 Waters, and Type 5 Waters when an interior core is established, would receive exterior-core wind buffers to protect the integrity of the interior-core buffers from damaging winds. Wind buffers would be applied to all riparian segments for which stand wind-firmness cannot be documented.

D. Exterior-core buffers on Type 1 through Type 3 Waters would average 150 feet where applied; exterior-core buffers on Type 4 and Type 5 Waters would average 50 feet where applied.

E. Thirty-three percent or less by volume of the riparian trees in the designated exterior buffer may be removed for commercial purposes during each harvest rotation on 75 to 85 percent of the riparian buffers. Site specific experimentation may occur on the remaining 15 to 25 percent.

3. East-side Planning Units

No riparian management strategy is proposed in the HCP for the East-side Planning Units. Riparian Management Zones would be established as required by existing Washington Forest Practices Rules (WAC 222-30-020) (WDNR 1995a), which would provide minimal protection of riparian and aquatic habitat; limited nesting, roosting and foraging opportunities; and, minimal security cover for species that utilize riparian and aquatic habitat. Maximum Riparian Management Zone widths would be as follows:

A. Type 1 and 2 Waters 75 feet and wider would receive a maximum 100-foot Riparian Mangement Zone with 25 to 50 trees per 1000 feet on each side, depending on stream substrate.

B. Type 1 and 2 Waters less than 75 feet wide would receive a maximum 75-foot Riparian Management Zone with 50 to 100 trees per 1,000 feet on each side, depending on stream substrate.

C. Type 3 Waters 5 feet and wider would receive a maximum 50-foot Riparian Management Zone with 25 to 75 trees per 1,000 feet on each side, depending on stream substrate.

D. Type 3 Waters less than 5 feet wide would receive a maximum 25-foot Riparian Management Zone with 25 trees per 1,000 feet on each side, regardless of stream substrate.

E. Type 4 and 5 Waters would generally receive no protection.

Wetlands Protection

Under the HCP, wetlands would receive buffers to protect wetland habitat and adjacent vegetation necessary to maintain healthy wetland complexes. Wetlands would be designated according to Washington Forest Practices Rules (WAC 222-16-035) (WDNR 1995a). Wetland habitat includes but is not limited to forested and nonforested wetlands such as lakes, ponds, bogs, fens, and seeps. Wetlands are defined as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Forested wetlands means any wetland or portion thereof that has, or if the trees were mature would have, a crown closure of 30 percent or more. Nonforested wetlands means any wetland or portion thereof that has, or if the trees were

mature would have, a crown closure of less than 30 percent. The edge between forested and non-forested wetland is delineated as the point where the crown cover changes from less than 30 percent to 30 percent or more. The protection described below would continuously maintain a plant canopy that provides a sufficient transpiration surface and established rooting, maintain natural water flow, and ensure plant and tree regeneration. This protection would ensure the continued viability of open water habitat and adjacent plant vegetation that provides habitat for all life stages of amphibians; nesting habitat for waterfowl and forest land birds; foraging habitat for waterfowl, forest land birds, bats, and mammalian herbivores; and, nesting, foraging, and perching habitat for raptors.

1. West-side Planning Units Wetlands Protection Strategy

   A. DNR would maintain a general policy of no overall net loss of wetland function.

   B. Wetlands between 0.25 to 1 acre would have a 100-foot wide buffer measured on the horizontal.

   C. Wetlands larger than 1 acre would have a buffer width approximately equal to the site potential height of trees in a mature conifer stand or 100 feet, whichever is greater, measured on the horizontal.

   D. Timber harvest within the forested portions of forested wetlands and wetland buffer areas would be designed to maintain and perpetuate a stand that is wind-firm, has large root systems, and has a minimum basal area of 120 square feet per acre.

   E. Forest management in forested wetlands and in buffers of non-forested wetlands would minimize entries into these areas and utilize practices that minimize disturbance, such as directional felling.

2. OESF Planning Unit Wetlands Protection Strategy

   A. DNR would maintain a general policy of no overall net loss of naturally occurring wetland acreage and function.

   B. Wetlands larger than 0.25 acre, and bogs larger than 0.1 acre, would have a 100-foot wide buffer measured on the horizontal.

   C. Wetlands larger than 1 acre would have a buffer width approximately equal to the site potential height of trees in a mature conifer stand or 100 feet, whichever is greater, measured on the horizontal.

   D. Harvest within forested wetlands and their buffers would be conducted to retain at least 120 square feet of basal area per acre and maintain wind-firmness.

E. Harvest within forested buffers of non-forested wetlands would include a 50-foot no-harvest area measured on the horizontal from the wetland edge, maintain wind-firmness, and leave trees that would be representative of the dominant and co-dominant species in the intact forest edge of the wetland.

Uncommon Habitats - the HCP would provide specific protection to certain habitat types as described below in all west-side and the OESF Planning Units. These protection measures would not be applied to any East-side Planning Units.

1. Talus

Under the HCP, DNR would protect talus slopes as described below so that they remain intact, maintaining the moisture and temperature gradients that provide viable habitat for all life-stages of the Larch Mountain salamander and Van Dyke's salamander and potential den sites for large and small mammals.

A. No timber harvest would occur in non-forested (less than or equal to 30 percent canopy cover) talus fields greater than or equal to 1 acre in all west-side and the OESF Planning Units.

B. In the Columbia Planning Unit, no timber harvest would occur in non-forested talus fields greater than or equal to 0.25 acre in designated NRF and Dispersal Management Areas.

C. Open talus fields would have a buffer of 100 feet from the talus field edge to maintain moisture and temperature gradients important to amphibians. The talus edge would begin where canopy closure first exceeds 30 percent.

D. Timber harvest in the buffer would retain at least 60 percent canopy closure and yarding within the buffer would protect the integrity of the talus field.

E. Timber harvest in forested talus and exposed talus with greater than 30 percent canopy closure, outside of the talus buffer, would not remove more than one third of the standing timber volume each harvest rotation.

F. Road construction through talus fields and buffers would be avoided, when practicable.

G. Mining of rock from talus fields and buffers for road construction would be avoided, provided construction materials could be acquired in a practicable manner.

2. Caves and Cave Passages Identified as Important Wildlife Habitat

Under the HCP, DNR would protect caves and cave passages as described below to maintain these structures for bat roosting and maternity colonies, as den sites for large mammals, and as habitat for amphibians.

A. The microclimate and physical integrity of caves would be maintained by establishing a 250-foot wide buffer around cave entrances. No disturbance of soils or vegetation would be allowed.

B. Cave passages would be protected by 100-foot wide buffers. No disturbance of soils or vegetation would be allowed.

C. Roads would not be constructed within 0.25 mile of a cave entrance, when practicable.

D. Roads would not be constructed within 300 feet of a cave passage, when practicable.

E. Human disturbance to bat hibernacula and maternity colonies would be minimized by maintaining the confidentiality of cave locations.

3. Cliffs

Under the HCP, DNR would protect cliffs as described below to provide and maintain existing or potential raptor nest and perch sites, den sites for mammal species, and habitat for amphibians and reptiles.

A. Site-specific management for cliffs greater than 25 feet tall and below 5,000 feet in elevation determined to be likely to be used by wildlife would be developed to include protection of cliff integrity and retention of trees along the base and top of cliffs judged suitable for nesting raptors.

B. All cliffs in excess of 150 feet in height would be evaluated for peregrine falcon use and, if determined to have an aerie, protection would be provided as described under the peregrine falcon conservation strategy.

C. Mining of rock from cliffs for road construction would be avoided, where practicable.

4. Oak Woodlands

Under the HCP, DNR would protect oak woodlands as described below to provide nesting and foraging habitat for the western gray squirrel, Lewis' woodpecker, and approximately 200 other species that use this habitat to some degree.

Partial harvest would occur, but all very large dominant oaks would be retained, as well as standing dead and dying oak trees, to provide current and future nest trees.

B. Timber harvests would maintain 25 to 50 percent canopy cover, and would remove encroaching conifers, except western white pine, to ensure arboreal travel corridors are maintained.

C. Road construction through oak woodlands would be avoided, where practicable .

5. Large, Structurally Unique Trees

Under the HCP, DNR would protect large, structurally unique trees to provide potential nesting and roosting sites for forest land birds, raptors, bats, and small and arboreal mammals.

A. When selecting trees for retention, DNR would preferentially select for large trees with structural characteristics important to wildlife and those trees considered to be old-growth remnants.

B. One tree per acre selected for retention would belong to the largest diameter class of living trees in the harvest unit.

6. Snags and Live Trees

Under the HCP, DNR would provide snags and live trees as described below to protect current and future nest and den sites and foraging opportunities for forest land birds, raptors, mammals, and other wildlife.

A. At least three snags would be retained per acre harvested, on average.

B. Snags qualifying for retention would be a minimum of 15 inches dbh and 30 feet tall.

C. Priority for retention would be given to large hollow snags, hard snags with bark, and snags that are at least 20 inches dbh and 40 feet tall.

D. At least five live trees per acre would be retained for each acre harvested as future snags, two of which are described under the strategy to retain large, structurally unique trees. The other three trees would be from the dominant, co-dominant, or intermediate crown classes.

E. If fewer than three snags per acre are left after harvest, one live tree would be retained for each snag missing of the three snags required to be retained, so that the total combination of snags and live trees retained after harvest is at least 8 per acre. Live trees would be from the co-dominant or intermediate crown class.

F. Snags and live trees selected for retention may be clumped to improve wildlife habitat, or protect them from severe weather, but the density of clumps may not be less than one clump per 5 acres.

7. Balds

Under the HCP, DNR would protect balds, an opening dominated by grasses and herbs formed on shallow soils, by avoiding the construction of roads through them, where practicable. This measure would ensure protection of plants unique to balds and ground nesting birds.

8. Mineral Springs

Under the HCP, DNR would protect mineral springs as described below to protect this unique habitat type used by mammals and such species as band-tailed pigeons to obtain minerals essential to their diet.

A. Management activities within 200 feet of a mineral spring would be designed in coordination with the FWS to retain adequate trees for perching and maintain berry, fruit, and mast-producing shrubs and trees.

B. Trees harvested near mineral springs would be felled away from the spring, and residual large green trees and snags within 25 feet would be retained.

C. Yarding across mineral springs would be avoided, and ground-based logging equipment would be prohibited from crossing mineral springs.

9. Other Forested Habitats

Under the HCP, DNR would ensure that stand structural stages not provided by other conservation strategies of the HCP are present in the HCP area. These forest stages would ensure that the full range of upland forest habitats are available for use by species in the HCP area.

A. Based on DNR's commitment to manage to HCP objectives for stand structures that provide habitat for all species, it is estimated that approximately 31 percent of the West-side Planning Units and 60 to 70 percent of the OESF Planning Unit would have complex forests (at least 70 years old) by 2096.

B. Fully functioning conifer forest, a subset of complex forests, would be provided. By 2096 these would comprise 12 percent of West-side Planning Units at least 150 years old and 10 to 15 percent of the OESF Planning Unit at least 200 years old.

10. Road Management

Under the HCP, DNR would implement a road management plan for west-side and the OESF Planning Units that reduces impacts to species affected by roads and the disturbance associated with them. Road management for fish and wildlife would reduce the effects that the presence of roads has on streams, and of human disturbance, thus, protecting salmonid habitat and improving the quality of wildlife habitat adjacent to roads. The FWS anticipates the initiation of the development of a road management plan within the next 2 years.

11. Research - Under the HCP, DNR would conduct or support research as follows:

    1. DNR would actively manage a research program conducted mostly by qualified research institutions through cooperative agreements and contracts to obtain information needed to: implement adaptive management strategies; assess and improve the effectiveness of the conservation strategies; and, increase management options and commodity production opportunities for lands managed pursuant to the HCP.

    2. Most research would be conducted in the OESF Planning Unit; however, research that cannot be carried out on the western Olympic Peninsula, or cannot be extrapolated from this planning unit, would take place on other appropriate DNR-managed HCP lands.

    3. Research would include maintaining riparian functions while conducting management activities in riparian buffers; definitions, amount, configuration, and distribution of spotted owl habitats; management activities in spotted owl habitats; spotted owl prey requirements; and, definitions and relationships of marbled murrelet habitat, marbled murrelet breeding-site characteristics, management activities near marbled murrelet breeding sites, and basic marbled murrelet ecology.

Monitoring - under the HCP, DNR would conduct monitoring as follows:

1. Detailed procedures to implement the requirements for each element of the HCP monitoring program would be prepared by DNR in cooperation with the FWS and the NMFS. All monitoring procedures would be completed and reviewed before forest management activities consistent with a conservation strategy are first undertaken.

2. Implementation and effectiveness monitoring as described in the HCP would be conducted for spotted owl habitat goals in all planning units, and validation monitoring as described in the HCP would be conducted for spotted owl nesting habitat in the OESF.

3. Implementation and effectiveness monitoring would be conducted for marbled murrelet habitat goals in all west-side and the OESF planning units, and validation monitoring would be conducted for marbled murrelet nesting habitat in the OESF.

4. Implementation and effectiveness monitoring would be conducted for riparian and salmon habitat goals in all west-side and OESF Planning Units and validation monitoring would be conducted on salmon habitat on one subbasin in the OESF Planning Unit. No validation monitoring would be conducted in riparian and salmon habitat other than in the OESF.

Reporting - under the HCP, DNR would conduct reporting as follows:

1. Provide annual reports using GIS and other methods that display summaries of previous year timber sales and management activities and all monitoring activities.

2. Provide an annual report of preceding year research results including data collected and preliminary data analyses.

3. Provide a comprehensive final report that includes detailed results, conclusions, and management recommendations at the conclusion of each research project.

4. Hold annual review meetings with the FWS and NMFS to review proposed and completed land transactions involving permit lands, to review the level of non-timber resource activities and any associated incidental take of species addressed in the HCP.

Implementation

The implementation of the HCP would be governed by an implementation agreement (IA) which would be a signed agreement among DNR, FWS and NMFS. The IA is incorporated herein by reference.

Scope

Permit Lands

All DNR-managed trust lands within the range of the spotted owl, except for those lands classified as urban or agricultural or leased for urban uses, are included in the HCP. The permit lands covered by the HCP were divided into nine planning units. Three of the planning units are east of the Cascade Crest and six (including the OESF) are west of the Cascade Crest.

DNR has an active land acquisition and disposition program including the designation of urban lands and the leasing of permit lands for commercial, industrial, residential or

agricultural purposes. The HCP and IA provide for the continuation of that program. In carrying out their land disposition program, DNR has committed to maintain the conservation objectives described in Chapter IV of the HCP. If land disposed by DNR does not remain subject to the provisions of the HCP, and the cumulative impact of the land disposition would have a significant adverse effect on the affected species, replacement mitigation may be required, pursuant to the standards and processes outlined in the extraordinary circumstances provisions of the IA. In carrying out their land acquisition program, DNR has committed to incorporate the relevant commitments of the HCP into the management of the newly acquired permit land. If the management of the newly acquired land increases take beyond the level authorized by the incidental take permit, additional mitigation may be required.

Actions

The HCP covers timber management and related activities, as well as nontimber activities. Timber sales, leases, contracts, etc. signed after January 1, 1999, would incorporate the commitments of the HCP. Timber sales, leases, and contracts signed prior to January 1, 1999 could either continue to follow established protocols for avoiding incidental take of listed species or incorporate the relevant commitments of the HCP. Because of the existing protocols to avoid incidental take, the FWS has determined that the incidental take involved with timber sales that do not incorporate the HCP commitments and are signed before January 1, 1999, is limited (see Transition Activities, P.A3-63 in the FEIS).

In general, the management activities discussed in this agreement can be categorized into two types: timber-related and nontimber-related.

Timber-related activities are those associated with commercial timber harvest and include cutting; felling; limbing; yarding; preparation of yarding corridors; construction and use of landings; loading and hauling; experimental silviculture; road construction, maintenance, decommissioning, administrative and commercial use, road access and control; site preparation including slash and residual treatment; planting; fertilizing; most forms of pest and brush control; fire and erosion control; thinning; pruning; research; and, all other activities related to the conduct of the timber-management program and actions listed in the HCP. Aerial spraying of pesticides would only be covered upon submission to, and approval by, the FWS of a site-specific plan.

Nontimber activities include actions commonly conducted by DNR or their contractors within the forest and other habitats and include gathering and collecting of vegetation; extraction and sales of rock, sand, and gravel; oil and gas exploration and extraction; mining and prospecting; construction, maintenance, and granting of rights-of-way for roads that are on DNR land; firewood cutting; ORV use; and, grazing. The level of nontimber resource activity and associated take of species addressed in the HCP will be reviewed annually by DNR, the FWS, and NMFS. This is to ensure that any expansion in the level of DNR's nontimber resource activities as described in the HCP does not result in increased incidental

take of species addressed in the HCP. If nontimber activities would result in increased incidental take, the HCP would be amended to address the impacts of the increased take. In other words, additional minimization and mitigation may be required if the nontimber activities increase the take of species beyond the 1996 level.

Covered Species

Only listed species would be included on the incidental take permit. However, the HCP contains measures to conserve currently unlisted fish and wildlife species which are dependent on habitats that occur within the five West-side Planning Units and the OESF and were analyzed in the HCP. In the future, should any of the currently unlisted species that use the habitat types that occur within the five West-side Planning Units and the OESF subsequently become listed, DNR may request that those species be added to the incidental take permit. Before such species would be added to the incidental take permit, the FWS and NMFS must also find that adding the species to the incidental take permit would be in accordance with the requirements of the Act, other Federal laws and regulations, and their responsibilities as Federal agencies. The HCP does not cover unlisted species in the three east side planning units.

In the event a species is delisted, the commitments of the HCP may be terminated unless failure to continue those measures would not maintain the conservation objectives of the HCP for another species.

Permit Duration

The term of the incidental take permit and HCP implementation would be for 70 years. The incidental take permit may be renewed by DNR three times for a period of up to 10 years per renewal provided certain specific conditions are met. The FWS and NMFS may require the HCP and the incidental take permit to be continued by for up to three periods of 10 years per period if certain specific conditions are not met. The incidental take permit would terminate for any species for which the HCP is terminated.

Contingencies

Unforeseen Circumstances

The IA provides that in the event of unforeseen circumstances arising in connection with the HCP, the incidental take permit, or the IA, the FWS or NMFS may request consultation with DNR regarding those circumstances and may suggest modifications to the commitments of the HCP, incidental take permit, or the IA to address unforeseen circumstances. DNR shall consult with the FWS or NMFS to explore whether there is a mutually acceptable means for adjusting the commitments of the HCP, the incidental take permit, and the IA that maintains the interests of DNR, FWS, and NMFS. If the cost of a mutually acceptable adjustment would be significant to DNR, then the DNR, FWS and NMFS must attempt to find voluntary

adjustments that would avoid or minimize the cost to DNR. The FWS or NMFS shall not seek from DNR without its consent a commitment of additional land or financial undertaking beyond the level of mitigation which is provided under the commitments of the HCP, the incidental take permit, and the IA.

Extraordinary Circumstances

The FWS and NMFS may require additional mitigation in the event of extraordinary circumstances. The IA defines extraordinary circumstances to mean that continued DNR-management activities in accordance with the HCP, the Incidental Take Permit, and the IA would result in a substantial and material adverse change in the status of a species that was not foreseen on the effective date of the IA, which can be remedied by additional or different mitigation measures on the HCP lands. This may occur when additional species are added to the incidental take permit. Upon a determination of extraordinary circumstances, the IA provides for additional mitigation by DNR with its express written consent, voluntarily by conservation organizations or other private parties, or to the extent in accordance with law and available appropriation, by FWS and NMFS.

Adaptive-Management

Modifications of conservation strategies and management practices may be implemented as a result of new information and scientific developments obtained from monitoring, research, or other sources during the term of this Incidental Take Permit. Several areas in which adaptive management is likely are enumerated in the IA section 24.5 and are not subject to unforeseen or extraordinary circumstances. Implementation of one or more of those adaptive management strategies may result in additional mitigation. Other adaptive management strategies contained in the HCP that are not identified in section 24.5 of the IA are subject to the unforeseen and extraordinary circumstances provisions.

Amendments

The HCP and IA can be modified by mutual agreement by the parties. Any change which increases the level of incidental take would require an incidental take permit amendment. Several actions may result in amendment proceedings including new listings, land transactions, adjustments to conservation strategies, and increases in levels of take. The types and procedures for amendments are specified in section 25 of the IA.

STATUS OF THE SPECIES (range wide)

Information on the range wide status of species addressed in this opinion and land management plans for nonfederal lands is described in several HCPs. Nine Habitat Conservation Plans (HCPs) have been completed within the range of the northern spotted owl in California, Oregon and Washington. Two HCPs in California cover 380,500 acres of nonfederal lands and allow incidental take of 52

spotted owl sites. Three Oregon HCPs cover 302,106 acres and allow incidental take of 36 spotted owl pairs and spotted owls associated with 22,000 acres of nesting, roosting and foraging habitat and marbled murrelets associated with 2,440 acres of nesting habitat. Four HCPs in Washington cover approximately 233,040 acres of nonfederal lands and allow incidental take of 108 spotted owls in the short term (equivalent to 54 pairs or sites) and 10 spotted owls per decade until 2093. The Washington HCPs also provide for the incidental take of marbled murrelets associated with 2,810 acres of nesting habitat. A negligible number of bald eagles, grizzly bears, and gray wolves may be incidentally taken as a result of harassment through implementation of these HCPs.

On July 27, 1995, the President signed the 1995 Rescission Act (P.L. 104-19). Section 2001(k) of this law directed the Secretaries of Agriculture and Interior to allow the harvest of certain timber sales for which contracts were "*offered or awarded before [July 27, 1995] in any unit of the National Forest System or district of the Bureau of Land Management subject to section 318 of Public Law 101-121 (103 Stat. 745)*." The vast majority of these timber sales were developed in accordance with Section 318 of P.L. 101-121, the Fiscal Year 1990 Interior and Related Agencies Appropriations Act.

In 1993, President Clinton directed Federal agencies to develop a management plan for Federal lands in the Pacific Northwest. The first assessment, Forest Ecosystem Management: An Ecological, Economic, and Social Assessment (Report of the Forest Ecosystem Management Assessment Team) (FEMAT report) (USDA et al. 1993), was completed in July 1993. Two NEPA documents; (1) the Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (USDA and USDI 1994a); and (2) the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and Standards and Guidelines for Management of Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (USDA and USDI 1994b), which completed assessments and implemented the decision, respectively, were completed by April 1994. This plan is known as the Northwest Forest Plan.

The Biological Opinion (USDI 1994c) for the Northwest Forest Plan determined that the Plan provided protection for more known spotted owl sites and more acres of suitable habitat than was provided for in previous spotted owl plans. For example, the Northwest Forest Plan provided: (1) less risk of loss of a well-distributed, reproducing populations of spotted owls; (2) fewer acres subject to harvest; (3) dispersal habitat provisions; and (4) more acres in reserves. Nearly 90 percent of marbled murrelet occupied sites and habitats were contained within areas designated for protection under the Northwest Forest Plan. The remaining occupied marbled murrelet sites outside of the reserve network were protected by specific land allocations. Northwest Forest Plan Late-Successional Reserves, Managed Late-Successional Areas, and Riparian Reserves would benefit gray wolves, grizzly bears, bald eagles, and peregrine falcons. The Biological Opinion determined that the Northwest Forest Plan would have little effect on Columbian white-tailed deer or Oregon silverspot butterflies.

STATUS OF THE SPECIES (range wide) - NORTHERN SPOTTED OWL

For a detailed discussion of the biology and status of the species, refer to the following documents: the 1990 Status Review (USDI 1990a); the final rule listing the spotted owl as threatened (USDI 1990b; 55 FR 26114); the biological opinions for the U.S. Forest Service's (Forest Service) Region 6 pre-Section 318 (USDI 1990c) and Section 318 (USDI 1990d) timber sale programs; the final rule designating critical habitat (USDI 1992a; 57 FR 1796); the Interagency Scientific Committee (ISC) report (Thomas et al. 1990); the Scientific Analysis Team report (Thomas et al. 1993); the final draft Recovery Plan for the Northern Spotted Owl (USDI 1992b); the FEMAT report (USDA et al. 1993); "Spotted Owl Habitat in Washington: A Report to the Washington Forest Practices Board by the Spotted Owl Scientific Advisory Group" (Hanson et al. 1993); the Proposed 4(d) Special Rule (USDI 1995a; 60 FR 9484); the supporting documents for the Northwest Forest Plan (USDA and USDI 1994 a and b); "The Contribution of Federal and Non-federal Habitat to Persistence of the Northern Spotted Owl on the Olympic Peninsula, Washington: Report of the Reanalysis Team" (Holthausen et al. 1995); the Washington State Forest Practices Board FEIS on Forest Practices Rule Proposals (WDNR 1995b); and, "Demography of the Northern Spotted Owl" (Forsman et al. 1996a).

Management History

Interagency Scientific Committee Report

In 1990, the Interagency Scientific Committee (ISC) (Thomas et al. 1990) identified various geographic units termed Habitat Conservation Areas (HCAs) which were intended to support spotted owl pairs. The HCAs were divided into two categories: Category 1 HCAs included habitats capable of supporting 20 pairs of spotted owls and Category 2 HCAs included habitats capable of supporting 2 to 19 pairs of spotted owls. Within this context, intervening habitat between HCAs was considered for dispersal habitat and connectivity, which resulted in the development of the "50-11-40 rule" (i.e., timber harvesting on Federal lands shall be permitted when at least 50 percent of the forest landscape consists of forest stands with a mean diameter at breast height (dbh) of 11 inches and a canopy closure of 40 percent).

In addition to the HCA units identified by the ISC, physiographic provinces developed by Franklin and Dyrness (1988) provided a recognized set of landscape subdivisions incorporating the physical and environmental factors that shape the landscape of the Pacific Northwest. The provinces identified in the State of Washington were the Washington Cascades East, Olympic Peninsula, Washington Cascades, West and Southwest Washington. These physiographic provinces were modified and used in the ISC as the first subdivision of the range of the spotted owl (Thomas et al. 1990).

These provinces were further subdivided by areas of special concern, where past natural occurrences and human actions have adversely affected habitat more than in the remainder of the province. The areas of special concern consisted of the North Cascades, North Cascades East, Olympic Peninsula, Southwestern Washington, and Columbia River in

Washington; the Oregon Coast Range and southern Deschutes in Oregon; and, the Shasta-McCloud, North Coastal California and Mendocino National Forest in California (Thomas et al. 1990).

Critical Habitat

On January 15, 1992 (57 FR 1796) (USDI 1992a), the FWS designated 6,887,000 acres of spotted owl critical habitat, solely on Federal lands. This designation provided additional protection to the species by requiring Federal agencies to consult with the FWS on actions that may affect the primary constituent elements of spotted owl critical habitat.

Final Draft Recovery Plan

As a primary means for achieving recovery of the spotted owl, the final draft Recovery Plan (USDI 1992b) recommended establishing 192 Designated Conservation Areas (DCAs) covering more than 7.6 million acres of Federal forest lands as the primary habitat for the spotted owl. The DCA network represented approximately 46 percent of the total estimated spotted owl NRF habitat at that unit on Federal lands. The Recovery Plan remains in draft form; a final plan was not issued. Many of the concepts developed in the ISC Report and the final draft Recovery Plan were carried forward to the Northwest Forest Plan.

Northwest Forest Plan

The next phase in spotted owl management was the formation of the Forest Ecosystem Management Assessment Team in 1993. The Forest Ecosystem Management Assessment Team was an interagency, interdisciplinary team of experts which produced a report assessing ten options for management of Federal forests within the range of the spotted owl. This served as the basis for President Clinton's proposed Forest Plan which was announced on July 1, 1993, and analyzed in a Draft Supplemental Environmental Impact Statement (Draft SEIS). The Final SEIS was made available to the public in February 1994 (USDA and USDI 1994a). The Record of Decision and standards and guidelines for habitat management for late successional old growth species issued in April 1994, provide for an integrated reserve system based largely on the protection of habitat within multiple-purpose watersheds. Concepts such as Late-Successional Reserves and Riparian Reserves were incorporated to assure the viability of threatened and at-risk species, as determined by "viability panels" tasked to predict the likelihood of persistence under each option. Adaptive Management Areas were created to test technical and social objectives associated with the overall strategy of ecosystem management. Further, the Northwest Forest Plan allocated more than 24 million acres of Federal lands into six designated categories (Congressionally Reserved Areas, Late-Successional Reserves, Adaptive Management Areas, Managed Late-Successional Areas, Administratively Withdrawn Areas, and Riparian Reserves) and one non-designated category referred to as Matrix.

Past land-management activities have degraded suitable spotted owl habitats throughout the range of the species. The Northwest Forest Plan was developed to address the conservation of the spotted owl and other species on Federal lands. The basic conservation strategy in the Northwest Forest Plan improves upon the measures developed by the ISC (Thomas et al. 1990). The Northwest Forest Plan provides for the protection of extensive Federal forest reserves which are intended to support large, reproductively viable spotted owl population clusters throughout the range of the species on Federal lands. The system of Late-Successional Reserves (7,430,800 acres) will not only protect habitat currently suitable for spotted owls, but also develop future habitat in large blocks.

Through implementation of the Northwest Forest Plan, Federal lands are expected to carry the major burden of conservation and recovery of late-successional habitats and associated species, including spotted owls. The expectation is spotted owl populations will not decline beyond a viable level during the 50 to 150 year critical transition period and will eventually stabilize at a new equilibrium once suitable habitats have regrown within the Federal reserves (USDA et al. 1993). Federal reserves are not expected to be fully restored, at 80 percent suitable habitat, for approximately 100 years (USDA and USDI 1994a).

The Forest Ecosystem Management Assessment Team spotted owl viability panel predicted an 83 percent likelihood that habitat conditions would provide for well-distributed, stable populations of spotted owls on Federal lands (USDA et al. 1993; USDA and USDI 1994a App. J3). The ISC Plan and Northwest Forest Plan noted that nonfederal lands including portions of DNR-managed lands have a role to play in contributing to the conservation lands of the spotted owl (Thomas et al. 1990; USDA and USDI 1994a).

Most of the 2001(K) (Section 318) timber sales that were subject to harvest under the Rescission Act occurred in south-central Oregon. Overall, 28 sales occurred in five planning provinces: Olympic Peninsula, Oregon Coast, Willamette, Southwest Oregon and Klamath. Of the 4,279 total acres, 1,199 acres occurred in LSRs (about 0.06 percent of adjusted spotted owl habitat acres in LSRs) and 534 acres occurred in riparian reserves (about 0.05 percent of adjusted spotted owl habitat acres in riparian reserves). The adjustment in suitable habitat was derived from the FWS's estimate that approximately 43 percent of LSR acres are in suitable owl habitat.

STATUS OF THE SPECIES (range wide) - MARBLED MURRELET

The marbled murrelet was Federally listed as threatened on September 28, 1992 (57 FR 45328) (USDI 1992c). Critical habitat was designated on May 24, 1996 (61 FR 26256) (USDI 1996c). An account of the taxonomy, ecology, and reproductive characteristics of the marbled murrelet is found in: the 1988 Status Review (Marshall 1988); the final rule designating the species as threatened; the FWS's biological opinion for Alternative 9 (USDI 1994c) of the FSEIS for the Northwest Forest Plan (USDA and USDI 1994a); the Ecology and Conservation of the Marbled Murrelet (Ralph et al. 1995a); the final rule designating critical habitat for the species (USDI 1996c); and, the draft recovery plan for the species (USDI 1995b).

Marbled murrelets are dependent upon old-growth forests, or forests with an older tree component, for nesting habitat (Hamer and Nelson 1995; Ralph et al. 1995b). Sites occupied by marbled murrelets tend to have a higher proportion of mature forest classes than do non-occupied sites (Raphael et al. 1995b). Much of this forest habitat has been harvested over the last century (Booth 1991; Bolsinger and Wadell 1993; Zybach 1993; Ripple 1994; Perry 1995). Ripple (1994) concluded that 71 percent of all conifer forests in western Oregon prior to 1840 were in the large forest class, and 89 percent of these were spatially connected as one patch. An estimated 34.5 percent of the Oregon Coast Range forests burned in the 1840s (Teensma et al. 1991), and many of these fires have been linked to European settlers (Kirkpatrick 1940, cited in Zybach 1993; Ripple 1994). Based on Teensma et al. (1991) and other sources, Ripple (1994) concluded that the amount of old-growth forest lands in the Oregon Coast Range was 43 percent in 1933 and 61 percent before the 1840s. This determination is consistent with Booth's (1991) conclusion that 82 to 87 percent of the old-growth forests that existed in western Washington and Oregon prior to the 1840s is now gone.

Perry (1995) summarized the amount of potentially suitable marbled murrelet habitat remaining within Washington, Oregon, and California: Washington has approximately 977,811 acres, Oregon has approximately 565,185 acres, and California has a total of approximately 819,472 acres, for a total of 2,362,469 acres. Perry (1995) provided two caveats regarding the interpretation of this data. First, estimates are largely based upon interpretations of satellite imagery and have not been thoroughly ground-truthed. Second, the estimates refer to quantity of potential habitat, not quality. Depending on proximity to the coast, landscape context, and size, any stand may or may not provide quality marbled murrelet habitat. He defined quality habitat as that which meets basic nesting requirements, provides refuge from predators, and is relatively stable against catastrophic disturbances. Perry (1995) also concluded that it is not possible at this time to estimate the proportion of remaining habitat that could be considered of high enough quality to allow long-term nesting success.

Based on Perry's (1995) analysis and USDA and USDI (1994a), the FWS concludes that the actual amount of good quality nesting habitat available to marbled murrelets in Washington, Oregon and California is less than the 2,362,469 acres of potentially suitable habitat remaining. This could be significantly less, but the FWS does not have the information to quantify it.

In the Northwest Forest Plan, the Forest Service and Bureau of Land Management adopted a plan for their lands that provides a long-term management strategy for marbled murrelets (USDA and USDI 1994b). The Northwest Forest Plan mandates the protection of all sites determined to be occupied by marbled murrelets, including those found outside mapped Late-Successional Reserves. All known occupied sites of marbled murrelets occurring on Federal lands are to be managed as Late-Successional Reserves. Over time, unsuitable or marginally suitable habitat occurring in Late-Successional Reserves will be managed, overall, to develop late-successional forest conditions, thereby providing a larger long-term habitat base into which marbled murrelets may eventually expand. It is anticipated that implementation of the Northwest Forest Plan will result in an 80 to 90 percent likelihood of achieving a marbled murrelet population well-distributed on Federal lands.

In the Draft Marbled Murrelet Recovery Plan (USDI 1995b), the Recovery Team identifies six Marbled Murrelet Conservation Zones throughout the listed range of the species. These are the Puget Sound Conservation Zone (Zone 1); the Western Washington Coast Range Conservation Zone (Zone 2); the Oregon Coast Range Conservation Zone (Zone 3); the Siskiyou Coast Range Conservation Zone (Zone 4); the Mendocino Conservation Zone (Zone 5); and, the Santa Cruz Mountains Conservation Zone (Zone 6).

The Forest Service recently published the Ecology and Conservation of the Marbled Murrelet (Ralph et al. 1995a), the most comprehensive summary of the status of the species to date. It was prepared, edited, and reviewed by a team of government and university scientists. In their introductory chapter, the editors (Ralph et al. 1995a) make the following conclusions regarding the status of the marbled murrelet:

1. "(E)vidence is mounting that population trends are downward where they have been measured, even though short-term fluctuations in climate and longer-term variation in ocean currents can result in apparent or temporary increases" (pg. 11). The magnitude of the decline is unknown (pp. 10, 12).

2. Declines in populations "have coincided with the cutting of a large fraction of the old-growth forests," although "cumulative effects of oil pollution, gill netting, and changes in the marine environment have undoubtedly played a role as well" (pg. 12).

3. "(T)here is reason for concern for the continued viability of the species in some regions. Numbers at the southern end of the range are small and concentrated geographically, thereby leaving subpopulations vulnerable to damage by stochastic (catastrophic) events" (pg. 11).

4. The "ultimate fate of the marbled murrelet is largely tied to the fate of its reproductive habitat, primarily old-growth forest or forest with an older tree component" (pg. 16).

5. "(T)he trend in amount and distribution of suitable nesting habitat is the most important determinant of the long-term population trends (pg. 17)."

6. "The cumulative effects of further incremental loss of existing habitat, in addition to continued loss of adults at sea, must immediately be considered and dealt with by all relevant agencies. To this end, we strongly suggest that a prudent strategy would be to curtail further loss of occupied nesting habitat in at least Washington, Oregon, and California (pg. 17)."

7. "We feel that any further reduction in nesting habitat or areas for the murrelet in Washington, Oregon, and California would severely hamper stabilization and recovery of these populations to viable levels. Occupied habitat should be maintained as reserves in large contiguous blocks and buffer habitat surrounding these sites should be enhanced (pg. 21)."

8. "The greatest threat to recovery, therefore, is continued loss of habitat, adult mortality, and causes of breeding failure, in that order. We stress that it is critical to maintain and enhance habitat, reduce adult mortality rates due to at-sea risks and predation, and reduce the loss of nest site contents to predators (pg. 22)."

Marbled murrelets are susceptible to oil pollution and entanglement in near shore fishing nets such as gill nets and purse seines (Carter and Sealy 1984; Ralph et al. 1995a). Of the three States where marbled murrelets are listed as threatened, only Washington has a significant net fishery. Tribal and nontribal gill net and purse seine fisheries occur within the Puget Sound, Strait of Juan de Fuca, Cape Flattery, Grays Harbor, Willapa Bay, and lower Columbia River areas. A variety of observer programs provide data on marbled murrelet entanglement in gill net fisheries in Washington. A National Marine Fisheries Service marine mammal observer program that was carried out in Grays Harbor from 1991 to 1993 did not observe any marbled murrelet entanglement, although some unidentified alcids were netted. An observer program in the sockeye salmon fishery in Washington conducted in 1994 specifically to estimate marbled murrelet entanglement estimated that 15 marbled murrelets (range = 2 to 59) were entangled in the fishery (Pierce et al. 1996). This estimate was based on one observed entanglement. Marbled murrelets were also observed entangled in this fishery in 1993 (Craig and Cave 1993) and in 1996 during the modified gear testing program (E. Melvin, unpubl. data). An observer program in the Makah tribal set gill net fishery observed the entanglement of 7 marbled murrelets, with an estimated 12 drowned (BIA 1994; USDI 1994b). Observer programs in other fisheries in Puget Sound have not recorded marbled murrelet entanglement, although observer effort was low (Erstad et al. 1996; Pierce et al. 1994).

There continues to be substantial variation in marbled murrelet population estimates in Oregon. For example, Varoujean and Williams (1995) used aerial surveys, conducted along the entire Oregon Coast in August and September 1993, to estimate that 6,600 marbled murrelets occur in Oregon. They compared these aerial surveys with opportunistic boat-based surveys conducted along portions of the Oregon Coast in April and July 1986-88, and concluded with some reservation that the marbled murrelet population size has remained relatively stable in Oregon over the last 10 years. In a different study, Strong et al. (1995) used boat surveys to estimate that 15,000 to 20,000 marbled murrelets occur in Oregon. These authors caution that large numbers of non-breeding adults and low numbers of fledglings on the water may be a consequence of lack of suitable nesting habitat, and thus low numbers of nesting birds (Strong et al. 1995).

In Washington, Spiech and Wahl (1995) concluded that marbled murrelet populations in Puget Sound are lower now than they were at the beginning of this century. Total estimates for Washington are about 5,500 marbled murrelets (Ralph et al. 1995b). Varoujean and Williams (1995) estimated that 2,600 birds occur on the outer coast of Washington and the western portion of the Strait of Juan de Fuca.

Various population estimates have been made for California over the past 15 years. Sowls et al. (1980) estimated a breeding population of about 2,000 birds based on data collected opportunistically while surveying other seabirds. Carter and Erickson (1992) and Carter et al. (1992) came up with similar population estimates. Ralph and Miller (1995) conducted intensive at-sea surveys in small portions of the marbled murrelet's range primarily in northern California. These surveys were

specifically designed to estimate population size for marbled murrelets in California; they estimated a stable population of approximately 6,000 birds, including breeding and non-breeding birds. These authors extrapolated from small areas to estimate numbers over much larger areas. Given the non-uniform distribution of marbled murrelets at sea, this process may have led to overestimation of marbled murrelet numbers.

Beissinger (1995) constructed a demographic model of the marbled murrelet and concluded that the population may be declining at rates of 2 to 12 percent per year. It is possible that the age-ratio data used in the model are reflective of a relatively temporary decline due to unusual ocean conditions (Ralph et al. 1995b).

Ralph et al. (1995b) summarized some of the reasons for variability in population estimates among researchers, including differences in methodology, assumptions, spatial coverage, and survey and model errors. Nevertheless, both Ralph et al. (1995b) and the Marbled Murrelet Recovery Team (1994) have concluded that the listed population appears to be in a long-term downward trend. The Recovery Team estimates that the population may be declining at rates of between 4 to 12 percent, which means that in 20 years the population could be less than one-half to one-twelfth its current size. The Recovery Team believes that possible reasons for the decline include the species' low reproductive rate, its dependence on older forests that are now scarce and heavily fragmented for nesting, and adult mortality due to entanglement in gill nets and encounters with oil spills.

The conclusions drawn by Ralph et al. (1995b) and the Marbled Murrelet Recovery Team (1994) are regarded as the best available information on the current status of the species. Therefore, the FWS concludes that the listed marbled murrelet population is not stable or increasing within Washington, Oregon, and California, but may be declining at a rate of at least 4 percent per year.

The Draft Marbled Murrelet Recovery Plan (USDI 1995b) states that the following actions are necessary to stabilize the population and allow for continued existence of viable populations: (1) increase the productivity of the population, as reflected by total population size, the juvenile:adult ratio, and other measures of nesting success; (2) minimize threats to survivorship; (3) identify and conduct research and monitoring necessary to determine specific delisting criteria; and, (4) develop a research cooperative to coordinate monitoring and research efforts. The key method to stop population decline and encourage future increase in population growth is to stabilize and increase habitat quality and quantity on land and at sea.

STATUS OF THE SPECIES (range wide) - MARBLED MURRELET CRITICAL HABITAT

Critical habitat for the marbled murrelet was designated on May 24, 1996 (61 FR 26256) (USDI 1996c). Thirty-two units totaling 3,887,800 acres were designated on Federal, State, county, city, and private lands in Washington, Oregon, and California. The majority of these units (78 percent) occur on Federal lands, while 21 percent occur on State lands, 1.2 percent occur on private lands, 0.2 percent occur on county lands, and 0.003 percent occur on city lands.

Critical habitat is defined in section 3(5)(A) of the Act as "(i) the specific areas within the geographical area occupied by the species, at the time it is listed...on which are found those physical and biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by a species at the time it is listed...upon a determination...that such areas are essential for the conservation of the species."

In determining which areas to designate as critical habitat, the FWS considers physical and biological features of the habitat that are essential to the conservation of the species and/or that may require special management considerations or protection. Such requirements include, but are not limited to, the following: (1) space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring; and, (5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species. The FWS is not limited in its consideration to only these five features. The identification of these areas may be helpful in planning Federally regulated land use activities. The added emphasis on these areas for conservation of the species may shorten the time needed to achieve recovery.

In the case of marbled murrelet critical habitat, the FWS has determined that the physical and biological habitat features, referred to as primary constituent elements, associated with the terrestrial environment that support nesting, roosting, and other normal behaviors are essential to the conservation of the marbled murrelet and require special management considerations. The specific primary constituent elements identified for the marbled murrelet were individual trees with potential nesting platforms and forested areas within 0.8 kilometer (0.5 mile) of individual trees with potential nesting platforms and a canopy height of at least one-half the site-potential tree height. These primary constituent elements were deemed essential for providing suitable nesting habitat for successful reproduction of the marbled murrelet.

Several qualitative criteria, referred to as selection criteria, were considered in the selection of specific areas for inclusion in marbled murrelet critical habitat: (1) suitable nesting habitat; (2) survey data; (3) proximity to marine foraging habitat; (4) large, contiguous blocks of nesting habitat; (5) range wide distribution; and, (6) adequacy of existing protection and management.

Although most of the areas designated as marbled murrelet critical habitat occur on Federal lands (National Forest Late-Successional Reserves and Congressionally Withdrawn Areas), the FWS designated selected nonfederal lands that meet the above selection criteria where Federal lands are insufficient to provide suitable nesting habitat for the recovery of the species. The designated critical habitat units (CHU) are distributed more or less evenly across the range of the species in Washington and Oregon and less so in California.

The quality of the marbled murrelet habitat occurring within the boundaries of the CHUs ranges from nonhabitat (e.g., plantations) to high-quality habitat (i.e., large blocks of old-growth forest). While significant amounts of high-quality marbled murrelet habitat are present in some of the CHUs, much

of the habitat in CHUs, particularly on nonfederal lands, is of lesser quality due to its occurrence in smaller, more fragmented blocks. The highest quality marbled murrelet habitat occurs in National Parks and areas with little or no harvest history. Many of these areas, such as National Parks and wilderness areas, are managed in ways that did not necessitate designation of critical habitat.

Habitat lost to wind, fire, other catastrophic events, or harvest may take up to 250 years to develop characteristics that supply adequate nest platforms for marbled murrelets. This time period may be shorter in redwood and western hemlock forests, and in areas where significant remnants of the previous stand remain.

STATUS OF THE SPECIES (range wide) - GRAY WOLF

A detailed account of the taxonomy, ecology, and reproductive characteristics of the gray wolf is presented in the Northern Rocky Mountain Wolf Recovery Plan (USDI 1987), and The Gray Wolf: History, Present Status and Management Recommendations (Kaminski and Boss 1981).

Wolves in the contiguous 48 states have been listed under the Act as an endangered species since 1973, except in Minnesota where wolves were downlisted to threatened in 1978 (43 FR 9612) (USDI 1978b). The listing was based on a nationwide population decline as a result of land development, loss of habitat, poisoning, trapping, and hunting. Current populations of the gray wolf in the west are mostly confined to small areas in central Idaho, western Montana, and extreme northwestern Wyoming. A Northern Rocky Mountain Wolf Recovery Plan was completed on August 3, 1987 (USDI 1987). The goal of the Recovery Plan is to re-establish the gray wolf in portions of its former range in the Northern Rocky Mountains.

Gray wolves also persist or are becoming re-established in the North Cascades of Washington. There is no recovery plan for the gray wolf in the Pacific Northwest States. The FWS is currently involved in the development of a range-wide gray wolf recovery strategy. Gray wolf management guidelines for Washington have been developed to serve in the interim.

Gray wolves have flexible habitat requirements. They require an adequate food supply, suitable denning and rendezvous sites, travel corridors, and minimal human disturbance (USDI 1987). Provided that adequate food is available, gray wolves adapt readily to a variety of habitats and climates. One of the primary management requirements for encouraging gray wolf recovery is promoting and maintaining adequate ungulate populations through access control and habitat improvement. Another management activity that can benefit gray wolves is restricting human activity around active dens, especially just prior to whelping and in the first few weeks after birth.

STATUS OF THE SPECIES (range wide) - GRIZZLY BEAR

A detailed account of the taxonomy, ecology, and reproductive characteristics of the grizzly bear is presented in the Grizzly Bear Compendium (LeFranc et al. 1987) and the revised Grizzly Bear Recovery Plan (USDI 1993).

The grizzly bear was Federally listed as threatened on July 28, 1975 (40 FR 31736) (USDI 1975). The grizzly bear was originally distributed in various habitats throughout western North America from Central Mexico to the Arctic Ocean. Grizzly bear populations in the lower 48 States had receded from estimates of over 50,000 to less than 1,000 grizzly bears between 1800 and 1975. Habitat loss and direct and indirect human-caused mortality are related to their decline in numbers. The current distribution of the grizzly bear south of Canada has been reduced to five, possibly six, ecosystems within four states, which equates to less than 2 percent of its former range. The grizzly still exists in the North Cascades ecosystem in Washington.

A Grizzly Bear Recovery Plan was approved on January 29, 1982 (USDI 1982a), and a revised plan was completed on September 10, 1993 (USDI 1993). The Grizzly Bear Recovery Plan established six recovery zones with the overall objective to delist the grizzly bear in each of the zones as grizzly bears within each zone achieved recovery targets. A draft North Cascades recovery chapter has been written and would be appended to the Grizzly Bear Recovery Plan when signed.

The grizzly bear ranges over large areas and typically uses many vegetation types to fulfill its life requisites. Its diet includes 124 species of plants, winter killed ungulates, small mammals, and anadromous fish (Almack et al. 1993). All naturally vegetated land types are considered suitable grizzly bear habitat. Grizzly bear habitats are often relatively isolated from human disturbance. Of special importance to grizzly bears are wet meadows, swamps, bogs, streams, and conifer, subalpine, and lodgepole pine forests, as well as alpine meadows and parklands (Brown 1985; cited in USDI et al. 1996). Den sites of grizzly bears can be found in nearly any type of forest, but are typically in coniferous forests. Grizzly bears normally select den sites on steep slopes at or near the tree line where deep snows have accumulated (Almack 1986).

STATUS OF THE SPECIES (range wide) - BALD EAGLE

A detailed account of the taxonomy, ecology, and reproductive characteristics of the bald eagle is presented in the Pacific States Bald Eagle Recovery Plan (USDI 1986) and the final rule to reclassify the bald eagle from endangered to threatened in all of the lower 48 States (60 FR 36010) (USDI 1995c).

On February 14, 1978, the bald eagle was Federally listed throughout the lower 48 States as endangered except in Michigan, Minnesota, Wisconsin, Washington, and Oregon, where it was designated as threatened (USDI 1978a). The listing was the result of a decline in the bald eagle population throughout the lower 48 States. The decline was largely attributed to the wide-spread use of DDT and other organochlorine compounds in addition to destruction of habitat, illegal harassment and disturbance, shooting, electrocution from power lines, poisoning, and a declining food base.

In the 18 years since it was listed throughout the conterminous 48 States, bald eagle populations have increased in number and expanded their range. The improvement is a direct result of recovery efforts including habitat protection and the banning of DDT and other persistent organochlorines.

The species has doubled its breeding population every 6 to 7 years since the late 1970s. As a result, the FWS has reclassified the bald eagle from endangered to threatened in the lower 48 States (USDI 1995c).

Habitat loss continues to be a long-term threat to the bald eagle in the Pacific Recovery Area of Washington, Idaho, Nevada, California, Oregon, Montana, and Wyoming. Urban and recreational development, logging, mineral exploration and extraction, and all other forms of human activities are adversely affecting the suitability of breeding, wintering, and foraging areas. While individual and small scale actions may not appear to significantly affect the species as a whole, the cumulative long-term effects throughout this recovery area pose an important threat to the species recovery.

Habitat suitability for bald eagles involves accessible prey and trees for nesting and roosting (Stalmaster 1987). Food availability, such as aggregations of waterfowl or salmon runs, is a primary factor attracting bald eagles to wintering areas and influences nest and territory distribution (Stalmaster 1987; Keister et al. 1987).

Bald eagle nests in the Pacific Recovery Area are usually located in uneven-aged stands of coniferous trees with old-growth forest components that are located within 1 mile of large bodies of water. Factors such as relative tree height, diameter, species, form, position on the surrounding topography, distance from the water, and distance from disturbance appear to influence nest site selection. Nests are most commonly constructed in Douglas-fir or Sitka spruce trees, with average heights of 116 feet and size of 50 inches dbh (Anthony et al. 1982; cited in USDI et al. 1996). Bald eagles usually nest in the same territories each year and often use the same nest repeatedly. Availability of suitable trees for nesting and perching is critical for maintaining bald eagle populations.

A number of habitat features are desirable for wintering bald eagles. During the winter months bald eagles are known to band together in large aggregations where food is most easily acquired. The quality of wintering habitat is tied to food sources and characteristics of the area that promote bald eagle foraging. Key contributing factors are available fish spawning habitat with exposed gravel bars in areas close to bald eagle perching. Bald eagles select perches that provide a good view of the surrounding territory, typically the tallest perch tree available within close proximity to a feeding area (Stalmaster 1987). Tree species commonly used as perches are black cottonwood, big leaf maple, or Sitka spruce (Stalmaster and Newman 1979). Forests with suitable nest and perch trees are critical to bald eagle populations.

Wintering bald eagles often roost communally in single trees or large forest stands of uneven ages that have some old-growth forest characteristics (Anthony et al. 1982; cited in USDI et al. 1996). Some bald eagles may remain at their daytime perches through the night but bald eagles often gather at large communal roosts during the evening. Communal night roosting sites are traditionally used year after year and are characterized by more favorable microclimatic conditions. Roost trees are usually the most dominant trees of the site and provide unobstructed views of the surrounding landscape (Anthony et al. 1982; cited in USDI et al. 1996). They are often in ravines or draws that offer shelter from inclement weather (Hansen 1978 as cited in USDI et al. 1996; Keister 1981; cited in USDI et al. 1996). A communal night roost can consist of two birds together in one tree, or more

than 500 in a large stand of trees. Roosts can be located near a river, lake, or seashore and are normally within a few miles of day-use areas but can be located as far away from water as 17 miles or more. Prey sources are available in the general vicinity, but close proximity to food is not as critical as the need for shelter that a roost affords (Stalmaster 1987).

The primary objective of the bald eagle recovery process is to provide secure habitat for bald eagles within this recovery area and to increase population levels in specific geographic areas to the extent that the species can be delisted. Achieving the recovery goal of increasing the number of nesting pairs in the recovery area will require the protecting of existing habitat for breeding and wintering bald eagles and restoring habitat lost due to human development and modification (USDI 1986).

STATUS OF THE SPECIES (range wide) - PEREGRINE FALCON

A detailed account of the taxonomy, ecology, and reproductive characteristics of the peregrine falcon is presented in the Pacific Coast Recovery Plan for the American Peregrine Falcon (USDI 1982b) and the Advanced Notice of a Proposal To Remove the American Peregrine Falcon from the List of Endangered and Threatened Wildlife, June 30, 1995, Federal Register, (60 FR 34406) (USDI 1995d).

Due to population declines of American peregrine falcons, the FWS, in 1970, listed this subspecies as endangered under the Endangered Species Conservation Act of 1969 (USDI 1970a and b). The subspecies was subsequently listed under the Endangered Species Act of 1973, as amended. During the period of DDT use in North America, shell thinning and nesting failures were widespread in peregrine falcons, and in some areas successful reproduction virtually ceased. DDT was discovered to accumulate in individual peregrine falcons after ingesting contaminated food which eventually impaired calcium release for egg shell formation, thus inducing thin shells and reproductive failure. Recently, the population has improved as a direct result of the ban of DDT and other persistent organochlorines and from other recovery efforts. As a result of the improved population, the FWS published an advance notice of a proposed rule to remove the peregrine falcon from the list of endangered and threatened wildlife (USDI 1995d). The rule has not been finalized.

Peregrine falcons nest almost exclusively on cliffs or high escarpments that dominate the nearby landscape, usually near water, although office buildings, bridges, and river cut banks have also been used for nesting (USDI 1982b; Craig 1986; cited in USDI et al. 1996). Physiographic characteristics of nesting cliffs are currently being studied. Preliminary results indicate that the preferred sites are sheer cliffs 150 feet or more in height found from sea level to 11,000 feet in elevation (USDI 1982b). Some nest cliffs are found at 75 feet in height. The cliff usually has a small cave or overhung ledge large enough to contain three or four full-grown nestlings. Several holes or ledges that can be used in alternate years are apparently not an absolute requirement but may increase the suitability of the cliff.

Foraging areas are associated with the nest territory. Foraging habitat includes wooded areas, marshes, lakes, river bottoms, croplands, and meadows where peregrines prey primarily on songbirds, shorebirds, and waterfowl (Porter and White 1973 as cited in WDNR 1996a). Wooded

areas near water attract a diverse avifauna, and bodies of water provide open areas where prey cannot easily escape attack. During the breeding season, peregrine falcons will travel as far as 17 miles from the aerie to hunt, although a hunting range of 10 miles is considered typical (Porter and White 1973; cited in WDNR 1996a; USDI 1982b). Some breeding adults, as well as birds of the year and unpaired adults, may range more widely outside of the breeding season. Little is known of the winter habitat needs of peregrines along the Pacific Coast. Apparently some adults remain near the nest cliff year round.

STATUS OF THE SPECIES (range wide) - ALEUTIAN CANADA GOOSE

Historically, the Aleutian Canada goose, a small subspecies of the Canada goose, was known to breed on most of the larger islands in the Aleutian Islands and the Commander and northern Kuril Island chains. When the species was listed as endangered in March 1967 (USDI 1967), its only known nesting site was Buldir Island in the western Aleutian Islands, Alaska. Subsequently, remnant flocks have been found on Chagulak Island in the eastern Aleutians and Kaliktagik in the Semidi Islands. The decline of this subspecies is largely attributed to predation resulting from the introduction of foxes and other small mammals to the Aleutian Islands during the period 1836 to 1930.

At one time, recreational and subsistence take of this subspecies in the Pacific Flyway may have been a factor preventing the remnant breeding segments from recovering. The actual winter areas were not known until the recovery of the first banded birds was reported in late 1974 in California. The wintering habitat for this subspecies has been the focus of study from 1974 to the present. Areas in California and Oregon, essential to winter survival, have been identified and partially protected by inclusion of the lands used in the National Wildlife Refuge System or California's Department of Fish and Game Wildlife Area and State Park systems. Additionally, staging and migration areas, and additional wintering areas in Alaska, Washington, and Oregon have been closed to the hunting of this and/or other subspecies of Canada goose, offering further protection.

On the principal wintering grounds in California, hunting closure zones have been in effect since 1975 in order to protect these geese. These closure zones have been largely responsible for allowing the wild population to increase from 790 birds in 1975 to 3,500 in 1982 and to an estimated 20,000 in 1996. The Aleutian Canada goose was first listed as endangered on March 11, 1967. On December 12, 1990, (55 FR 51112) (USDI 1990e) the Aleutian Canada goose was reclassified as threatened. This reclassification has not changed the level of protection afforded it under the Act. Extensive recovery efforts have concentrated primarily on the western Aleutian flock (Buldir, Agattu, and Nizki) because the eastern Aleutian and Semidi Island flocks were unknown when the first recovery plan was developed. A revised plan has been prepared. The recovery team currently considers the three island-group stocks to be separate "breeding segments." Each breeding segment has its own recovery agenda and objective population levels in the revised recovery plan. The recovery team considers the three breeding segments to constitute a single population of the Aleutian Canada goose subspecies.

With the continued growth of Aleutian Canada goose numbers there is likely to be an expansion of its range, primarily in and about the current use areas in California, namely the northern coast, the Sacramento Valley, and the San Joaquin Valley, and secondarily, into parts of western Oregon and southwestern Washington. Aleutian Canada geese are regularly reported in the Willamette Valley of Oregon in September and early October. Reduced goose hunting required for protection of the dusky Canada goose and the abundance of winter pasture, makes this area a likely spot for range expansion by Aleutians. The overall population exhibited a 13 percent rate of increase from 1992-1994.

STATUS OF THE SPECIES (range wide) - COLUMBIAN WHITE-TAILED DEER

The historic range of the Columbian white-tailed deer was believed to have extended northward from Roseburg, Oregon, up the Willamette Valley and Puget Trough, possibly as far as the south end of Puget Sound (USDI 1983). They were, however, extirpated from most of their range by 1900, and today two populations of the Columbian white-tailed deer exist, one in Douglas County, Oregon, (the Douglas County population), and the other in Columbia and Clatsop Counties, Oregon, and Wahkiakum County, Washington (the Lower Columbia River population). The Lower Columbia River population was listed as endangered in 1967 under the Endangered Species Preservation Act, and the Douglas County population received protection under the Act in 1977. The Lower Columbia River population has increased from fewer than 400 animals in 1977 to 550-725 in 1996 (Al Clark, pers. comm.). Numbers were estimated at 700-950 individuals prior to 1996 floods, which caused significant deer mortality. The population occupies an area of about 23 square miles. The Douglas County population has increased from a low of 200 to 300 individuals in 1940 to a total of about 5,000 to 5,500 deer today and their range encompasses approximately 300 square miles (ODFW 1995).

Columbian white-tailed deer inhabit riparian forest, brushland, and pasture on islands and within the floodplain near the mouth of the Columbia River (Suring 1974, Gavin et al. 1984). They were originally associated with native tidal spruce forest communities along the Columbia and Cowlitz Rivers.

STATUS OF THE SPECIES (range wide) - OREGON SILVERSPOT BUTTERFLY

The Oregon silverspot butterfly was historically found along the central and northern Oregon coast and southern Washington Coast. The species is listed as threatened by the Federal government and listed as an endangered species by Washington State. Critical habitat has been designated under the Endangered Species Act in the State of Oregon.

The Oregon silverspot butterfly is found in open grassland habitat within the coastal salt-spray zone and inland meadows that support its larval host plant, the western blue violet (*Violet adunca*). The Oregon silverspot only breeds in stabilized sand dune communities and inland meadows where *Viola adunca* persists.

Moderate grass cover found in these open grasslands provides shelter for the larvae from wind, rain, and heat (Stine 1982). Adult butterflies rest and find shelter in adjacent open forests composed of sitka spruce (*Picea sitchensis*) and shore pine (*Pinus contorta* var. *contorta*). Adult butterflies feed in the grasslands, on nectar-producing plants such as aster (*Aster chilensis*), tansy ragwort (*Senecio jacobaea*), goldenrod (*Solidago canadensis*), thistle (*Cirsium* sp.) and pearly everlasting (*Anaphalis margaritacea*). These nectar-producing species are all found in early successional habitat which can be maintained or restored through management of the habitat (seasonal mowing, burning, and removal of trees) to provide the structural condition and species composition (host and nectar plants) that are required by the Oregon silverspot.

The main threat to the species range wide is the loss of habitat from development and the succession of vegetation from grasslands to habitat dominated by woody plants (shrubs and trees).

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area which have undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultation in progress. Such actions include, but are not limited to, previous timber harvests and other land-management activities. The baseline includes adoption of a late-successional forest management strategy for Federal lands known as the Northwest Forest Plan (USDA and USDI 1994a, 1994b). Information relevant to describing the environmental baseline for this action is included in the Forest Ecosystem Management Assessment Team report (USDA et al. 1993), the Northwest Forest Plan Record of Decision, and the biological opinion on the FSEIS preferred alternative (USDI 1994c). Information used to update the environmental baseline includes the effects of: (1) actions implemented under the Northwest Forest Plan on Federal lands which have undergone section 7 consultation; (2) section 10 incidental take permits with section 7 consultation completed; (3) timber sales harvested pursuant to the 1995 Rescission Act; and, (4) updated spotted owl survey and habitat data (see DATA SOURCES section near the end of this opinion).

Habitat Conservation Plans have been completed for four private forest land managers in Washington: Murray Pacific Corporation Mineral Tree Farm; Scofield Corporation; Plum Creek Timber Company; and, Port Blakely L.P., R.B. Eddy Tree Farm.

Murray Pacific Corporation completed a 100-year HCP for northern spotted owls for their 53,527-acre Mineral Tree Farm in Lewis County, Washington, in September 1993, and an amendment in June 26, 1995 to include all listed species. The original permit allowed the incidental take of up to 20 spotted owls due to habitat loss and disruption within 2.5 miles of 10 known site centers. In addition, since spotted owls might occupy marginal habitats, under the permit, 10 spotted owls may be incidentally taken in each succeeding decade until 2093. Although no marbled murrelet occupancy has been determined by current surveys, the amended permit allows incidental take of

marbled murrelets associated with 800 acres out of 1,091 acres of potential marbled murrelet habitat. If marbled murrelets occupy potential habitats in the future, some incidental take may occur as a result of disturbance. The permit also authorizes incidental take of bald eagles, grizzly bears, or gray wolves in the form of harassment.

The Scofield Corporation permit authorizes the incidental take of one pair of spotted owls as a result of a commercial thin harvest of a 40-acre parcel on the east side of the Cascades.

The Plum Creek permit addresses 169,177 acres which generally occur in alternating sections, creating a checkerboard pattern of public and private lands, within the Interstate 90 (I-90) corridor in King and Kittitas Counties, Washington. Up to 83 spotted owl sites may be incidentally taken as a result of proposed timber harvest activities over a 100-year time period. Incidental take of spotted owls would be mitigated by a combination of NRF habitat and foraging-dispersal habitat deferrals and connecting corridors. Site specific deferrals surrounding some of the more productive spotted owl sites during the first 20 or more years will ameliorate adverse effects of harvest. Some nesting, roosting and foraging habitat will be harvested with a decrease from 20 to no less than 8 percent during the incidental take permit period. There will be an increase of foraging and dispersal habitat from 20 to 46 percent during the incidental take permit period and an increase in total spotted owl habitat from 40 to 55 percent on Plum Creek lands. Retention and growth of habitat should improve patch size and connectivity providing better linkage among Federal sections which may contain nesting, roosting and foraging habitat. With an increase in total habitat there will be a decrease in non-habitat forest acres and a reduction in fragmentation. Several areas totaling 100 square miles will be surveyed at frequent intervals for model verification and feedback for adaptive management.

The Plum Creek Timber Company permit allows incidental take of marbled murrelets associated with up to 400 acres of unsurveyed low quality habitat west of the Cascade crest and 1,400 acres of unsurveyed habitat east of the Cascade crest. Incidental take will be mitigated by habitat maintenance and improvement in a 500-acre stand (or the Plum Creek portion) designated around identified occupied marbled murrelet sites. Road building and harvest within 0.25 miles of occupied stands during the breeding season is precluded.

The Plum Creek Timber Company permit also authorizes take of grizzly bears and gray wolves. Although no direct mortality of grizzly bears or gray wolves is anticipated, some incidental take may occur as a result of disturbance. The estimated number of grizzly bears that may be incidentally taken as a result of harassment through disturbance is from one to three individuals. This would include one male, one female, or one female with two cubs. The estimated number of gray wolves that may be incidentally taken as a result of harassment through disturbance is from one to eight animals (an average pack of gray wolves is normally around eight animals).

The Port Blakely Tree Farms, L.P. permit for the 7,486-acre R.B. Eddy Tree Farm, located in Pacific and Grays Harbor counties in southwest Washington, was approved in July, 1996. The HCP permits incidental take of three spotted owls in two site centers through harvest of about 2,750 acres of low quality spotted owl habitat. Spotted owls occupying forest habitats which may develop into suitable spotted owl habitats may also be incidentally taken during the permit period. A 70-acre core of

habitat will be retained around known spotted owl site centers until 3 years of surveys determine that the site is no longer occupied. No modification nor disturbance of known occupied marbled murrelet sites is authorized under the HCP. However, due to the possibility that habitat surveyed in the first 5 years of the plan could become occupied in the future, incidental take may result during the harvest of 210 acres of deferred habitat and 250 acres of habitat that may develop in Riparian Management Zones. In addition, incidental take from disturbance due to harvest may occur during the nesting season. Although no direct mortality is anticipated, some incidental take of non-territorial foraging bald eagles or peregrine falcons may occur as a result of timber harvest and road building under the HCP.

STATUS OF THE SPECIES (in the action area) - NORTHERN SPOTTED OWL

For the purpose of this consultation, the action area is defined as the range of the spotted owl within the State of Washington. The status of spotted owls in this action area can be best examined through an evaluation of the following: (1) number and distribution of spotted owl sites or activity centers; (2) habitat conditions at the landscape and site level; (3) estimates of the population's rate of change from demographic study areas; and, (4) the nature and extent of threats. All of these criteria are evaluated in light of ongoing conservation accorded the species through the Northwest Forest Plan.

Spotted Owl Sites

Table 1 displays the number of spotted owl sites on Federal, DNR, and other nonfederal and tribal lands within each of the physiographic provinces in Washington State. These sites are recorded by Washington Department of Fish and Wildlife (WDFW) in a State-wide database reflecting 10 years of survey information (1986 to 1995). Federal spotted owl sites are assigned to reserve or matrix status, as appropriate.

Table 1. Known territorial spotted owl site centers (WDFW status 1, 2 or 3)[1] on Federal, DNR, or other nonfederal and tribal lands in Washington State.

Physiographic Province	Federal Reserve	Federal Matrix	DNR	Other Nonfederal	Tribal	Total
Olympic Peninsula	195	8	25	4	1	233
Western Washington Lowlands	0	0	8	13	0	21
Western Washington Cascades	299	90	27	20	0	436
Eastern Washington Cascades	199	28	16	46	13	302
Total	693	126	76	83	14	992

[1]Status 1, 2, and 3 owl sites represent reproductive pair, pair - status unknown, and territorial single sites, respectively.

Nesting, Roosting, and Foraging Habitat

Table 2 displays the acres of suitable spotted owl habitat on Federal, DNR, other nonfederal, and tribal lands within each of the physiographic provinces in Washington State. Federally managed habitat is assigned to matrix or reserve status in accordance with the appropriate management scenario. The sources of these data are described in the DATA SOURCES section near the end of this opinion.

Table 2. Acres of suitable spotted owl habitat by land manager and by physiographic province in Washington State.

Physiographic Province	Federal Reserve	Federal Matrix	DNR	Other Nonfederal	Tribal	Total
Olympic Peninsula	702,787	8,737	73,941	53,751	11,342	850,558
Western Washington Lowlands	0	35,663	129,538	268,915	413	434,529
Western Washington Cascades	1,021,994	266,578	210,306	188,372	2	1,687,252
Eastern Washington Cascades	577,398	129,002	70,932	192,137	229,345	1,198,814
Total	2,302,179	439,980	484,717	703,175	241,102	4,171,153

The Late-Successional Reserves on National Forests in Washington State are estimated to contain an average of 43 percent suitable habitat (USDA and USDI 1994a). Information regarding suitable habitat conditions within estimated spotted owl home ranges in the Federal reserves is presented in Table 3. Tables 1, 2, and 3 are included in this baseline discussion to illustrate those areas of the State where contributions as identified in the ISC and the Northwest Forest Plan from nonfederal lands are most important. Information of this nature was considered in the development of the Northwest Forest Plan, and is reflected in the Forest Ecosystem Management Assessment Team's conclusions regarding nonfederal lands. Consistent with previous consultations and to help assess the relative effects of the DNR HCP, the FWS calculated the percent of suitable habitat within the average estimated home ranges of known spotted owl pairs in the State of Washington. Using spotted owl habitat data described in the DATA SOURCES section, the FWS estimates that 36 percent of the sites centered on Federal reserves (Late-Successional Reserves, Congressionally or Administratively Withdrawn Areas, Managed Late-Successional Reserves, and the Snoqualmie Pass Adaptive Management Area AW903) in Washington have less than 40 percent suitable habitat within their estimated home ranges.

Table 3. Condition of estimated spotted owl (owl) home ranges centered on Federal reserves in Washington, by Physiographic Province and by National Forest.

Physio-graphic Province	Number of estimated Owl Home Ranges with < 40 % SH[1]	Number of estimated Owl Home Ranges with ≥ 40 % SH	National Forest	Number of estimated Owl Home Ranges with < 40 % SH	Number of estimated Owl Home Ranges with ≥ 40% SH
Western Lowlands	N/A	N/A	N/A	N/A	N/A
Olympic	66	129	Olympic	49	54
Western Cascades	104	195	Mt. Baker-Snoqualmie	82	89
			Gifford Pinchot	14	105
Eastern Cascades	112	87	Wenatchee	97	74
			Okanogan	10	2
Total	282	411	Total	252	324[2]

[1] SH = Suitable Habitat, as defined in Data Sources at the end of this opinion.

[2] The difference in Province and National Forest totals represent 117 spotted owl sites centered on National Park lands.

Spotted owl habitat removed or degraded through actions taken since the Northwest Forest Plan was adopted is shown in Table 4. This table also shows habitat lost as a result of timber harvest pursuant to the Rescissions Act.

Rescissions Act sales are found in the action area that impact spotted owls. The Rocky timber sale, located on the Olympic National Forest, removed 55 acres of suitable owl habitat and resulted in the take of one owl site. The Holdaway II timber sale, located on the Gifford Pinchot National Forest, allowed for the removal of 37 acres of suitable owl habitat and the potential take of five owl sites. However, this sale was offered but not sold prior to the expiration of the Rescission Act on December 31, 1996, and the timber has not been harvested.

Table 4. Spotted owl suitable habitat acres removed or degraded, and spotted owl pair or territorial single sites (sites) incidentally taken on National Forest lands in Washington, as authorized through the section 7 consultation process or occurring as the result of a natural event since adoption of the Northwest Forest Plan Record of Decision (USDA and USDI 1994b) (April 1994) and pursuant to the Rescissions Act, P.L. 104-19.

	Gifford Pinchot NF	Mt. Baker Snoqualmie NF	Olympic NF	Wenatchee NF	Okanogan NF	Total
Acres of NRF Removed/Degraded Authorized Pursuant to section 7 or occurring due to a natural event	4,144	2	0	10,773[1]	0	14,919
Number of Owl Sites Incidentally Taken as Authorized Pursuant to section 7 or occurring due to a natural event	39	0	0	31	0	76
Acres of NRF Removed/Degraded Pursuant to the Rescissions Act	37	0	55[2]	0	0	92
Number of Owl Sites Taken Pursuant to the Rescissions Act	5	0	1	0	0	6

[1] Of this total, removal or degradation of 9,512 acres and incidental take of 17 spotted owl sites occurred as a result of natural wildfires in 1994.

[2] All of these acres removed were located in a Northwest Forest Plan Late-Successional Reserve.

Demographic Status

The action area includes two demographic study areas where age-specific birth and death rates and population growth rates of spotted owls have been examined. Forsman et al. (1996b) summarized

results from the Olympic Peninsula study area and the Cle Elum Ranger District study area on the east slope of the Cascades. Both of these data sets were considered by the Forest Ecosystem Management Assessment Team and the SEIS team in development of the Northwest Forest Plan. Data were collected from 1987 to 1993 on the Olympic Peninsula and from 1989 to 1993 in the Cle Elum area. Results indicated that annual adult survival was declining in the Cle Elum study area, whereas no trends in adult survival were apparent on the Olympic Peninsula. Fecundity of greater than or equal to 3-year-old females (i.e., the number of female young produced per adult female per year) averaged 0.380 (Standard Error (SE) = 0.106) on the Olympic Peninsula and 0.565 (SE 0.061) on Cle Elum. Fecundity of 1 and 2-year-old females averaged 0.206 (SE = 0.106) on the Olympic Peninsula and 0.379 (SE = 0.120) on Cle Elum. Non-juvenile survivorship was 0.862 (SE = 0.017) on the Peninsula and 0.850 (SE = 0.031) on Cle Elum. Juvenile survival estimates were 0.245 (SE = 0.064) for the Peninsula and 0.140 (SE = 0.046) on Cle Elum. Juvenile survival estimates adjusted to account for emigration were 0.611 (SE = 0.204) on the Olympic Peninsula and 0.349 (SE = 0.098) on Cle Elum.

With the adjustment to account for juvenile emigration, the estimated annual rate of population change did not differ from 1.0 in either study area. The authors note that it would take a minimum of 10 to 20 years of monitoring before significant trends could be detected if the annual rate of change was less than 5 percent per year.

Olympic Peninsula Reanalysis Report

In 1994, the FWS convened a group of scientists to assess the impacts of the proposed 4(d) rule on the persistence of the spotted owl on the Olympic Peninsula. The team produced a report titled "The Contribution of Federal and Non-Federal Habitat to Persistence of the Northern Spotted Owl on the Olympic Peninsula, Washington: Report of the Reanalysis Team Scientific Analysis Team" (Holthausen et al. 1995) (Reanalysis Team report). This report concluded that " ...it is likely, but not assured, that a stable population of spotted owls would be maintained..." on Federal lands in the Olympic Peninsula Province. It also stated, "the retention of non-federal habitat could result in a biologically significant contribution to the maintenance of a stable population of spotted owls distributed across currently occupied portions of the Olympic Peninsula," and that "nonfederal lands may provide the majority of low-elevation habitat, which is poorly represented on the federal lands, and which might be of higher quality than higher-elevation habitat." The report also notes it would be unlikely that spotted owls would persist on "...the western coastal strip of the National Park..." if nonfederal habitat on the western side of the peninsula were excluded from current Federal protection for spotted owls. The report went on to explain that "the retention of non-federal habitat in the western portion of the peninsula was particularly significant and provided for a larger area of core habitat on Federal land in model analysis. In addition, the retention of this habitat would likely increase the chances of maintaining a population on the coastal strip of the Olympic National Park." The report concluded that nonfederal lands on the northern portion of the peninsula were not viewed as having an appreciable capability, beyond supporting spotted owls in Federal Late-Successional Reserves, of making a significant contribution to the long-term conservation of the spotted owl on the Olympic Peninsula.

Finally, the report stated that attempts to maintain a "habitat connection across southwestern Washington would have little effect on the status of the spotted owl population on the Peninsula if that population was stable or nearly stable." Further, "..the population of owls on the Peninsula is sufficiently large to avoid any short to mid-term loss of genetic variation..." (Holthausen et al. 1995). The conclusions of the team are dependent on assumptions about the stability of the population on the Olympic Peninsula at this time. The team cautioned that their conclusions are dependent on the current understanding of demographic trends and that this understanding is incomplete (Holthausen et al. 1995).

In June 1995, the FWS convened a second group of scientists/biologists to conduct additional modeling of spotted owl habitat and persistence, with an emphasis on finding management scenarios that were more efficient than managing spotted owl habitat under the proposed 4(d) rule. For this analysis, efficiency was defined as management requiring less nonfederal habitat but providing similar benefits to spotted owl conservation, with management under the proposed 4(d) rule as the baseline. This team produced the document "Searching for Efficiency: An Analysis of the Contribution of Federal and Non-Federal Habitat to Persistence of the Northern Spotted Owl on the Olympic Peninsula, Washington." This second reanalysis used the same owl demography and habitat condition models that were developed by the original analysis team to run the 100-year simulations, but incorporated different parameters: (1) growth was not simulated; (2) effects of catastrophic fire were not simulated; and, (3) the model assumed that no spotted owl habitat would remain on tribal land.

This team analysis concluded that nonfederal contributions to spotted owl conservation on the Peninsula would be most effective by retaining habitat that is aggregated and found in larger proportions on the landscape. The model was unable to address the connectivity issue and habitat needs of linking the National Park Service's coastal strip spotted owl population with the main population near the center of the Peninsula. As in the previous analysis, the authors caution that the findings vary across demographic rule sets and are dependent on the structure and assumptions of the model.

Scientific Advisory Group

The Washington State Forest Practices Board spotted owl Scientific Advisory Group was formed to obtain, interpret, and synthesize available scientific information related to the conservation and management of spotted owls on nonfederal lands in Washington. The Scientific Advisory Group, composed of five scientists representing tribal, State and private or industrial forest land managers, began their task in May 1993 and completed their final report in December 1993.

The Scientific Advisory Group report provided descriptions of spotted owl habitat for two broad regions: western Washington and the eastern Washington Cascades. They recommended new descriptions for younger forest spotted owl habitat types that were related to the functions that these habitat types serve in spotted owl life history and were based upon stand level forest structural characteristics, and that they annually review new habitat data and recommend necessary changes to habitat descriptions. The DNR used these spotted owl habitat type descriptors in the development of their HCP and subsequent analyses of potential effects.

The Scientific Advisory Group report provided descriptions of four habitat types including old forest, sub-mature, young forest marginal, and dispersal. Old forest habitat consist of old-growth or mature forest that provides all of the characteristics spotted owls need for nesting, roosting, foraging, and dispersal. Sub-mature habitat on the west-side consists of non-old Forest habitat that provides all of the characteristics spotted owls need for roosting, foraging, and dispersal. On the east-side sub-mature may also provide nesting habitat. Young forest marginal habitat consists of younger forest that provides some of the characteristics that spotted owls need for roosting, foraging, and dispersal. Dispersal habitat includes old forest, sub-mature, young forest marginal and other young forest conditions that provide characteristics spotted owls need for successful dispersal. Among other items, the Scientific Advisory Group recommended that all functional spotted owl NRF habitat within 0.7 mile of a site center should be included as essential habitat.

The Scientific Advisory Group report states that, "Non-federal lands are needed to contribute to the conservation of the northern spotted owl in several regions of Washington." The Scientific Advisory Group report identified two alternative definitions of essential spotted owl habitat, or habitat essential to provide life requisites throughout the annual cycle. One alternative recognized that all territorial spotted owls, including those on nonfederal lands, provide some contribution to the stability and viability of the spotted owl population. This alternative would maintain the current species range in Washington, as well as all management options.

Another alternative, which was adopted by the Washington State Forest Practices Board, recognized that territorial spotted owls in some landscapes are more important to species conservation. Fifteen areas were identified within nonfederal landscapes that are most important to the conservation of spotted owls including the Columbia Gorge, White Salmon, Siouxon, Mineral Block, Mineral Link, I-90 West, Easton, Taneum, I-90 East/Teanaway, North Blewett, Entiat, Finney, Southwest Washington, Hoh-Clearwater/Coastal Link, and North Olympic Peninsula. These areas identified under this alternative formed the basis for spotted owl Special Emphasis Areas used by the Washington State Forest Practices Board in developing the Permanent Forest Practice Regulations for the spotted owl. Boundaries of these areas have been negotiated and modified through the State regulatory process.

Nature and Extent of Threats

Various threats to the owl population in Washington State have been addressed in the ISC (Thomas et al. 1990), SAG (Hanson et al. 1993), and FEMAT (USDA et al. 1993). Many of the threats to the spotted owl population on Federal lands were reduced or eliminated by the implementation of the Northwest Forest Plan and by proactive planning and habitat protection and enhancement on the North Cascades, Olympic and Mt. Rainier National Parks and Fort Lewis Military Reservation. Further support of the Northwest Forest Plan has been provided by the promulgation of Forest Practice Regulations that protect owls and owl habitat within strategically placed Spotted Owl Special Emphasis Areas on nonfederal lands (Figure 2), and by the completion of HCPs. HCPs which have been completed in the Action Area include the Plum Creek and Murray Pacific HCPs. These HCPs support the Northwest Forest Plan by providing habitat for spotted owls adjacent to Federal reserves. Continued threats to the population are expected to occur from catastrophic fire events on the east side of the Cascades, further fragmentation of habitat and isolation of owl clusters

on unprotected nonfederal land, and the loss of timber lands through land use conversion to urban development as experienced in the western Washington lowlands.

STATUS OF THE SPECIES (in the action area) - MARBLED MURRELET

For the purpose of the consulation, the FWS will discuss the terrestrial portion of the range of the marbled murrelet. The marine portion of the marbled murrelet's range in Washington will not be affected by the DNR HCP.

In Washington, the marbled murrelet is found on forested lands within approximately 55 miles of the marine environment. Approximately 5,000 marbled murrelets occur in Washington (Spiech et al. 1992; Spiech and Wahl 1995), which is about one-third of the total listed population. This figure, while considered the best available information, is based on data gathered in 1978, 1979, and the early 1980s, and may therefore be an overestimate because of the large amount of error associated with early survey methodolgy.

Two Conservation Zones are identified in Washington under the Draft Marbled Murrelet Recovery Plan (USDI 1995b). These are the Puget Sound Conservation Zone, and the Western Washington Coast Range Conservation Zone. The main threat to the species in the terrestrial portion of both Conservation Zones is continued loss of suitable (old-growth forest) habitat.

In the Puget Sound Conservation Zone, loss of late-successional forest habitat and its replacement with urban development in the Puget Trough means that remaining suitable habitat for the marbled murrelet is a considerable distance (greater than 20 miles) from the marine environment. Marbled murrelet habitat in this Conservation Zone occurs mainly on Federal lands. This Conservation Zone roughly coincides with the DNR's Straits, South Puget, and North Puget Planning Units.

In the Western Washington Coast Range Conservation Zone, forest lands in the northwestern portion of this Conservation Zone occur on public (State, County, City, and Federal) and private lands while most forest lands in the southwestern portion of this Conservation Zone are privately owned and have been harvested in the last century. The complete lack of Federal lands in southwestern Washington means that conservation of the marbled murrelet is entirely dependent on contributions from nonfederal lands. This Conservation Zone roughly coincides with the DNR's OESF, South Coast, and a portion of the Columbia Planning Units.

The quality of the marbled murrelet habitat occurring on nonfederal (State, County, City, Tribal, and private) lands ranges from nonhabitat (e.g., plantations) to high-quality habitat (i.e., large blocks of old-growth forest). However, very little high-quality marbled murrelet habitat occurs on nonfederal lands. Much of the habitat on these lands is of lesser quality due to its occurrence in smaller, more fragmented blocks. However, approximately 45 percent of the currently known occupied marbled murrelet sites, and approximately 25 percent of the suitable marbled murrelet habitat in the State, occur on non-federal lands (Tables 5 and 6). Only a very small percentage of suitable marbled murrelet habitat on Federal and nonfederal lands has been surveyed to determine occupancy. More areas have been surveyed to determine presence or absence, but this number is also small. Current Washington State Forest Practices Rules, administered by DNR, do not require private landowners to survey suitable marbled murrelet habitat prior to harvest.

Table 5. Number of active or historic known occupied marbled murrelet sites by land management category and by Conservation Zone.

Conservation Zone	Federal	DNR[1]	Other Nonfederal	Tribal	Conservation Zone Total
Puget Sound	313	43	9	0	365
Western Washington Coast Range	199	141	63	2	405
Totals	512	184	72	2	770

[1] DNR information in this table is based on the location of DNR-managed lands as of April 1995.

Table 6. Acres of suitable marbled murrelet habitat[1] by land management category by Conservation Zone.

Conservation Zone	Federal	DNR[2]	Other Nonfederal	Tribal	Conservation Zone total
Puget Sound[3]	800,857	88,016	191,460	857	1,081,190
W. WA. Coast Range	452,108	60,556	57,452	11,196	581,312
Totals	1,252,965	148,572	248,912	12,053	1,662,502

[1] For the purposes of this analysis, suitable marbled murrelet habitat was mapped onto GIS as a composite of old-growth forest (produced by WDFW as of 1988 (Eby)), Classified Canopy coverage (from DNR as of 1991 (Collins)) and Rate of Harvest data base (from DNR as of 1993 (Collins)), with an elevation cut-off of 3,500 feet. The FWS considers this to be the best available information for determining suitable marbled murrelet habitat on a state-wide scale.

[2] DNR information in this table is based on the location of DNR-managed lands as of April 1995.

[3] These acres include 10,731 acres of Federal lands, 213 acres of DNR-managed lands, and 2,246 acres of Other nonfederal lands in this Conservation Zone. These acres are located in the I-90 corridor area, and represent data that is otherwise missing from current GIS maps of habitat for that area. These acres were calculated by determining the percent of each land management category in the Western Washington Cascades Province (USDI 1992c) within the range of the marbled murrelet that is also marbled murrelet habitat. This percentage was then multiplied by the acres of corresponding land management category in the area of missing data. Maps showing this area of missing data are available from this office.

Specific Washington State Forest Practices Rules are triggered by Federal listing of a species as threatened or endangered in Washington. Under current Emergency Forest Practices Rules pertaining to the marbled murrelet (WDNR 1995c), certain forest management activities on nonfederal lands within or adjacent to a known occupied marbled murrelet site are classified as "Class IV - special" forest practices. The applicant for the Forest Practices permit must submit, in

addition to the usual information for the Forest Practices permit, an environmental checklist under the State Environmental Policy Act (SEPA). This checklist covers all resources, not just the species in question (i.e., the marbled murrelet). The DNR then makes a threshold determination from this information. The DNR may make a determination of nonsignificance, mitigated determination of nonsignificance, or a determination of significance. If a determination of nonsignificance or mitigated determination of nonsignificance is reached, the action can proceed. If a determination of significance is made, preparation of an EIS is required. This includes public involvement. State regulations exclude from Class IV - Special review requirements, areas covered by an HCP approved by the FWS.

There are two Rescissions Act sales in the action area. Both have been harvested and may have affected the marbled murrelet. Neither of these sales are located in critical habitat. These are the Rocky and Caraco Cat timber sales on the Olympic National Forest. Rocky removed 55 acres of high quality marbled murrelet habitat, and Caraco Cat removed 98 acres of low-quality marbled murrelet habitat. No surveys were conducted at either sale prior to harvest, therefore an unknown number of marbled murrelets may have been incidentally taken.

STATUS OF THE SPECIES (in the action area) - MARBLED MURRELET CRITICAL HABITAT

Eleven critical habitat units totaling 1,631,300 acres have been designated in Washington State. Of these, nine units include Federal lands, seven units include DNR-managed lands, and portions of two units occur on private lands (Table 7). Four units include Federal lands, five units include nonfederal and Federal lands, one unit includes DNR and private lands, and one unit includes DNR-managed lands only. DNR-managed lands in critical habitat are concentrated in southwest Washington and on the Olympic Peninsula, with lesser amounts in the North Cascades (Table 8).

Table 7. Acres of Federal, State (DNR-managed), and private lands within Marbled Murrelet Critical Habitat Units (CHUs) in Washington State.

	Federal (CHUs 1-3, and 6-11)	State (CHUs 1,2,4-6, 7, 9)	Private (CHUs 5 and 7)	Total
Total Marbled Murrelet CHU Acres	1,201,167	426,881	2,509	1,630,557
Percent of Total Washington Marbled Murrelet CHU	74	26	0	100

Table 8. Acres and percents of DNR-managed lands within Marbled Murrelet Critical Habitat Units (CHU) within various areas of the State.

Area of the State	Total Acres	Percent of Total Statewide Marbled Murrelet CHU
Olympic Peninsula (Units 1, 2 and 6)	174,912	10.7
Southwest Washington (Units 4 and 5)	167,755	10.3
North Cascades (Units 7 and 9)	84,214	5.2
TOTAL (7 units)	426,881	26.2

Currently, suitable marbled murrelet habitat on these lands is highly fragmented. Critical habitat units on Federal lands tend to contain a greater proportion of suitable habitat, higher quality suitable habitat, and larger blocks of suitable habitat than nonfederal lands. In most cases, marbled murrelet habitat in CHUs on State and private lands is more isolated than on Federal lands. On Federal lands, conditions are expected to gradually improve since the vast majority of Federal critical habitat coincides with the Late-Successional Reserves designated under the Northwest Forest Plan.

STATUS OF THE SPECIES (in the action area) - GRAY WOLF

The gray wolf is listed by both the Federal government and the State as endangered in Washington (WDFW 1993). This species is a habitat generalist that may potentially be found throughout the Cascade Range from Canada south from the Idaho border to the Cascade Range west through the Okanogan highlands.

There have been 148 Class 1 and Class 2 gray wolf observations in the HCP planning area (Figure 3) since 1983. Class 1 observations have been recorded, investigated and confirmed by a biologist. Confirmation requires a direct observation of a wolf or hearing a wolf. A Class 2 observation is a probable wolf observation. No visual observation or vocalization was confirmed by a biologist. The observation does include however, current physical descriptions that differentiate the observed animal from coyote or domestic dog. Of the Class 1 and Class 2 observations, 4 are located on DNR-managed lands, 79 are within 8 miles of DNR-managed lands, and 65 are beyond 8 miles of DNR-managed lands.

Virtually all naturally vegetated lands in remote areas are considered potential habitat for this species, with the most suitable habitats being those that support dense ungulate populations, such as deer, elk, moose, and mountain goats (Laufer and Jenkins 1989). Because the gray wolf may occur in the action area and little data have been collected on its habitat use, all naturally vegetated lands should be considered potentially suitable habitat for this species. Vegetation types used most

often include quaking aspen, mixed conifer, ponderosa pine, white or grand fir, alpine meadows, shrublands, riparian zones, marshes, bogs, and swamps (Thomas 1979; cited in USDI et al. 1996). Roads can have significant effects upon wolves. Excessive road densities and human use may displace wolves from critical areas. Roads are associated with and may cause increases in direct mortality. Wolves are found only where conditions will support an adequate prey base, comprised primarily of ungulates. Adequate ungulate populations can be enhanced through access control and habitat improvement. Habitat manipulation and other forest management (e.g., roads) which negatively affect ungulate populations may also result in the take of wolves. Human activity around active dens may be particularly disruptive, especially just prior to whelping and in the first few weeks after birth.

STATUS OF THE SPECIES (in the action area) - GRIZZLY BEAR

The grizzly bear is listed by the Federal government as threatened in Washington (USDI 1975) and by the State as endangered (WDFW 1993). This species potentially occurs throughout the Cascade Range, from Canada south to near Yakima, and across the northern third of the State from the Okanogan Highlands to the Idaho border (Almack et al.1993).

The North Cascades Recovery Zone, as described in the draft North Cascades Recovery Chapter, consists of 9,565 square miles and extends from the Canadian border in north central Washington south to Interstate 90. It includes all of the North Cascades National Park Service Complex; the Mount Baker-Snoqualmie National Forest and Wenatchee National Forest north of Interstate 90; and the Okanogan National Forest west of the Okanogan River. The federally designated North Cascades Grizzly Bear Ecosystem extends through this region at elevations from about 492 to 10,778 feet. The proposed Recovery Zone within the North Cascades Grizzly Bear Ecosystem (proposed North Cascade Grizzly Bear Recovery Zone) is contiguous with an area of low grizzly bear density in Canada.

Grizzly bears occur, at least occasionally, within the proposed North Cascades Grizzly Bear Recovery Zone. There have been 153 reports of grizzly bears recorded in the North Cascades between 1983 and 1991. Of those reports, 21 were classified as confirmed grizzly bears (Almack et al. 1993). This recent evidence indicates that the North Cascades may harbor a small number of resident grizzly bears (Almack et al. 1993). The proposed Recovery Zone contains in excess of 6,000,000 acres. In the east-side and west-side planning units of the HCP, DNR manages 122,300 acres in the proposed Recovery Zone. Some DNR-managed land within the proposed Recovery Zone could potentially provide low elevation spring habitat for grizzly bears.

The majority of DNR-managed lands covered by the HCP within the Recovery Zone can be described as occurring in four locations: Skagit Valley, Spada Lake, the west side of the Methow Valley, and a group of separate sections between Wenatchee and Lake Chelan and surrounded by National Forest (Figure 4). In each of these areas, DNR-managed lands generally lie between Federal lands and areas of human occupancy and related activity.

STATUS OF THE SPECIES (in the action area) - BALD EAGLE

In Washington, the bald eagle is listed by both the Federal government and the State as threatened. Of the seven States involved in the Pacific Bald Eagle Recovery Plan, Washington State supports the largest bald eagle breeding and wintering populations (USDI 1986).

Most nesting territories in Washington are located on the San Juan Islands, the Olympic Peninsula coastline, and along the Strait of Juan De Fuca, Puget Sound, Hood Canal, and the Columbia River. In addition, bald eagle nesting territories are found within southwestern Washington, the Cascade mountains, and in the eastern part of the State where adequate sources of prey are found. The nesting season extends from January 1 through August 15, with egg laying in March (Stalmaster 1987). The 1995 information provided by the WDFW indicates that 656 bald eagle nesting territories were surveyed throughout Washington; 559 nests were occupied and 472 young were produced. This is well above the recovery goal of 276 pairs for Washington. Approximately 44 of the known territories are located on DNR-managed lands within the action area.

The bald eagles wintering season in Washington extends from October 31 through March 31. Most bald eagles winter on river systems in the Puget Trough, on the Olympic Peninsula, along the outer coast and Strait of Juan De Fuca, or on the Columbia River Basin. These areas provide food sources such as anadromous fish runs, high concentrations of waterfowl, and mammalian carrion. Wintering bald eagles are found, normally in smaller numbers, at low elevations along streams and rivers east of the North Cascades crest.

STATUS OF THE SPECIES (in the action area) - PEREGRINE FALCON

The peregrine falcon is listed by both the State and Federal government as endangered. Peregrine falcon nesting occurs along the Pacific Coast, the Columbia River Gorge, in the San Juan Islands, and at inland sites. Potential peregrine falcon habitat managed by DNR includes land near estuaries and other water bodies where large concentrations of shorebirds, songbirds, and waterfowl accumulate. Nearby cliffs, high escarpments, bridges, and river cut banks might also be used for nesting (USDI 1982b; Craig 1986; cited in USDI et al. 1996).

Of 51 known nesting sites located in the HCP planning area, 5 are located on DNR-managed lands, 6 are located within 1 mile of DNR-managed lands, and 40 are located at least 1 mile beyond DNR-managed lands. In addition to the nest sites, Washington provides important migratory and wintering habitat for peregrine falcons, including estuaries such as Skagit River flats, Grays Harbor, and Willapa Bay where peregrine falcons prey on large concentrations of waterfowl and shorebirds.

STATUS OF THE SPECIES (in the action area) - ALEUTIAN CANADA GOOSE

The Aleutian Canada goose may intermittently occupy sites within the HCP area as they migrate between their Alaskan breeding and Oregon and California wintering grounds. WDFW (1991)

identified habitat used by the geese during migration in and near Willapa Bay and along the lower reaches of the Columbia River. Other potential resting and feeding sites include lakes, large ponds, wetlands, grasslands, meadows, and agricultural fields.

STATUS OF THE SPECIES (in the action area) - COLUMBIAN WHITE-TAILED DEER

Two subpopulations consisting of 260 to 285 deer of the Lower Columbia population, occur within the action area in Wahkiakum County, Washington. The mainland subpopulation is found on the Julia Butler Hansen National Wildlife Refuge. This subpopulation declined from estimates as high as 500 in the mid-1980's to 140 individuals in 1994. The 1996 floods resulted in significant mortality and the present population is estimated at 60 individuals. The Puget Island subpopulation, which is found primarily on private and DNR-owned lands, has been fairly stable at 200 to 250 individuals since the late 1980's.

STATUS OF THE SPECIES (in the action area) - OREGON SILVERSPOT BUTTERFLY

In Washington, the species was historically found along the coast from Westport to the Columbia River. The Oregon silverspot butterfly is the only federally listed species of arthropod historically extant in Washington State. Recent surveys have not reported any butterfly occurrences in Washington. Most likely there are no Oregon silverspot butterflies found in Washington (Paul Hammond, pers. comm., 1997; WDFW 1993). In Washington, potential habitat for the Oregon silverspot is limited to the coastal grasslands of the Long Beach Peninsula near Loomis Lake.

EFFECTS OF THE ACTION - NORTHERN SPOTTED OWL

The HCP covers 1.6 million acres of DNR-managed lands within the range of the spotted owl in Washington. This geographic area is delineated into three planning areas: the West-side Planning Units, the East-side Planning Units, and the OESF (Figure 1). Different spotted owl conservation strategies have been proposed for these areas, but conservation goals are similar: (1) to provide for demographic support; (2) species distribution; and, (3) dispersal.

Outside the OESF, DNR-managed lands in the eight planning units (five west-side and three east-side) total about 1.4 million acres. The HCP would provide 202,000 acres of NRF Management Areas and 200,000 acres of Dispersal Management Areas in these eight planning units. The NRF Management Areas in the five West-side Planning Units total 163,000 acres in size; the three East-side Planning Units NRF Management Areas total 39,000 acres. The OESF Planning Unit includes about 270,000 acres of DNR-managed land in 11 landscape planning units. NRF Management Areas are not identified in the OESF. Instead, each landscape planning unit would provide certain proportions of spotted owl habitats.

The following discussion of spotted owl effects is organized into three groups: the five West-side Planning Units, the three East-side Planning Units, and the OESF. This is consistent with the different management and mitigation approaches proposed for these areas.

The methodology used to estimate the amount of incidental take associated with timber harvest of suitable spotted owl habitat is described in the DEIS and discussed under Effects of the Action. No analysis for OESF long-term incidental take was provided in the DEIS; therefore, the FWS analysis is described under that section of this document.

Five West-side Planning Units

The impacts of DNR's HCP (WDNR 1996a) in the five West-side Planning Units were evaluated in the DEIS (USDI et al. 1996) using the following five criteria:

1. Amount and distribution of NRF habitat;
2. Spotted owl activity centers (current and projected future sites);
3. Dispersal habitat;
4. Demographic support; and,
5. Species distribution

The following discussion of impacts is largely based on the analysis included in the DEIS, except where noted, and is organized accordingly.

Nesting, Roosting, and Foraging Habitat

DNR manages approximately 1,180,000 acres in the five West-side Planning Units. Current habitat conditions in these units are summarized in Table 9. Thirty-one percent (roughly 358,400 acres) of the area currently support suitable habitat. Twenty percent of this suitable habitat, or 71,680 acres, is currently restricted from harvest in order to avoid incidental take under the Act. After implementation of the HCP, the acreage of suitable habitat that cannot be degraded to a non-habitat condition on DNR-managed lands will increase from 71,680 acres (currently restricted from harvest) to 81,500 acres. Under the proposed permit, incidental take of spotted owls would be authorized on 93 percent of DNR-managed lands and approximately 77 percent of the existing suitable habitat in these planning units, if conducted in a manner consistent with the HCP.

Table 9. Existing suitable spotted owl habitat (SH) acres and landscape conditions in the five West-side Planning Units. All acres and percents are calculated only for DNR-managed lands within the planning units.

Planning Unit	Acres of DNR-managed lands in Unit[1]	Acres SH in Unit (% of total acres in Unit)[2]	Acres inside NRFMAs (% of total acres in Unit)[3]	Acres SH inside NRFMAs (% of SH in Unit)[3]	Acres outside NRFMAs (% of total acres in Unit)[3]	Acres SH outside NRFMAs (% of SH in Unit)[3]
Straits	111,307	17,168 (15)	0	0	111,307 (100)	17,168 (100)
S. Coast	238,283	46,963 (20)	0	0	238,283 (100)	46,963 (100)
N. Puget	395,420	185,874 (47)	107,599 (27)	51,494 (28)	287,821 (73)	134,380 (72)
S. Puget	145,278	32,382 (22)	2,684 (2)	1,535 (5)	142,594 (98)	30,847 (95)
Columbia	289,310	75,977 (26)	52,996 (18)	31,925 (42)	236,314 (82)	44,052 (58)
Total	1,179,598	358,364 (30)	163,279 (14)	84,954 (24)	1,016,319 (86)	273,410 (76)

[1] Planning Unit data and NRF Management Area (NRFMA) data received from DNR in September 1996.

[2] Planning Unit data and NRF Management Area data received from DNR in September 1996. Owl habitat is based on data developed by the Mid Continent Ecological Service Center Technology Applications Team of the Biological Resources Division of the U.S. Geological Survey and delivered to the FWS in October 1996.

[3] Adapted from Table IV.4 in the HCP (WDNR 1996a).

Roughly 163,000 acres (14 percent of DNR-managed lands in the five West-side Planning Units) would be designated as NRF Management Areas, generally within 2 miles of the Federal reserves. Fifty percent of the NRF Management Areas, by WAU, are intended to support spotted owl habitat at any one time. Approximately 7 percent of DNR-managed lands in these five units, or 81,500 acres, will be expected to provide spotted owl habitat during the course of the incidental take permit. This compares to over 358,000 acres of spotted owl habitat now existing on DNR-managed lands in the five West-side Planning

Units. The remaining 93 percent of DNR-managed lands in the five units will not be explicitly managed to support nesting spotted owls in the long term. This represents 1,016,319 acres outside the NRF Management Areas and approximately 81,500 acres inside the NRF Management Areas.

Because there are no reliable means of predicting which method of defining spotted owl habitat on DNR-managed lands in the five West-side Planning Units is most accurate, two methods were used in the DEIS analysis (USDI et al. 1996). The Age Class method uses the age class of the primary tree species in a stand as a surrogate for habitat. The Multiple Data Source method combines data from several sources in order to fully cover land management categories. Limitations of each method are described in the DEIS.

Approximately 76 percent of the existing suitable habitat in the five West-side Planning Units is located outside NRF Management Areas and could be harvested in the short-term. The greatest habitat losses would likely occur within the Straits and South Coast Planning Units, which represent a significant portion of the Olympic Peninsula and Western Washington Lowlands Provinces, as well as DNR-managed lands in the action area. There are no lands within these two units proposed for the management of spotted owl habitat, either through Dispersal Management Areas or NRF Management Areas. All existing habitat in these two units (about 64,000 acres) could be available for harvest in the short-term. Restrictions due to riparian zones, steep and unstable slopes, and marbled murrelet deferrals are likely to reduce the actual acreage available for harvest.

The North Puget, South Puget and Columbia Planning Units have lands allocated for owl management through NRF Management Areas and Dispersal Management Areas. DNR proposes to manage 163,000 acres, or 7 percent of DNR-managed lands within the five West-side Planning Units, as NRF Management Areas. Between 117,513 and 281,046 acres of existing suitable habitat, primarily located outside the NRF Management Areas, would be available for harvest.

Using the MDS data available to the FWS (See Data Source Section), the FWS evaluated the arrangement of habitat in the NRF Management Areas WAUs to determine where excess suitable habitat available for harvest was located and where harvest activities would likely occur in the short-term. Within the NRF Management Areas, 50 percent of the landscape by WAU is to be managed as spotted owl habitat, with the remaining acres available for harvest. Using AC habitat data, about 13,000 acres of additional habitat would need to be developed before all NRF Management Areas could meet the 50 percent habitat target. In contrast, the MDS method of estimating habitat indicates there are currently about 3,450 acres of suitable habitat available for harvest within the three units. There are 13 WAUs in which harvest of available suitable habitat could occur within NRF Management Areas: 9 within the North Puget Planning Unit; 2 within the South Puget Planning Unit; and 2 within the Columbia Planning Unit.

The NRF Management Areas in the North Puget Planning Unit are notably small parcels which reflect the fragmented pattern of DNR-managed lands in that unit. These parcels are primarily located adjacent to Federal reserves, but because of the fragments in the parcels, they may be somewhat limited in their ability to support a functional spotted owl territory and provide significant demographic support to the spotted owl population in these reserves.

The South Puget Planning Unit supports one small NRF Management Area in the I-90 West area, totaling 2,600 acres. In the Columbia Planning Unit, two NRF Management Areas are proposed in the White Salmon and Souixon areas.

The stated goal of the NRF Management Areas is to provide demographic support to adjacent Federal reserves. In this regard, the NRF Management Areas represent the mitigation "backbone" of the HCP. The demographic support provided by these NRF Management Areas may be limited in the first 30 years while habitat is developing.

The majority of spotted owl habitat provided in the NRF Management Areas is not required to be NRF habitat. At the 50 percent objective, the NRF Management Areas will contain a minimum of 81,500 acres of sub-mature or better spotted owl habitat. Approximately 20,400 acres, or 25 percent of the 81,500-acre habitat target, would be required to support high quality nesting habitat, or actual NRF habitat, at any one time. This nest patch contribution represents 1.7 percent of DNR-managed lands in the five West-side Planning Units.

The remaining 61,100 acres of designated habitat in the NRF Management Areas would meet the definition of sub-mature habitat, which provides roosting and foraging opportunities for spotted owls. The NRF Management Areas will eventually include stands older than 70 years outside the 300-acre nest patches as a result of riparian reserves, steep and unstable slopes, and/or marbled murrelet habitat deferred from harvest. The spatial arrangement of these stands may limit their ability to function as spotted owl habitat. Most are likely to be small, narrow and/or disjunct, resulting in a small percentage of interior forest habitat. In addition, steep and unstable slopes are, by definition, prone to failure naturally and are unlikely to support spotted owl habitat over the long term.

The strategy of delineating a 300-acre nesting habitat patch with a contiguous 200-acre buffer of sub-mature or better habitat within a 0.7-mile radius was derived from studies that correlated pair site occupancy over time with suitable habitat quantities at various radii (Irwin and Martin 1992). This study examined the predictability of occupancy in the Eastern Cascades Province, where spotted owl habitat use differs from that on the west side. This strategy may not be as effective in the Western Cascades Province. However, the habitat retained within these NRF areas is expected to provide demographic support in the form of nesting opportunities on DNR land, and foraging and roosting habitat for owls that are centered on adjacent Federal reserves.

Sub-mature or better habitat that counts toward the habitat target in a WAU can be managed at a rate of up to 5 percent every 2 years, as long as the stands retain at least sub-mature

characteristics after manipulation. The 2-year limitation is based on the recognition that prey populations may be impaired during this period and that the required canopy cover takes a year or two to rebound. In addition, the ramifications of habitat modification may not become apparent before this and spotted owls may avoid these areas for 2 years. An additional 5 percent of the habitat contributing to the target can be entered as long as sub-mature habitat remains within the first 5 percent that was managed. If the first 5 percent managed is inadvertently degraded to a condition less than sub-mature habitat, then no additional habitat can be managed until that first 5 percent has returned to at least a sub-mature condition. Consequently, even in a worst-case scenario, habitat quantities in a WAU are not expected to be reduced to less than 45 percent. The strategy of allowing degradation of NRF habitat to sub-mature or roosting/foraging habitat may provide DNR with more flexibility in scheduling harvest, but may incur additional risks to the species.

In summary, in the short term, the west-side NRF Management Areas may not be sufficient to support reproductively successful spotted owl sites at current levels under a worst-case scenario; however, in the long term, overall habitat quality is expected to improve in these areas and reproductive success should rise above current levels. The amount existing at the end of the incidental take permit period is expected to be more than would occur under the no action alternative because of the conservation strategy provided. In addition, if model projections indicate that the stand structure objectives would not be met in 2066, the FWS and NMFS have the option of extending the permit for up to three 10- year periods. Stand structure projections indicate that 32 percent of the NRF Management Areas will be in forests older than 150 years by year 2096 (Tables 10 and 11).

Table 10. Projected percent of DNR-managed lands within various stand stages[1] at current year, 1996, for the OESF and West-side Planning Units. No stand stage projections were calculated for the East-side Planning Units.

Stand Stage	OESF (%)	West-side[2] (%)			
		NRF Management Areas	Dispersal Management Areas	Areas with No Spotted Owl Role	Entire West-side
Open - 0 to 10 years old	20	3	3	5	5
Regeneration - 10 to 20 years old	25	9	9	12	11
Pole - 20 to 40 years old	25	12	22	15	15
Closed - 40 to 70 years old	5 to 10	28	47	40	39
Complex - 70 plus years old	20 to 30	49	19	28	30
Fully Functional[3] - 150 to 200 plus years old	< 2	23	4	3	6

[1] Projections include on-base and off-base DNR-managed lands. Off-base acres include areas such as high-elevation areas, poor growing sites, unstable slopes, marbled murrelet occupied sites, Natural Resource Conservation Areas, and Natural Area Preserves where no harvest will occur. Riparian and wetland buffers were included in the on-base acres. Many off-base or riparian acres lack the potential to attain old-forest conditions.

[2] Four projections are given for the West-side Planning Units. It is not possible to add projections for NRF Management Areas, Dispersal Management Areas and areas with no spotted owl role to calculate projections for the entire West-side Planning Units unless weighted by acreage.

[3] The Fully Functional stand stage is a subset of Complex stand stage. For these projections, stands 200-plus years old for the OESF Planning Unit and 150-plus years old for the West-side Planning Units were considered to be in Fully Functional stand stages.

Table 11. Projected percent of DNR-managed lands within various stand stages[1] at year 2096 for the OESF and West-side Planning Units. No stand stage projections were calculated for the East-side Planning Units.

Stand Stage	OESF (%)	West-side[2] (%)			
		NRF Management Areas	Dispersal Management Areas	Areas with No Spotted Owl Role	Entire West-side
Open - 0 to 10 years old	5 to 15	1 to 2	5 to 6	6 to 7	5 to 6
Regeneration - 10 to 20 years old	5 to 15	4 to 5	7 to 8	10 to 12	9 to 11
Pole - 20 to 40 years old	5 to 15	9 to 13	13 to 16	20 to 23	17 to 21
Closed - 40 to 70 years old	5 to 15	16 to 22	25 to 30	28 to 33	26 to 31
Complex - 70 plus years old	60 to 70	59 to 71	39 to 49	25 to 35	31 to 42
Fully Functional[3] - 150 to 200 plus years old	10 to 15	32 to 46	12 to 20	9 to 17	12 to 22

[1] Projections include on-base and off-base DNR-managed lands. On-base acres are defined as DNR-managed lands that are timbered and harvestable. Excluded are lands such as high-elevation areas, poor growing sites, unstable slopes, marbled murrelet occupied sites, Natural Resource Conservation Areas, and Natural Area Preserves. Riparian and wetland buffers were included in the on-base acres. Off-based DNR-managed lands include those areas where no harvest will occur. Many off-base or riparian acres lack the potential to attain old-forest conditions. The figures displayed above as a range indicate the level of uncertainty. These figures represent the FWS's best estimate of the stand stage projections resulting from the HCP.

[2] Four projections are given for the West-side Planning Units. It is not possible to add projections for NRF Management Areas, Dispersal Management Areas and areas with no spotted owl role to calculate projections for the entire West-side Planning Units unless weighted by acreage.

[3] The Fully Functional stand stage is a subset of Complex stand stage. For these projections, stands 200-plus years old for the OESF Planning Unit and 150-plus years old for the West-side Planning Units were considered to be in Fully Functional stand stages.

The FWS expects certain changes to occur in stand stage amounts within the first 50 to 70 years. The FWS expects: (1) a decrease in the 10-to-20-year stand stage early in the permit period; (2) a steady decrease in the 40-to-70-year stand stage; and, (3) a steady increase in the 70-plus-year stand stage. Within the 70-plus-year stand stage, the FWS expects: (1) in the 70-to-100-year stand stage, approximately stable amounts for about the first 50 years as various stands move through this phase and a decrease in this stand stage late in the permit period: (2) in the 100 to 150-year stand stage, an increase early in the permit period and as stands mature they will be replaced by additional stands moving into this category; and, (3) in the 150 year category, slight increases during the first 50 years, after which larger increases will occur (i.e., as much as 5-fold increases in some cases).

Spotted Owl Activity Centers

Within the five West-side Planning Units, there are currently 145 known territorial spotted owl sites whose estimated home ranges include DNR-managed lands. An additional 42 projected unknown sites are also potentially influenced by DNR-managed lands (Table 4.2.7, DEIS). Of the 145 known sites, 66 (46 percent) have estimated home ranges located wholly or partially within NRF Management Areas (Table 12). Seventy-nine known sites (54 percent) lay outside the NRF Management Areas. Since these will receive no protection under the HCP, most of these sites would not be expected to remain occupied beyond the first 10 years of the incidental take permit period.

Table 12. Known territorial spotted owl site centers (WDFW status 1, 2 or 3)[1] on DNR-managed lands in the five West-side Planning Units.

Planning Unit	Inside NRF Management Areas	Outside NRF Management Areas	Total
Straits	0	44	44
South Coast	0	11	11
North Puget	37	3	40
South Puget	5	5	10
Columbia	24	16	40
Total	66	79	145

[1] Status 1, 2, and 3 owl sites represent reproductive pair, pair-status unknown, and territorial single sites, respectively.

Outside NRF Management Areas: Of the 79 known spotted owls whose site centers are located outside the NRF Management Areas, between 51 and 55 sites would be at risk of incidental take due to implementation of the HCP (Table 13). Most of these sites will be lost out of the Straits and South Coast Planning Units, which have no DNR-managed lands allocated to NRF or dispersal habitat. These sites represent up to 6 percent of those known within the range of the northern spotted owl in Washington and 38 percent of those within the five West-side Planning Units. Once the short-term impacts of the HCP have been absorbed by the spotted owl population, few sites are expected to be established on DNR-managed lands outside NRF Management Areas.

Table 13. Spotted owl sites that are not likely to persist as a result of habitat loss due to HCP implementation in the five West-side Planning Units. These numbers include spotted owls likely to be harassed due to disturbance within NRF Management Areas.

Location	Near-term Known	Near-term Unknown[1]	Long-term Projected	TOTAL
Outside NRFMAs	51 to 55	8	0	59 to 63
Within or Near NRFMAs	15	7	8 to 36	30 to 58
TOTAL	66 to 70	15	8 to 36	89 to 121

[1] This category of incidental take is described on page 4-65 of the DEIS (USDI et al. 1996).

Near Term Impacts to Sites Within NRF Management Areas: To estimate near-term impacts, it was assumed that existing site centers would remain static for the next 10 years. Thirty-six known sites currently have some portion of their estimated home ranges in NRF Management Areas that contain more than their target habitat acres, based on WAU-level calculations. Of these, 15 sites would have habitat acres reduced to levels below 40 percent, or further reduced from levels already below 40 percent.

Long Term Impacts to Sites within NRF Management Areas: the DEIS used a two-step analysis to estimate long-term impacts to spotted owl sites within NRF Management Areas. The first step involved analyzing potential impacts to current sites after all NRF Management Areas reached their target habitat condition. It was assumed that site status would remain static. The following impacts were predicted. Of 66 spotted owl sites with some portion of their home ranges in NRF Management Areas, 17 to 18 sites (26 percent and 27 percent, respectively) would have improved habitat conditions due to implementation of the HCP. Between 24 and 28 sites would have overall habitat conditions reduced, but with quantities remaining above 40 percent, and between 8 and 14 sites would have habitat quantities

unchanged. Seven to 16 sites would have habitat levels reduced to below 40 percent (Table 4.2.21, DEIS). Impacts could be greater or lesser, however, depending on the persistence rate of existing sites, the establishment of new territories, and the location of future harvests.

The second step of the analysis attempted to address the dynamic nature of spotted owl sites and habitat through the development of a model to predict changes in spotted owl numbers over time. The model incorporated three assumptions: (1) after 10 years, spotted owl habitat on DNR-managed lands outside NRF Management Areas will be insufficient to support spotted owls; (2) Federal reserves will provide a source of spotted owls using NRF Management Areas in the future; and, (3) the analysis by Burnham et al. (1994) represents a reasonable estimate of the population rate of change. In choosing the upper limit of the confidence interval instead of the mean, the DEIS attempted to portray a worst-case scenario for spotted owls by producing a larger estimate of spotted owls that could be adversely affected by future harvest activity inside the NRF Management Areas.

Five scenarios were developed to relate rate of population to changes in Federal habitat. These scenarios are outlined in the DEIS. The results of DNR's modeling exercise are also illustrated in Table 4.2.22 of the DEIS. Approximately 8 to 36 future spotted owl sites were predicted to be at risk, depending on population trends and demographics at various points in time.

Two additional forms of take may occur within the NRF Management Areas. The first involves the risk of harm to owls that have not been detected by surveys (or are otherwise unknown) and are nesting in stands considered habitat available for harvest. This is most likely to occur when owls nest outside the 300-acre nest patch or its 200-acre buffer. There is no commitment to survey for owls if activities are proposed in habitat adjacent to a 300-acre nest patch. Consequently, owls occupying these stands could face the loss of their nest site, and eggs or young could be killed during harvest activities that occurred during the breeding season.

The second form of take involves harassment due to disturbance. This form of take is most likely to occur after the first 5 to 10 years of the incidental take permit period, when the location of spotted owl site centers may not be known. The commitment to implement seasonal restrictions within 0.7 miles of known sites during the breeding season inside NRF Management Areas would avoid disturbance to the extent that owl sites are identified.

Outside the NRF Management Areas, seasonal harvest restrictions will be applied within known 70-acre core areas during the breeding season. This will entail the risk of harm. Since there will be no effort to survey and owl site centers could move annually, there is no assurance that nesting core areas will be identified and protected from harvest during the nesting season. Consequently, it is possible that eggs and/or young outside the NRF Management Areas could be destroyed during the breeding season. Even if surveys were conducted sufficiently to identify nest sites, harassment due to disturbance could occur when activities with the potential to disturb nesting owls occurs adjacent to 70-acre core areas.

Consequently, owls occupying these stands could face the loss of their nest site, and eggs or young could be killed during harvest activities that occurred during the breeding season.

Dispersal Habitat

There is no existing requirement for maintenance of dispersal habitat on nonfederal lands. Dispersal Management Areas are proposed for 115,851 acres of DNR-managed lands in the North Puget, South Puget, and Columbia Planning Units (see Maps 12-14 in the DEIS). Fifty percent of the Dispersal Management Areas, by WAU, would have to be in a dispersal habitat condition at any one time. As such, 57,925 acres of dispersal habitat would be provided in these three units. The Straits and South Coast Planning Units have no lands dedicated to providing dispersal habitat.

The locations of the Dispersal Management Areas are generally consistent with the recommendations of the SAG (Hanson et al. 1993) for dispersal habitat in these geographic areas. These areas correspond with the SOSEAs identified in the SAG and incorporated into the Forest Practices Regulations for the spotted owl. In the North Puget Planning Unit, Dispersal Management Areas are delineated around the Finney Block with the objective of facilitating dispersal between Federal reserves to the north, south, and east. The objective of the two Dispersal Management Areas in the South Puget Planning Unit is also to improve dispersal between Federal reserves in the Mineral Block and the Cascades, and between the Cedar River watershed and Federal reserves north of Mt. Rainier. In the Columbia Planning Unit, a Dispersal Management Area is proposed in the Columbia Gorge Area of Concern, south of Federal reserves in the Gifford Pinchot National Forest.

Some Dispersal Management Areas may provide sub-mature or better habitat due to riparian reserves, steep and unstable slopes, deferred marbled murrelet habitat, and rotation ages necessary to meet the 50 percent dispersal habitat targets. The spatial arrangement and location of these sub-mature or better stands will likely limit their demographic contribution to spotted owls, but could facilitate successful dispersal by providing better roosting and foraging habitat than would otherwise be available.

Contributions to dispersing spotted owls currently provided by suitable habitat in the Straits and South Coast Planning Units will be reduced, but some dispersal habitat could be provided in the future due to stand structure commitments contained in the HCP.

Demographic Support

One of the objectives of the HCP is to provide demographic support to spotted owl populations within the Federal reserves. Demographic support refers to the contribution of individual sites, clusters of sites, and habitat to the viability of a species. While implementation of the HCP would most likely reduce the number of individual nest sites on DNR-managed lands in the near term, a contribution is provided to owls located within Federal reserves through the supplementation of nesting and foraging opportunities.

There are no provisions to survey for spotted owls in the NRF Management Areas prior to conducting activities that have the potential to harm owls. The chance of harvesting an owl site unintentionally during each year of the HCP planning period was analyzed by the FWS, and results indicate that approximately 3.5 owls could be harmed within the westside planning units each year. These numbers could be reduced due to owls usually nesting in high-quality habitat protected under the HCP. In addition, nest sites may often be located on adjacent Federal lands and owl home ranges will only overlap onto DNR-managed lands.

The positive aspect of the HCP is that demographic support to Federal reserves will be provided at strategic locations. While the HCP management strategy will not provide large quantities of NRF habitat, it does provide nesting habitat and larger quantities of roosting and foraging habitat within 2 miles of Federal reserves. The retention of 50 percent of the sub-mature habitat and 300 acres of NRF habitat within WAUs is a major contribution to adjacent owl pairs located on Federal reserves.

Species Distribution

The HCP will result in a reduction in species distribution within the action area. This may occur in several areas on the periphery of the owl's current range in Washington, including southwest Washington. While the potential loss of a few occupied sites in southwest Washington would reduce the geographic distribution of the species, this loss is not considered significant in light of the strategic contributions of the HCP in supporting owl conservation efforts of the Northwest Forest Plan and other HCPs, and is not expected to appreciably reduce the likelihood of survival and recovery of the species.

Summary of Effects (West side)

The DNR HCP will provide demographic support to the spotted owl and will contribute to the conservation goals of the Northwest Forest Plan. However, impacts of the HCP will occur during the critical 100-year transition period for habitat regrowth in Federal reserves. Demographic support to spotted owls in the Federal reserves may be limited during this period given the near-term loss of spotted owl habitat and sites outside NRF Management Areas, and the potential for harm and harassment of spotted owls during the nesting season within NRF Management Areas and the potential degradation of nesting habitat within close proximity of nest sites within the NRF Management Areas. Nonetheless, these impacts are not expected to appreciably reduce the likelihood of the species survival throughout its range for the following reasons: (1) the Federal Reserves will continue to support spotted owls in the State of Washington; (2) NRF Management Areas are strategically located close to the Federal reserves they are designed to support; and, (3) the NRF Management Areas will continue to provide demographic support throughout the permit period with no significant drop in the number of spotted owls using these areas. As the Federal reserves improve in habitat condition and support larger numbers of spotted owls, the mitigation provided by DNR should become more effective.

Three East-side Planning Units

DNR-managed lands east of the Cascade crest have been delineated into the Chelan, Yakima, and Klickitat planning units (Figure 1). The impacts of DNR's HCP in the three East-side Planning Units were evaluated in the DEIS using the following six criteria:

1. Amount and distribution of NRF habitat;
2. Spotted owl activity centers (current and projected future sites);
3. Dispersal habitat;
4. Demographic support;
5. Species distribution; and,
6. Forest health and risk of catastrophic disturbance.

Nesting, Roosting, and Foraging Habitat

DNR-managed lands in the three East-side Planning Units total approximately 228,800 acres (4 percent of the East Cascades Province). Current habitat conditions in these units are summarized in Table 14. Twenty-nine percent, or 67,400 acres, is considered NRF habitat. This is 6 percent of all NRF habitat in the eastern Cascades Province. Forty-nine percent of DNR's habitat in these planning units is currently restricted from harvest to avoid a risk of take pursuant to section 9 of the Act. Through issuance of an incidental take permit, incidental take of spotted owls would be authorized in 91 percent of DNR-managed lands and at least 71 percent of the suitable habitat in these planning units.

Table 14. Existing spotted owl suitable habitat (SH) acres and landscape conditions in the three East-side Planning Units. All acres and percentages are calculated only for DNR-managed lands within the planning units.

DNR Planning Unit	Acres of DNR-managed lands in Unit (% of total acres.)[1]	Acres SH in Unit (% of total acres in unit)[2]	Acres inside NRFMAs in Unit (% of total acres in unit)	Acres SH inside NRFMAs (% SH in unit)[3]	Acres outside NRFMAs (% of total acres in unit)	Acres SH outside NRFMAs (% of SH unit)
Chelan	15,700 (7)	5,000 (32)	5,600 (36)	2,847 (51)	10,100 (64)	2,153 (43)
Yakima	80,700 (35)	14,900 (19)	13,600 (17)	4,754 (35)	67,100 (83)	10,146 (68)
Klickitat	132,400 (58)	47,500 (36)	19,900 (15)	11,954 (60)	112,500 (85)	35,546 (75)
Total	228,800 (100)	67,400 (29)	39,100 (17)	19,555 (50)	189,700 (83)	47,845 (71)

[1] Planning Unit data and NRF Management Area (NRFMA) data received from DNR in September 1996.

[2] Planning Unit data and NRF Management Area data received from DNR in September 1996. Owl habitat is based on data developed by the Mid Continent Ecological Service Center Technology Applications Team of the Biological Resources Division of the U.S. Geological Survey and delivered to the FWS in October 1996.

[3] Adapted from Table IV.4 in the Draft HCP.

In the East-side Planning Units, site-specific stand information was unavailable on most of the landscape. To model vegetation classes, landsat imagery was used with available DNR stand inventory data (36 percent of the landscape). Habitat was described as either suitable or unsuitable for spotted owls. Upon field verification, the information displayed an error of 13 to 23 percent. Errors were found in underestimating the amount of suitable habitat on the landscape. DNR plans to have the vegetation in each WAU reevaluated prior to any forest management action. This would reduce the risk of removing NRF habitat mistakenly, especially in WAUs that are under the 50-percent target. It is expected that more site specific information (particularly in classifying spotted owl habitat) could alter the level of impacts addressed in this analysis.

In order for NRF habitat to be provided on DNR-managed lands in the East-side Planning Units, DNR has set aside NRF Management Areas. These management areas are generally located within 2 miles of Federal reserves. Roughly 17 percent (39,200 acres) of DNR-managed lands on the east-side will be managed for the purpose of maintaining nesting and

territorial pairs of spotted owls in NRF Management Areas. At any one time, 50 percent of the NRF Management Area, by WAU, will contain sub-mature or higher quality habitat. The remaining 83 percent of DNR-managed lands outside of the NRF Management Areas (189,600 acres) is not expected to support nesting spotted owls and, outside of the Dispersal Management Areas, is not expected to provide spotted owl habitat after implementation of the HCP. There are 35 WAUs that contain DNR designated NRF Management Areas on the east side. At present, five of these WAUs are above their habitat target and have 2,100 acres of spotted owl habitat available for harvest.

At the 50 percent objective, the NRF Management Areas will contain a minimum of 19,600 acres of sub-mature or better spotted owl habitat. The NRF Management Areas in the three East-side Planning Units are currently providing nearly 99 percent of the target 50 percent (19,400 acres) overall. Suitable habitat outside of the NRF Management Areas and suitable habitat in the NRF Management Areas in excess of the 50 percent per WAU (2,100 acres) will not be managed as spotted owl NRF habitat. In the three East-side Planning Units this amounts to 50,100 acres, a 74 percent reduction from the current condition. The most significant habitat losses will occur in the Klickitat Unit where the majority of DNR-managed lands in the three East-side Planning Units is located. While sub-mature habitat may provide the elements of NRF as used by east-side spotted owls, this habitat may be of lower quality habitat than what is currently available over the landscape.

NRF Management Areas in the Chelan and Yakima units are small, scattered parcels which reflect the fragmented pattern of DNR-managed lands. The ability of these small, isolated parcels to support a functional spotted owl territory and provide demographic support to the spotted owl population in adjacent Federal reserves is limited.

The conservation strategy for the three East-side Planning Units allows the harvest of habitat in all NRF Management Areas of a WAU of up to 5 percent for any 2-year period, regardless of whether they are below, meet, or exceed the 50 percent habitat target. The 2-year limitation is based on the recognition that prey populations may be impaired during this period, "the ramifications of habitat modification may not become apparent before this," the required canopy cover takes a year or two to rebound and, spotted owls may avoid these areas for 2 years. Such modification can occur in close proximity (within 0.7 miles) of site centers, where maintaining habitat is most important for site viability and reproductive success. An additional 5 percent of the habitat contribution to the target can be entered as long as sub-mature habitat remains within the first 5 percent that was managed. If the first 5 percent managed is inadvertently degraded to a condition less than sub-mature habitat, then no additional habitat can be managed until that first 5 percent has returned to at least a sub-mature condition. Consequently, even in a worst-case scenario, habitat quantities in a WAU are not expected to be reduced to less than 45 percent.

This strategy of allowing degradation of NRF habitat to low quality habitat and nonhabitat in some cases, may provide DNR with more flexibility in scheduling harvests but, as noted by the HCP Science Team, also incurs additional risks to the species.

Habitat quality within the east-side NRF Management Areas may not be sufficient to support reproductively successful spotted owl sites at current levels under the worst-case scenario. However, the HCP will provide NRF habitat for the spotted owl, and will contribute to the conservation goals of the Northwest Forest Plan. In the long term, habitat on DNR-managed lands is expected to be more contiguous in nature and concentrated closer to Federal reserves than current conditions. This will provide demographic support to those reserves. Once the NRF Management Areas have reached their habitat targets, the level of support available to the Federal reserves will be constant over time.

Spotted Owl Activity Centers

Within the three East-side Planning Units, there are 78 known spotted owl sites which have DNR-managed lands within their median annual home range. Eighteen of these have site centers which are centered on DNR-managed lands. An additional 23 projected unknown sites are also potentially influenced by DNR-managed lands (Table 4.2.7, DEIS). Of the 78 known sites, 45 (58 percent) overlap NRF Management Areas. Thirty-three known sites (42 percent) would lay outside the NRF Management Areas and receive no dedicated protection under the HCP. Most of these sites would not be expected to remain viable beyond the first 10 years of the incidental take permit period. Of the 23 projected unknown sites, 11 are within and 12 are outside the NRF Management Areas.

Outside NRF Management Areas: Of the 33 known spotted owl sites with home ranges located outside the NRF Management Areas, 27 sites (83 percent) would be at risk of incidental take due to implementation of the HCP (Table 15). These sites represent 3 percent of those known within the range of the spotted owl in Washington and nearly 10 percent (27 of 295) of those within the three East-side Planning Units (Table 16). Once the short-term impacts of the HCP have been absorbed by the spotted owl population, no future sites are expected to be established outside NRF Management Areas.

Table 15. Spotted owl sites on DNR-managed lands or adjacent ownerships that are not likely to persist as a result of HCP implementation in the three East-side Planning Units. The numbers include spotted owls likely to be harassed due to disturbance within NRF Management Areas.

Location	Near-term Known	Near-term Unknown	Long-term Projected	Total
Outside NRF Management Areas	27	11	0 (none left)	38
Within or Near NRF Management Areas	20	5	0 to 30 (over term of HCP)	25 to 55
TOTAL	47	16	0 to 30	63 to 93

Table 16. Known spotted owl site centers (WDFW status 1, 2 or 3)[1] by land manager in the three East-side Planning Units.

	Federal	DNR	Other Nonfederal	Tribal	Total
Chelan	74	1	3	0	78
Klickitat	23	11	8	13	55
Yakima	124	4	34	0	162
Total	221	16	45	13	295

[1] Status 1, 2, and 3 owl sites represent reproductive pair, pair - status unknown, and territorial single sites, respectively.

Near-Term Impacts to Sites Within NRF Management Areas: To estimate near-term impacts, it was assumed that existing site centers would remain static for the next 10 years. Twenty known sites currently have some portion of their estimated home ranges in NRF Management Areas that contain more than their target habitat acres. In the near term, none of these would have habitat acres reduced to levels below 40 percent. Twenty sites have less than 40 percent NRF within their home range circles. Of these, 11 currently have less than 1 percent DNR-managed land within their circles and any additional management may result in incidental take. An additional 7 known sites may incur incidental take in the long term along with potentially 16 projected unknown spotted owl sites in the near term.

To develop an estimate of the population rate of change, similar to that developed for the West-side Planning Units that could be applied across the three East-side Planning Units, the DEIS used the population rate of change derived from the Cle Elum study area. The 95percent confidence interval for the population rate of change from the Cle Elum study area is 0.861, 0.987. Spotted owl density observations are consistent with the value of 0.987.

Five scenarios were developed to relate the population rate of change in Federal habitat and potential incidental take. These scenarios are outlined in the DEIS. The results of this modeling exercise are also illustrated in Table 4.3.19 of the DEIS. The level of risk depends on population trends and demographics at various points in time. For the purposes of the FWS risk assessment to identify future potential incidental take, 0 to 30 (mean maximum number for of all scenarios over the HCP incidental take permit period) spotted owl sites in the East-side Planning Units are subject to take over the term of the HCP.

In summary, the direct effects to spotted owl activity centers include the maintenance of suitable habitat in some areas and the loss of habitat and general degradation of suitable habitat elsewhere. Spotted owl sites outside of the NRF Management Areas will be protected by a seasonal 70-acre core around known sites. These sites will no longer provide demographic support to Federal reserves.

Dispersal Habitat

Dispersal habitat provides the means of movement from one location to another. This is usually the movement of a juvenile from its natal area to a site where it may reproduce. When large blocks of dispersal habitat exist, the rate of successful dispersal is higher. For the spotted owl, dispersal areas provide the means for movement between relatively high quality habitat patches (that area used for nesting, roosting and foraging). These patches of habitat provide some minimal level of foraging and limited protection from predators. Without these areas, juveniles may not be able to successfully disperse away from their natal area and survive to reproduce.

The DNR HCP provides for dispersal by setting aside Dispersal Management Areas for a total acreage of 85,000. Similar to NRF Management Areas, these areas will be managed to provide for 50 percent of the landscape in dispersal habitat condition at any one time, which is 42,500 acres on the east side. This will be achieved by managing stands with 40 trees per acre greater than 11 inches in diameter at breast height (dbh) with 50 percent canopy closure or better. This is greater than the 40 percent recommended by the ISC. In the East-side Planning Units, dispersal habitat will be calculated on a quarter township basis rather than by an entire WAU as in western Washington. Due to the absence of riparian management zones and other species-specific protection measures that contribute to dispersal on the west-side, a smaller unit of habitat measurement was determined to be necessary to address the potential for gaps between dispersal stands in the East-side Planning Units.

Within the range of the northern spotted owl in the East-side Planning Units, areas of concern for the spotted owl on nonfederal lands have been identified (ISC, Scientific Advisory Group, Northwest Forest Plan). These sources consistently name the following as these areas of concern: (1) Easton area; (2) Taneum area; (3) I-90 East/Teanaway; (4) North Blewett; (5) Entiat Ridge; and, (6) White Salmon (Table 17). Four of these are important for dispersal habitat.

Table 17. Areas of concern and their spotted owl conservation functions within nonfederal lands in the East-side Planning Units of the DNR HCP (Adapted from the Scientific Analysis Team report, 1993).

Landscapes	Conservation Functions		
	Demographic Support	Dispersal	Maintain Species Distribution
Easton		X	
Taneum	X		
I-90 East/Teanaway	X	X	
North Blewett	X	X	
Entiat Ridge	X		X
White Salmon	X	X	

Dispersal Management Areas are proposed for two of the three units (Klickitat and Yakima) in the east-side analysis (see Maps 22-24 in the DEIS). The locations of the Dispersal Management Areas are generally consistent with the recommendations of the Scientific Advisory Group (Hanson et al. 1993) for dispersal habitat in these geographic areas of concern. The NRF Management Areas in conjunction with the Dispersal Management Areas are expected to provide for dispersal on approximately 124,100 acres (54 percent) of DNR-managed lands.

Demographic Support

Demographic support is accomplished by providing sufficient NRF habitat to support individual territorial spotted owls. Providing dispersal habitat alone does not achieve this. The demographic support of nonfederal NRF habitat areas in the Entiat Ridge, Blewett Pass, I-90 East/Teanaway, Taneum and White Salmon areas of concern may be reduced from current levels because under the HCP, DNR is required to provide submature habitat As opposed to higher quality nesting habitat. Maintenance of submature habitat on the east side may provide nesting opportunities for spotted owls, although not to the extent that would occur if the areas were managed for high quality nesting habitat as opposed to higher quality nesting habitat as opposed to higher quality nesting habitat. Unlike spotted owls on the west side, owls here have demonstrated the ability to successfully reproduce within pockets of older forest that are likely to be maintained in submature forests. In addition, these NRF Management Areas will include foraging habitat that is likely to support owls in the Federal reserves.

The commitment to implement seasonal restrictions within 0.7 miles of known sites during the breeding season inside NRF Management Areas would only avoid disturbance to the extent that owl sites are identified.

The HCP is expected to provide conservation benefits to the spotted owl primarily through the maintenance of sub-mature habitat in the NRF Management Areas, which will support owl sites located within the Federal reserves, and through the provision of dispersal habitat in the Dispersal Management Areas between the Federal reserves. The contributions of the NRF and Dispersal Management Areas to spotted owl conservation will support Federal efforts under the Forest Plan. Although the areas outside both the NRF and Dispersal Management Areas are not expected to contribute to owl conservation, this loss is not likely to significantly reduce the likelihood of the survival and recovery of the species in the wild.

Species Distribution

The HCP provides minimal protection to site centers on the edge of the species' range (e.g., in the Entiat Area). While the potential loss of sites is likely to reduce the geographic distribution of the species, this loss is not considered significant in light of the strategic contributions of the HCP in supporting owl conservation efforts of the Northwest Forest Plan.

Forest Health and Risk of Catastrophic Disturbance

Historically, the east-side landscape was developed and maintained by wildfire. Forest fire suppression in the last 100 years has changed the natural patterns of forest succession. These activities have promoted multi-layered canopy development as well as stands with high fire susceptibility. One of the threats to spotted owls on the east-side is catastrophic fire (see Table 5). During the 1994 fire season, large amounts (greater than 10,000 acres) of NRF habitat were lost throughout the three east-side units. Most of the habitat was located in places that historically had regular and repetitive fires, but due to present management activities had been protected from fires for 50 to 75 years. In order to prevent fires of this magnitude from affecting Federal lands in the future, Federal lands managers are planning numerous strategies designed to return dry or xeric areas to a more fire and disease-resistant system. These strategies are sound ecologically but may have direct impacts on suitability of habitat within the Federal reserves, at least until habitat that is better able to withstand natural disturbances (mesic and wet sites) is regrown. Most regional experts agree that the east-side Federal reserves will not avoid catastrophic fires during the next century. Therefore, it is important that suitable habitat is provided and maintained on nonfederal lands, especially in areas of concern. Under the HCP, the DNR will have more flexibility to manage and reduce catastrophic disturbances by reducing fuel loads and removing diseased trees.

The proposed HCP will provide for suitable habitat for the spotted owl on 17 percent of DNR-managed lands through the designation of NRF Management Areas. Due to the removal of nearly 74 percent of existing suitable habitat on DNR-managed lands, approximately 38 spotted owl singles or pairs outside of the designated NRF Management Areas are at risk of take. An additional 25 to 55 are at risk within the NRF Management Areas for the term of the HCP. In addition, owls which are adjacent to disturbing activities within the NRF Management Areas are at risk of take due to harassment and degradation of habitat.

By designating NRF Management Areas, the HCP will provide protection to spotted owl sites primarily within 2 miles of Federal reserves. Although most of these management areas overlap the areas of concern, the Entiat Ridge area was not incorporated into a NRF Management Area. This places sites within this area and other sites at the edge of the species range (outside of NRF Management Areas) at risk and reduces the overall range of the species. While the potential loss of sites is likely to reduce the geographic distribution of the species, this loss is not considered significant in light of the strategic contributions of the HCP in supporting owl conservation efforts of the Northwest Forest Plan.

Although habitat quantity throughout the landscape is reduced, habitat quality will increase as the DNR-managed lands provide increased support for the Federal reserves. In addition, dispersal quality and quantity will be provided over the landscape in a more or less contiguous manner at a higher level than prior to implementation of the HCP. Current levels of DNR-managed NRF habitat contribute a relatively low level of support to the Federal reserves due to checkerboard ownership and current forest management. Current management strategies isolate spotted owl activity centers and home range circles throughout the landscape. After implementation of the HCP, those targeted WAUs where NRF Management Areas are designated will provide nesting, roosting, and foraging opportunities for owls on DNR-managed lands adjacent to Federal reserves, and a higher level of support to Federal reserves.

The HCP is expected to provide conservation benefits to the spotted owl primarily through the maintenance of sub-mature habitat in the NRF Management Areas, which will support owl sites located within the Federal reserves, and through the provision of dispersal habitat in the Dispersal Management Areas between the Federal reserves. The contributions of the NRF and Dispersal Management Areas to spotted owl conservation will support Federal efforts under the Northwest Forest Plan. Although the areas outside both the NRF and Dispersal Management Areas are not expected to contribute to owl conservation, this loss is not likely to jeopardize the continued existence of the species throughout its range.

Olympic Experimental State Forest

The impacts of DNR's HCP in the OESF planning units were evaluated in the DEIS using the following five criteria:

1. Amount and distribution of NRF habitat;
2. Habitat capability;
3. Spotted owl activity centers (current and projected future sites);
4. Demographic support; and,
5. Species distribution.

Amount and Distribution of NRF Habitat

DNR management of the OESF will provide for spotted owl population monitoring, spotted owl habitat conditions, and adaptive management. DNR will manage each landscape planning unit to maintain or restore spotted owl habitat. This habitat will include:

1. At least 20 percent of DNR-managed lands in the landscape planning unit in the understory-reinitiation to old-growth forest stages that are potential old-forest habitat (after Hanson et al. 1993), and

2. At least 40 percent of DNR-managed lands in the landscape planning unit in the stem-exclusion to old-growth forest stages that are potential old-forest, sub-mature, or young-forest marginal spotted owl habitat types (Hanson et al. 1993), including any old-forest habitat described in (1) above.

The DEIS provided an analysis of the range of impacts from two data sources, DNR stand inventory data and thermatic mapping data. Of the 270,000 acres of DNR-managed lands in the OESF area (which includes National Park, National Forest, private and tribal lands on the Olympic Peninsula) from 8,024 acres (DNR inventory data) to 5,200 acres (thermatic mapping data) of old forest are above the 20 percent threshold by OESF Planning Unit. These acres could be harvested in the short term and represent approximately 16 percent (DNR inventory data) or 10 percent (thermatic mapping data) of the old forest in the OESF. Seven of the 11 OESF Landscape Planning Units currently contain less than 20 percent old forest. All old forest in these seven planning units will be maintained until 20 percent of the landscape planning unit is in old forest condition. At that time, old forest may be harvested as younger forests grow into old forest condition.

Habitat Capability

Habitat currently capable of supporting spotted owl pairs is concentrated mostly on Federal lands at the interior of the Olympic Peninsula. The low-elevation coastal plain, forest lands that dominate the OESF have little current capability as habitat for spotted owl pairs. Two projections of the HCP 100 years into the future predicts increases in the ability of the low-elevation, coastal plain forests of the OESF to support spotted owl pairs relative to current conditions. One analysis, the Habitat Capability Estimate, predicts a greater than three-fold increase in the area of DNR-managed lands in the OESF area capable of supporting spotted owl pairs, while the second analysis, DNR's Simulation Model, predicts that the DNR-

managed lands in the OESF area would be capable of supporting 80 percent more spotted owl pairs.

The Habitat Capability Estimate technique provides an evaluation of the general habitat capability that will result in the OESF area in the near and long terms under the HCP. Current conditions were estimated to provide 338,900 acres on all land management categories within the 1,066,300-acre OESF, including 48,900 acres of the 270,000 DNR-managed acres, that had at least 40 percent potential habitat at the median annual home range (2.7 mile radius). This suggests that 32 percent of the total area and 18 percent of DNR-managed lands within the OESF area are currently capable of supporting spotted owl pairs.

In comparison, projections for the HCP 100 years into the future resulted in 511,300 acres of all lands and 153,600 acres of DNR-managed lands in the OESF area that had at least 40 percent potential habitat at the median annual home range. Under the HCP, habitat capability is predicted to improve such that 48 percent of all lands, and 57 percent of DNR-managed lands will be capable of supporting spotted owl pairs. This is a greater than 3-fold increase from current conditions. This improvement in habitat capability is predicted to result from: (1) habitat development on all DNR-managed lands under the HCP; (2) habitat development of the Olympic National Forest resulting from current policy (USDA and USDI 1994a); and, (3) generally static conditions on other lands.

DNR's Simulation Model technique provides evaluations of the ability of the landscape to provide suitable sites for resident spotted owls, and computer simulations of spotted owl life histories in response to landscape conditions resulting from the HCP. The habitat model partitioned the Olympic Peninsula into 1,239 hexagonal, 3,134-acre sites, of which 435 were classified as suitable (USDI et al. 1996 App. D). Two hundred thirty-four sites, of which 61 were classified as suitable, contained some DNR-managed lands in the OESF area. Habitat development on Federal lands, and on DNR-managed lands under the HCP, is predicted to increase the number of suitable sites to 505 on all lands and to 99 on DNR-managed lands in the OESF area relative to the No Action Alternative 100 years into the future. Improvements in the quality and quantity of habitat on DNR-managed lands is reflected in the increase in the number of sites classified as suitable and the higher median scores for suitable sites. DNR's management under the HCP would result in the westward extension of suitable sites from the Federal core toward the Olympic National Park coastal strip and in the northwest portion of the peninsula.

Spotted Owl Activity Centers

In the near term, of the 69 known spotted owl sites within 2.7 miles of DNR-managed lands in the OESF area (See Data Sources section), 45 are classified as pair sites, two as sites occupied by spotted owls of unknown pair status, 13 as territorial single sites, and 9 as sites where spotted owls were observed but could not be assigned a resident status. Under the HCP, harvests of habitat would proceed under the guidance of general landscape level management plans without regard for then-current locations of spotted owl sites. In a simple estimate, of the 60 known WDFW status 1, 2, or 3 site centers within 2.7 miles of DNR-

managed lands: (1) 29 sites are not at risk of incidental take due to harvest of habitat under the HCP; (2) 18 sites have greater than or equal to 40 percent habitat on Federal land; and (3) seven sites have greater than or equal to 40 percent habitat on all lands, and at which DNR harvests in the OESF are estimated to maintain greater than or equal to 40 percent habitat on Federal and DNR-managed land. Thus, 31 sites are at risk of incidental take including: 4 sites in which DNR-managed habitat provides the margin above 40 percent; and 27 sites surrounded by less than 40 percent habitat.

In the long term, habitat conditions for spotted owls, and subsequently the number of spotted owl sites, should improve in the OESF. For the purposes of calculating incidental take, the FWS used three measurements; loss of the 70-acre core of habitat around a nest site, loss of 500 acres of the best habitat within a 0.7-mile radius circle around a nest site or activity center, and loss of suitable habitats below 40 percent within a home range radius circle (2.7 miles for the OESF).

DNR will not conduct annual surveys to determine where spotted owl pairs are nesting each year. Therefore, harvest might occur within a spotted owl nest or activity center, within a 500-acre core, or within home range radius circles at or below 40 percent suitable habitats. In addition, unless an entire home range radius circle is on DNR-managed or Federal reserve lands, it is likely that maintenance of 40 percent habitat conditions on DNR-managed lands will not maintain 40 percent habitat within the home range radius circle. As a result, incidental take in the long-term may result from any harvest of spotted owl habitat or disturbance within 0.25 mile of spotted owl nest sites during the nesting season.

FWS anticipates that incidental take as a result of habitat loss may occur for all acres harvested (from 3,300 to 16,300 acres per decade) (USDI et al. 1996a) and that the first decade rate of harvest may continue in subsequent decades. Therefore, the FWS estimates that, in the long-term on the OESF, incidental take may occur for spotted owls associated with harvest of 3,300 to 16,300 acres per decade in as a result of harm and harassment.

Demographic Support

Projected spotted owl population trends 100 years into the future indicate that the spotted owl sub-population on the Olympic Peninsula would decline for approximately 60 years. After that time the population would reverse its negative trend and begin to increase in size because of the increase in habitat capability resulting from habitat development on Federal lands. Projections for the HCP 100 years into the future predicted an Olympic Peninsula spotted owl sub-population that was 5 percent larger, or 20 more pairs, relative to projections of the No Action alternative 100 years into the future.

Species distribution

Under the Northwest Forest Plan, one impact on the viability of the spotted owl sub-population on the Olympic Peninsula results from a relatively restricted geographic and

ecological distribution of spotted owls and their habitat in the mid-elevation forests of the interior Olympic Peninsula. The HCP would extend the geographic and ecological distribution of spotted owls and habitat into low-elevation, coastal plain forests in the OESF area. Habitat capability of this area would increase by 51 percent by the end of 100 years.

A concern with the proposed management in the OESF involves managing to minimum thresholds old forest habitat conditions necessary for spotted owl survival. Should some stochastic event result in old forest habitat loss, landscape planning units could drop below the 20 percent old forest threshold which could limit options for management.

Summary of Effects (OESF)

When spotted owl nest sites are not determined from annual reproduction surveys, potential to harvest or disturb actual nest sites will increase, resulting in potential incidental take. This may be off-set by improved habitat conditions providing the habitat capability to support more owl pairs than current habitat condition. Amounts and distribution of spotted owl habitat are likely to improve over current conditions in both the short term and long term. Habitat conditions are also likely to improve on National Forest lands and other Federal reserves adjacent to the OESF.

Disturbance-related Effects (West side, East side, and OESF)

Annual timber harvest activities on DNR-managed lands within the range of the spotted owl may cause disturbance-related effects. Approximately 50,000 acres of timber harvest occur annually on DNR-managed lands within the range of the spotted owl; 17,000 acres are clearcut harvests and 33,000 acres are thinning harvests. Under the worst-case scenario, all this timber harvest activity could be expected to affect occupied spotted owl sites. However, some of these harvest activities occur outside the breeding season. Fifty-five percent of clearcut harvests and 52.5 percent of thinning activities occur during the breeding season and have the potential to disturb occupied spotted owl sites. These percentages represent 9,350 acres and 17,325 acres, respectively, for a total of 26,675 acres of timber harvest activities that could cause disturbance to occupied spotted owl sites on an annual basis.

Nontimber Resource Activities (West side, East side, and OESF)

Impacts due to habitat loss as a result of nontimber resource activities such as timber harvest for road rights of way are included in the effects of timber harvest section above. The following discussion will cover only those impacts due to disturbance from nontimber resource activities. The nontimber resource activities described in the HCP may have varying potential effects to spotted owls, ranging from no effect to adverse effects. DNR has committed to initiate the HCP amendment process if the 1996 level of incidental take of spotted owls associated with these activities increases as a result of expanding the level of nontimber resource activities on DNR-managed lands covered by the HCP. Descriptions of these activities and the acreage figures discussed below are based on information received from the DNR (Hansen 1996).

Timber harvest activities associated with nontimber resource activities could result in disturbance to spotted owls. DNR timber harvest activities currently operate under the Washington State Forest Practices Rules for spotted owls (WDNR 1996b) and its own provisions regarding protection of spotted owls. These rules restrict all timber harvest of suitable spotted owl habitat within 0.7 mile of an owl site center and management activities within 0.25 mile of an occupied owl site center during the breeding season in Spotted Owl Special Emphasis Areas. Outside Spotted Owl Special Emphasis Areas, no harvest is allowed in the best 70 acres around an owl site center during the nesting season (between March 1 and August 31). DNR prohibits harvest of suitable owl habitat on DNR-managed lands in owl site centers that contain less than 40 percent suitable owl habitat.

Potential incidental take of spotted owls due to disturbance would be caused by nontimber resource activities adjacent to occupied spotted owl sites during the critical nesting season, and by conducting associated timber harvest activities within 0.25 mile of an owl site during the critical nesting period.

No suitable spotted owl habitat would be lost due to collection of special forest products such as Christmas greens and medicinals or Christmas tree cutting. Impacts due to these activities will have minimal effect to spotted owls. These activities mainly entail people walking through the forest, often close to a road, and often in young forests. Some disturbance to spotted owls may occur during the nesting season. Christmas tree cutting is likely to have no impact to spotted owls because it does not involve the loss of suitable spotted owl habitat and it occurs outside the nesting season.

Firewood gathering could potentially have some small disturbance impacts to spotted owls. Firewood gathering occurs in a dispersed manner, involves the use of chainsaws, and is characterized by short (not sustained) bursts of noise (except at slash piles). This activity, which usually occurs at designated areas such as timber harvest landings, adjacent to roads or at the end of spur roads, is restricted to the collection of down wood only, and primarily occurs between September and November. No standing live or dead trees may be taken. Some of this activity could occur adjacent to suitable, occupied spotted owl habitat; however, it occurs mainly outside the nesting season. Therefore, this activity has the potential to disturb a small number of nesting spotted owls, on a limited number of acres on an annual basis.

Grazing permits and leases are in effect only on the east-side; approximately 5,000 acres in the Methow Valley and 100,000 acres in Yakima and Klickitat Counties. No suitable spotted owl habitat would be destroyed due to grazing. Some spotted owl habitat degradation may occur on the East-side Planning Units due to a decrease in forest structure. No grazing permits or leases are in effect on the West-side Planning Units. Grazing permits will have minimal disturbance effect to spotted owls due to the nature of the activity (people and sheep or cattle walking in the forest, usually in young forest).

Current activity levels due to the permitting of rights-of-way across DNR-managed lands are estimated to include approximately 192 acres of timber harvest per year. Timber harvest associated with this activity would be subject to the restrictions cited above and, therefore, any take due to rights-of-way activity in 1996 was likely limited to disturbance during the breeding season. Since most existing permits for rights-of-way are for access to lands by other landowners on existing roads, and not for construction of new road, pipelines or power lines, the disturbance of owls is neglible.

The activity levels due to the permitting of sand and gravel extraction on DNR-managed lands are estimated to cover approximately 800 acres of forested area adjacent to roads. Extraction may involve the use of heavy machinery or blasting with explosives. In the West-side Planning Units, approximately 27 percent of DNR-managed lands are structurally complex forest (greater than 70 years old). No age-class data was available for East-side Planning Units. Assuming all of this forest type is spotted owl habitat and that it is relatively evenly distributed, sand and gravel extraction activities occurred on approximately 216 acres of forested land that could be expected to be adjacent to potential suitable spotted owl habitat. Under the worst-case scenario, FWS assumes that disturbance associated with extraction and blasting would have occurred adjacent to or within spotted owl habitat in 1996 during the nesting season. The likelihood of these activities occurring on 216 acres across DNR's ownership of 1.6 million acres in the vicinity of a spotted owl nest site was low and, therefore, disturbance to owls is negligible.

Current activity levels due to the letting of prospecting leases on DNR-managed lands include several types of actions that are not likely to affect spotted owls. These include geologic mapping, soil and stream sediment sampling, and geophysical surveys. Drilling activities may involve trucks, tracked vehicles, and helicopters. Drilling, as part of prospecting, could impact spotted owls, if it occurred near occupied spotted owl habitat during the nesting season, or if it removed suitable spotted owl habitat. No drilling activities occurred in 1996, and thus no disturbance of spotted owls occurred.

Of the 12 mining contracts currently in effect on DNR-managed lands, only two have the potential to affect spotted owls. These two contracts are for the expansion of an open-pit coal mine (due to occur no earlier than 2008) currently located on adjacent ownership. Since no mining occurred in 1996, no disturbance of spotted owls occurred.

Current oil and gas leases are estimated to exist on 20,000 to 25,000 acres of DNR-managed lands, mostly in the Puget Sound lowlands, although many are inactive. There is currently only one active well, located one mile northeast of Morton. Exploration in 1996 occurred only around this well site. Exploration usually involves a truck-mounted unit that "thumps" the ground with a heavy weight and measures sound wave response. This type of exploration generally occurs on or adjacent to roads. The FWS assumes that this type of exploration may cause disturbance to spotted owls. Exploration rarely involves explosives, but when it does, it usually physically disturbs an area of only a few square feet. The FWS assumes that the use of explosives may disturb spotted owls when it occurs within 1 mile of an occupied site. The disturbance effects of exploration activities would be from the sound of thumping along roads and from any blasting that occurred. Due to location of the current well (in a clearcut, near a town), exploration around the well in 1996 likely involved little or no disturbance of spotted owls.

The current activity levels due to electronic lease sites are estimated to have affected approximately 20 acres of second-growth forest in 1996, primarily in second growth forests along highway corridors. The remainder of these sites occur on non-forested mountain tops, and are not expected to affect spotted owls. In 1996, less than 20 acres were disturbed, and likely resulted in no disturbance to spotted owls.

Current activity levels due to recreation sites are estimated to affect approximately 1,832 acres across DNR-managed lands covered by the HCP, mainly in riparian areas. Maintenance and operation activities associated with recreation sites may disturb spotted owls during the nesting season. This is due to the fact that maintenance and operation activities may involve the use of heavy equipment, and may involve hazard tree removal. In the West-side Planning Units where most recreation sites occur, approximately 27 percent of DNR-managed lands are structurally complex forest (greater than 70 years old). Assuming all of this forest type is spotted owl habitat and that it is relatively evenly distributed, approximately 495 acres of recreation sites could be expected to be adjacent to potential suitable spotted owl habitat. The FWS assumes that maintenance and operation activities could have occurred on some portion of all recreation sites and that disturbance to spotted owls during the nesting season occurred as a result of maintenance and operations activities at these sites. However, it is unlikely that all these acres are adjacent to occupied spotted owl habitat or that activities associated with these recreation sites occurred within 0.25 mile of an occupied spotted owl site during the breeding season. Therefore, disturbance at recreation sites was minimal.

Of all types of recreation, off-road vehicle (ORV) use has the highest likelihood of impacting spotted owls. Motorized recreation is permitted at 17 sites concentrated in 14 areas on DNR-managed State Forest lands within the HCP area. All 17 of these sites occur in the range of the spotted owl. A total of 10 acres of spotted owl habitat occurs within 0.25 mile of an ORV site and within the mean home range of a spotted owl. A total of 339 acres of suitable spotted owl habitat occurs within 0.25 mile of an ORV site, but not within the mean home range of a spotted owl. It is unlikely that all of the 339 acres of suitable spotted owl habitat of unknown occupancy was occupied during the breeding season or that activities associated with the recreation sites on these acres impacted spotted owls.

Summary of Effects - Nontimber Resource Activities

Potential incidental take of spotted owls from nontimber resource activities would be due to disturbance caused by these activities and any associated timber harvest activities occurring adjacent to an occupied spotted owl site, or within 0.25 mile of an owl site, during the critical nesting period. The effects of timber harvest activities have been discussed above.

Disturbance due to plant and firewood collection activities, grazing, and sand and gravel extraction are negligible because of the small acreage affected (e.g. 40 acres per sand and gravel site), the location where they occur (e.g. young forests, along roads) and the timing of the activity (e.g. after nesting season). No disturbance occurred as a result of permitting of rights-of-way, drilling associated with prospecting and mining, oil and gas exploration, and electronic lease sites due to the location of these activities or because these activities did not occur in 1996. Some disturbance may have occurred on the 495 acres of recreation sites that may be adjacent to potential suitable spotted owl habitat. However, it is unlikely that all these acres are adjacent to occupied spotted owl habitat or that activities associated with these sites occurred within 0.25 mile of an occupied spotted owl site during the breeding season. Therefore, disturbance at recreation sites was minimal. Most DNR ORV sites are located within young second growth forests. Disturbance to spotted owls from ORV use in 1996 was unlikely because of the low number of acres of suitable spotted owl habitat within 0.25 mile of an ORV site.

EFFECTS OF THE ACTION - MARBLED MURRELET

The DEIS analyses were based on estimates of suitable marbled murrelet habitat on DNR-managed lands. The DEIS definition of suitable marbled murrelet habitat is as follows: "contiguous forested areas that: (1) are at least 5 acres in size; (2) contain an average of at least two potential nesting platforms per acre; and, (3) are within 50 miles of marine waters." However, the DNR GIS system used for that analysis did not contain a parameter for platforms per acre. DNR determined that a stand would develop two platforms per acre if it had three trees per acre of greater than or equal to 30 inches dbh. DNR had information in their database which included data on stands with four trees per acre of greater than or equal to 32 inches dbh. They used this information, as it was not significantly different from the three trees per acre of 30 inches dbh needed to identify stands with two platforms per acre. DNR's GIS analysis was based on the age of the primary tree species in a forest stand. Secondary tree species were not taken into account. Secondary tree species can provide additional trees per acre greater than 32 inches dbh.

Another analytical approach and the approach used in this opinion would be to define a minimum stand of suitable habitat as at least 5 acres in size, containing at least one potential nesting platform per acre, and occurring within 55 miles of the marine environment. Also, there are likely smaller (less than 5 acres) scattered pockets of suitable habitat occurring across the landscape which have fewer than one nesting platform per acre that are suitable for the marbled murrelet. This is particularly likely in southwest Washington, where past harvest practices on State and private lands have resulted in highly fragmented suitable habitat. Due to the difference on how many platforms per acre constitute potential suitable habitat, and the fact that DNR's GIS analysis did not include secondary tree species, the DEIS's figures contain a lower estimate of habitat than would the analytical approach used in this opinion.

This opinion uses data from several sources to quantify the amount of suitable marbled murrelet habitat. These sources include: late-seral conifer stand data (from DNR's Classified Canopy Coverage (Collins)), old-growth conifer forest stand data (from WDFW (Eby and Snyder)), and current location of clearcuts (from DNR's 1991-1993 rate of harvest information). The resulting GIS layer was refined to exclude areas above 3,500 feet in elevation. The late seral class information in calculations of suitable marbled murrelet habitat may include forested areas with trees smaller than 32 inches dbh. These areas would not meet the DEIS's definition of suitable marbled murrelet habitat.

Timber Harvest Activities

Under the HCP, DNR, which manages approximately 9 percent of the marbled murrelet habitat in Washington, is currently conducting a 2-year habitat relationship study for marbled murrelets (USDI et al. 1996). During this time, DNR is deferring all timber sales that meet a minimum definition of marbled murrelet nesting habitat[1]. The higher quality suitable habitat identified in this study,

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[1] The DEIS for DNR's HCP definition of potential nesting habitat refers to "suitable blocks of contiguous forested areas that: (1) are at least 5 acres in size; (2) contain an average of at least two potential nesting platforms per acre; and, (3) are within 50 miles of marine waters." (USDI et al 1996).

predicted to contain more than or equal to 95 percent of all occupied sites on DNR-managed lands, will then be surveyed for marbled murrelets. All of the suitable marbled murrelet habitat within 0.5 mile of any occupied site would be protected. Some of the surveyed, unoccupied habitat (outside the 0.5 mile areas) would then be available for harvest. The DNR and FWS will use information gathered during the habitat relationship study, completed surveys, and all other available information, in the development of the adaptive management phase of the marbled murrelet strategy. Any additional take resulting from the implementation of the aforementioned adaptive management phase would require a permit amendment.

There are 154 acres (using the DEIS's estimates) of unsurveyed[2], suitable marbled murrelet habitat on DNR-managed lands between 50 and 55 miles of the marine environment. The DNR HCP will not protect these acres as marbled murrelet habitat. This habitat is potentially occupied by marbled murrelets. This habitat occurs in small patches, and exists at the edge of the range of the marbled murrelet, and is therefore not the highest quality habitat, although portions may be protected through other conservation strategies. This habitat is not expected to support high numbers of marbled murrelets. Without complete occupancy-level surveys, the FWS must assume that at least some of these acres are occupied.

Using the results of the habitat relationship study, DNR will conduct occupancy-level surveys on all blocks of habitat within each planning unit with the highest probability of occupancy within 50 miles of the marine environment. Those blocks are expected to contain greater than or equal to 95 percent of the occupied marbled murrelet sites on DNR-managed lands. All contiguous occupied habitat will be protected. Therefore, no known occupied habitat will be lost to harvest.

The remaining DNR-defined habitat, which may contain up to 5 percent of all the potential occupied sites on DNR-managed lands, will not be surveyed for marbled murrelets. This equates to between 18,245 and 74,286 acres of habitat on DNR-managed lands [these numbers represent the estimate from the DEIS analysis (low-end) and the FWS's estimate used in this opinion (high-end) of suitable marbled murrelet habitat acres on DNR-managed lands]. This habitat will be lower quality habitat, as described and identified as a result of the habitat relationship study. Due to the low quality of this habitat, it is expected to support fewer marbled murrelets with lower reproductive success than other, higher quality habitats.

In southwest Washington, all suitable, unoccupied marbled murrelet habitat will be protected from harvest unless (a) the adaptive management phase of the marbled murrelet strategy for the applicable planning unit has been completed, or (b) at least 12 months have passed since the initiation of negotiations of this element without completion of those negotiations. At that time, management of suitable marbled murrelet habitat in southwest Washington would be conducted the same as in other areas of the state. It is unknown when this phase will be completed, and/or if negotiations on those plans would be completed within 12 months of their initiation. Therefore, the FWS can only evaluate the effects of the strategy as currently written and extend those effects throughout the length of the permit period. The FWS will assume that the DNR will protect all suitable marbled

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[2] "Unsurveyed habitat," as used here, means any area of suitable marbled murrelet habitat not surveyed for occupancy, i.e., to a level which would determine occupancy vs. non-occupancy of a forested area by marbled murrelets.

murrelet habitat in southwest Washington for about 4 years from the signing of the permit, but cannot assume protection of all such habitat will continue beyond that time period.

Up to 4,364 acres of suitable, unoccupied marbled murrelet habitat could be available for harvest in southwest Washington. There are currently low numbers of marbled murrelets occurring in this area of the State. Under the HCP, loss of suitable habitat would be minimized due to the protection of all suitable habitat in the short-term.

In all areas of the state, surveyed, unoccupied habitat will not be harvested if it is within 0.5 mile of an occupied site or if, after harvest, less than 50 percent of the suitable marbled murrelet habitat on DNR-managed lands (by WAU or OESF Planning Unit) will be left. In other words, DNR will maintain 50 percent of the suitable habitat by WAU or OESF Planning Unit currently existing on their lands. The remaining 50 percent would be made available for harvest, where it occurs outside 0.5 mile of an occupied site. It is unknown at this time where all occupied sites occur in these WAUs or OESF Planning Units. For the purposes of this analysis, it is assumed that all surveyed, unoccupied habitat occurs outside 0.5 mile of an occupied site, and therefore would be available for harvest. This is likely an over estimate. Total amount of habitat falling into this category equals between 15,204 and 52,000 acres. Added to the 18,245 to 74,286 acres falling into the "5-percent" category, a total of between 33,449 and 126,286 total acres of suitable marbled murrelet habitat would be made available for harvest. Harvest of these acres could occur prior to completion of the adaptive management phase.

Statewide, nonhabitat on DNR-managed lands may be harvested adjacent to occupied marbled murrelet sites on both DNR-managed lands and adjacent lands without restriction. Some disturbance (harassment) to marbled murrelets during the nesting season may result from harvesting nonhabitat adjacent to occupied sites. Timber harvest of nonhabitat may affect the marbled murrelet in several ways. In addition to disturbance, harvest of unsuitable marbled murrelet habitat adjacent to suitable marbled murrelet habitat may increase predation due to edge effect (i.e., increased fragmentation), and may set back or preclude the attainment of high-quality suitable marbled murrelet habitat. Annual timber harvest activites on DNR-managed lands within the range of the marbled murrelet may cause disturbance-related effects. Approximately 44,000 acres of timber harvest occur annually on DNR-managed lands within the range of the marbled murrelet; 16,000 acres are clearcut harvests and 28,000 acres are thinning harvests. Under the worst-case scenario, all this timber harvest activity could be expected to affect occupied marbled murrelet sites. However, some of these harvest activities occur outside the breeding season. Fifty-five percent of clearcut harvests and 52.5 percent of thinning activities occur during the breeding season and have the potential to disturb occupied marbled murrelet sites. These percentages represent 8,800 acres and 14,700 acres, respectively, for a total of 23,500 acres of timber harvest activities that could cause disturbance to occupied spotted owl sites on an annual basis. The FWS estimates that approximately 16 percent of the occupied marbled murrelet sites on DNR-managed lands could be disturbed annually.

Marbled murrelets have lower hatching and fledging success than do other alcids, in part due to egg and chick predation (De Santo and Nelson 1995). Nelson and Hamer (1995a) concluded that predation risk "may be the most significant factor in the development of alcid behavior, especially

for marbled murrelets in their forest nesting environment." These researchers also concluded that "small increases in predation will have deleterious effects on (marbled murrelet) population viability" because of the species' low reproductive rate (Nelson and Hamer 1995b). Clear-cut timber harvest creates biological islands and edges, often favoring edge-tolerant species (Zybach 1993; Paton 1994). Increases in edge habitat due to forest stand fragmentation are believed to increase predation risk for many bird species (Paton 1994), including marbled murrelets (Nelson and Hamer 1995b). Under the current murrelet strategy for the HCP, fragmentation of habitat may be minimized by the conservation strategies developed for occupied and suitable habitat.

Nontimber Resource Activities

Impacts due to habitat loss as a result of timber harvest associated with nontimber resource activities are included in the effects of timber harvest section, above. The following discussion covers those impacts due to disturbance as a result of nontimber resource activities.

There may be varying effects to marbled murrelets as a result of nontimber resource activities, including associated timber harvest. These effects have the potential to range from no effect to adverse affects. DNR has committed to initiate the HCP amendment process if the 1996 level of incidental take of marbled murrelets would increase as a result of expanding the level of nontimber resource activities on DNR-managed lands covered by the HCP. Acreage figures discussed below are based on information received from the DNR (Hansen 1996).

The DNR currently operates under the Washington State Forest Practices Emergency Rules for marbled murrelets (WDNR 1995c; WDNR 1996a). These rules restrict all timber harvest activities within occupied marbled murrelet sites, and restrict disturbing activities (related to harvest and blasting) within 0.25 mile of known occupied marbled murrelet sites during the critical nesting season (April 1 to August 31) or during the daily peak activity period during the critical nesting season, depending on the activity. In addition, DNR has restricted harvest of timber on their own lands to exclude suitable marbled murrelet habitat. For these reasons, most potential incidental take of marbled murrelets due to disturbance would be caused by conducting timber harvest activities (other than removing suitable habitat) during the critical nesting season and conducting nontimber resource activities adjacent to occupied marbled murrelet sites throughout the critical nesting season.

The DNR will not restrict harvest of non-habitat within 0.5 mile of occupied marbled murrelet sites. Therefore, harvest associated with nontimber resource activities of non-habitat could occur directly adjacent to an occupied marbled murrelet site.

No suitable marbled murrelet habitat would be lost due to collection of special forest products such as Christmas greens and medicinals or Christmas tree cutting. Impacts due to these activities are likely to have no effect to marbled murrelets. These activities mainly entail people walking through the forest, often close to a road, and often in young forest. Christmas tree cutting is likely to have no impact to marbled murrelets because it does not involve the loss of suitable marbled murrelet habitat, and occurs outside the nesting season. Grazing permits also are likely to have no effect to

marbled murrelets, due to the fact that leased grazing lands occur outside the range of the marbled murrelet.

Firewood gathering could potentially have some small disturbance impacts to marbled murrelets. This activity involves the use of chainsaws, and may occur adjacent to suitable, occupied marbled murrelet habitat. However, firewood gathering occurs in a dispersed manner, is characterized by short (not sustained) bursts of noise, and occurs mainly outside the nesting season. Therefore, this activity has the potential to disturb a small number of nesting marbled murrelets, on a limited number of acres, on an annual basis.

Current activity levels due to the permitting of rights-of-way across DNR-managed lands are estimated to include approximately 192 acres of timber harvest per year. Timber harvest associated with this activity would be subject to the restrictions cited above and, therefore, any take due to rights-of-way activity in 1996 was likely limited to disturbance during the breeding season. Since most existing permits for rights-of-way are for access to lands by other landowners on existing roads, and not for construction of new road, pipelines or power lines, the disturbance of marbled murrelets is neglible.

Current activity levels due to the permitting of sand and gravel extraction on DNR-managed lands are estimated to cover approximately 800 acres of land within forested areas, adjacent to roads. Extraction may involve the use of heavy machinery or blasting with explosives. Marbled murrelet habitat on DNR-managed lands comprises 9 percent (148,572 acres) of DNR-managed lands in the five west-side and OESF Planning Units, most (75 percent) of which is located in the OESF (USDI 1996a). The FWS assumes, for the purposes of estimation, that activities associated with 9 percent of the acreage of sand and gravel sites causes disturbance to marbled murrelet habitat. This disturbance would affect 72 acres. This is likely an overestimate because both sand and gravel sites and marbled murrelet habitat are unevenly distributed. Under the worst-case scenario, FWS assumes that disturbance associated with extraction and blasting could occur annually, within suitable, unoccupied marbled murrelet habitat and/or adjacent to occupied marbled murrelet habitat, during the nesting season. However, it is unlikely that sand and gravel operations occurring on 72 acres would be within or adjacent to suitable and/or occupied marbled murrelet habitat.

Current activity levels due to the letting of prospecting leases on DNR-managed lands include several types of actions that are not likely to affect marbled murrelets. These include geologic mapping, soil and stream sediment sampling, and geophysical surveys. Drilling, as part of prospecting, could impact marbled murrelets, if it occurred near occupied habitat during the nesting season, or if it removed suitable, unoccupied marbled murrelet habitat. Drilling may involve trucks, tracked vehicles, and helicopters. No drilling occurred in 1996, and thus no disturbance of marbled murrelets occurred due to drilling.

Of the 12 mining contracts currently in effect on DNR-managed lands, only two have the potential to effect marbled murrelets in the future. Those are the two contracts for the expansion of an open-pit coal mine (due to occur no earlier than 2008) currently located on adjacent ownership. Since no mining occurred in 1996, no disturbance of marbled murrelets occurred due to mining.

Current oil and gas leases are estimated to exist on 25,000 acres of DNR-managed lands, mostly in the Puget Sound lowlands. There is currently only one active well, located 1 mile northeast of Morton. Exploration in 1996 occurred only around this well site. Exploration usually involves a truck-mounted unit that "thumps" the ground with a heavy weight and measures sound wave response. This type of exploration generally occurs on roads. The FWS assumes that this type of exploration may disturb marbled murrelets. Exploration rarely involves explosives, but when it does, it usually physically disturbs an area of only a few square feet. The FWS assumes that the use of explosives may disturb marbled murrelets when it occurs within 1/2 mile of an occupied site. The disturbance effects of exploration activities would be from the sound of thumping along roads and from any blasting that occurred. Due to location of the current well (in a clearcut, near a town), exploration around the well in 1996 likely involves little or no incidental disturbance to marbled murrelets.

Current activity levels due to electronic lease sites are estimated to affect approximately 20 acres of second-growth forest in 1996. The remainder of these sites occur on non-forested mountain tops, and are not expected to affect marbled murrelets. In 1996, less than 20 acres of second-growth forest were disturbed, and thus it is likely that this activity results in little or no disturbance to marbled murrelets.

Current activity levels due to recreation sites are estimated to affect approximately 1,832 acres across DNR-managed lands covered by the HCP, mainly in riparian areas. Maintenance and operation activities associated with recreation sites may disturb marbled murrelets when they occur during the nesting season. This is due to the fact that maintenance and operation activities may involve the use of heavy equipment, and may involve hazard tree removal. Marbled murrelet habitat on DNR-managed lands comprises 9 percent (148,572 acres) of DNR-managed lands in the five west-side and OESF Planning Units, most (75 percent) of which is located in the OESF (USDI 1996a). The FWS assumes, for the purposes of estimation, that activities associated with 9 percent of the acreage of recreation sites causes disturbance to marbled murrelet habitat. This disturbance would affect 165 acres. This likely is an overestimate because the OESF, which contains most of the marbled murrelet habitat on DNR-managed lands, contains only 8 percent of the recreation sites. The FWS assumes that maintenance and operation activities could have occurred on some portion of all recreation sites and that disturbance to marbled murrelets during the nesting season occurred as a result of maintenance and operations activities at these sites. It is unlikely that all these acres are within the range of the marbled murrelet, adjacent to occupied marbled murrelet habitat or that activities associated with these recreation sites occurred within 0.25 mile of an occupied marbled murrelet site during the breeding season. Therefore, disturbance at recreation sites was minimal.

Of all types of recreation, off-road vehicle (ORV) use has the highest likelihood of impacting marbled murrelets. Motorized recreation is permitted at 17 sites concentrated in 14 areas on DNR-managed State Forest lands within the HCP area. Fourteen of these sites occur in the range of the marbled murrelet. There are 101 acres of suitable marbled murrelet habitat located within 0.25 mile of the 14 ORV sites; it is unknown whether these acres are occupied by marbled murrelets. Under worst-case scenario, FWS would assume that these acres are occupied by marbled murrelets, and that

ORV use could occur annually during the nesting season. However, it is unlikely that all 101 acres would be occupied by marbled murrelets, or that activities associated with the recreation sites on these acres impacted marbled murrelets.

Summary of Effects

The potential effects to marbled murrelets as a result of the DNR HCP, are summarized below:

1. At least 154 acres of unsurveyed, suitable (assumed occupied) marbled murrelet habitat between 50 and 55 miles of the marine environment will be harvested. Harvest of these low-quality acres is expected to affect nesting pairs of marbled murrelets. Marbled murrelets nesting in such low-quality habitat are not expected to have a high probability of reproducing successfully (i.e., successfully fledging young). Therefore, loss of these acres will not significantly affect the ability of the species to either survive or recover throughout its range.

2. The FWS anticipates the harvest of between 18,245 and 74,286 acres of unsurveyed, low-quality, suitable marbled murrelet habitat, expected to contain up to 5 percent of the occupied marbled murrelet sites on DNR-managed lands. Due to the low quality of these lands, marbled murrelets which may be nesting there are expected to have low reproductive rates. Therefore, loss of these acres will not affect the ability of the population to stabilize and increase in numbers.

3. The FWS anticipates harvest of between 15,204 and 52,000 acres of suitable, unoccupied marbled murrelet habitat. Harvest of this habitat may lead to increased fragmentation and predation across the landscape, thereby reducing the amount, distribution and quality of suitable habitat throughout the action area. However, DNR will survey all high quality suitable marbled murrelet habitat and will protect all suitable marbled murrelet habitat within 0.5 mile of occupied sites. Therefore, any loss of suitable, unoccupied high-quality habitat would occur at distances greater than 0.5 mile from occupied sites, which will help to minimize fragmentation at occupied sites. Loss of those acres would not significantly affect the species across the range.

4. In addition to the adverse effects resulting from habitat loss, the FWS anticipates that marbled murrelets will also be adversely affected by disturbance from timber harvest activities. These activities may occur on an average of 23,500 acres per year.

   The FWS estimates that disturbance from activities could potentially affect 30 percent (44,000 acres) of the occupied marbled murrelet sites on DNR-managed lands annually. Some occupied sites on adjacent land ownerships may also have the potential to be disturbed due to activities occurring on DNR-managed lands. However, the number of sites where murrelets are actually affected by disturbance is likely to be less than 16 percent (23,500 acres) annually because: (1) not all

activities occur during the nesting season; (2) activities during the breeding season may not occur at a time when murrelets are actually present in the stand; (3) many activities do not occur on an annual basis or occur at different locations from year to year; and, (4) disturbance due to such activities would not typically be expected to disrupt birds to the point at which reproduction fails.

Disturbance of murrelets will result in some loss of reproductive potential. However, the actual effect of disturbance on murrelets is of less significance to the species than effects resulting from habitat loss because: 1) disturbance due to such activities is unlikely to cause adult mortality and is less likely to cause juvenile mortality; 2) the loss of a year's reproduction from disturbance is not equivalent to potential total (lifetime) loss of reproduction for a pair resulting from timber harvest; and, 3) future reproduction at a site is not precluded.

5. The FWS anticipates that disturbance caused by nontimber resource activities to marbled murrelets may occur. Potential incidental take of marbled murrelets from nontimber resource activities would be due to disturbance caused by these activities and any associated timber harvest activities occurring adjacent to an occupied marbled murrelet site, or within 0.25 mile of an occupied site, during the critical nesting period. These activities may disturb birds on 338 acres per year. The effects of timber harvest activities have been discussed above.

   Disturbance due to firewood collection activities, permitting of rights-of-way, and sand and gravel extraction are negligible because of the small acreage affected (e.g. 40 acres per sand and gravel site), the location where they occur (e.g. young forests, along roads) and the timing of the activity (e.g. after nesting season). No disturbance occurred as a result of collection of forest vegetation, grazing, drilling associated with prospecting and mining, oil and gas exploration, and electronic lease sites due to the location of these activities (e.g. grazing on the eastside) or because these activities did not occur in 1996. Disturbance may have occurred on the 165 acres of recreation sites adjacent to marbled murrelet habitat but it is unlikely that all these acres are within or adjacent to occupied marbled murrelet habitat or that activities associated with these sites occurred within 0.25 mile of an occupied marbled murrelet site during the breeding season. Most DNR ORV sites are located within young second growth forests. Disturbance to marbled murrelets from ORV use in 1996 was unlikely because of the low number of acres of suitable marbled murrelet habitat within 0.25 mile of an ORV site. Therefore, disturbance at recreation sites was minimal.

The draft Recovery Plan specifically identifies several short-term actions needed from HCPs related to the development and implementation of management strategies to meet the needs of the marbled murrelet on nonfederal lands. The DNR conservation strategy for marbled murrelets implements these actions. These are described as follows:

1. Maintain all occupied nesting habitat - While not all occupied sites will be protected (unsurveyed habitat containing 5 percent of the DNR sites will be released), the best habitat, containing 95 percent of the occupied sites on DNR-managed lands, and in all likelihood more than 95 percent of the population on DNR-managed lands, will be surveyed and protected if found to be occupied. This strategy is essential for the implementation of the next two actions.

2. Maintain potential and suitable habitat in larger blocks - In general, suitable habitat on DNR-managed lands is highly fragmented. All surveyed, unoccupied habitat within 0.5 mile of known, occupied sites will be retained under the marbled murrelet strategy. This will retain suitable habitat around occupied sites where the greatest opportunity exists for creating larger blocks of habitat in a highly fragmented landscape.

3. Maintain and enhance buffer habitat surrounding potential nesting stands - While buffer habitat will not specifically be protected; riparian and leave tree strategies will maintain a certain number of nest trees on the landscape and increase the number of potential trees in areas where they are currently lacking.

The recently published overview chapter in the *Ecology and Conservation of the Marbled Murrelet* (Ralph et al. 1995b), statements by the Marbled Murrelet Recovery Team (1994), and previous seabird and colonial waterbird research (Anderson 1988; Anderson and Keith 1980; Boellstorff et al. 1988; Burger 1981; Ellison and Cleary 1978; Pierce and Simons 1986; Safina and Burger 1983) support these conclusions.

EFFECTS OF THE ACTION - MARBLED MURRELET CRITICAL HABITAT

The designation of critical habitat for the marbled murrelet did not set numerical population goals, but was designed to identify those areas which are most critical for the conservation of the species throughout its range. The removal of primary constituent elements within critical habitat units is of greatest concern where: 1) habitat is already of poor quality or in limited supply; and, 2) adjacent critical habitat units or protected, undesignated Federal lands, such as National Parks, are not available for the species.

Suitable habitat that would be harvested would most likely be clear-cut under proposed practices, although limited shelterwood harvest may occur. In general, harvest could result in the removal of of two primary constituent elements, nesting trees and the adjacent forest. Finally it is only the habitat that would be harvested that is least likely to be occupied, because of low numbers of platforms and nest trees. Habitat that has been surveyed and found to be unoccupied is an exception. Besides the effects to the stand being harvested, adjacent stands may be degraded due to blowdown and changes in micro-climatic conditions.

The effects of harvest on nest trees, which are the most difficult primary constituent element to create, would be mitigated by several measures relative to current forest practices. Potential nesting trees would be retained to varying extent in riparian buffers which are larger than the current forest practices. The leave tree requirement of five live trees per acre, two of which are large, structurally dominant unique trees, could also maintain and increase the distribution of nest trees throughout the landscape. Leaving residual nesting trees could provide for habitat more quickly where management results in longer rotations. While it may be possible at some sites (coastal hemlock stands with mistletoe) to regenerate nest trees within 100 years, most sites would require up to 250 years before nest trees develop.

The final rule designating critical habitat for the marbled murrelet (USDI 1996c) defined the scope of analysis for evaluating the impacts of an activity on marbled murrelet critical habitat. For a wide-ranging species such as the marbled murrelet, where multiple critical habitat units are designated, each unit has a local, regional (Conservation Zone), and range wide role in contributing to the conservation of the species. The basis for an adverse modification opinion would be whether a proposed action appreciably reduces the ability of critical habitat units to perform the function for which they were designated in supporting the Conservation Zone. In evaluating the effect of a proposed action, the FWS analyzes the impacts to individual units in light of their contribution to the survival or recovery of marbled murrelets in the Conservation Zone, and the overall range of the marbled murrelet in Washington, Oregon, and California. The loss of populations in one or more Conservation Zones, or even a major part of a Conservation Zone, could lead to genetic and demographic isolation of parts of the population.

Each critical habitat unit (CHU) is considered important for maintaining a stable, well-distributed population of the marbled murrelet. The loss of function in one or more CHUs could reduce the probability that this will occur. Maintaining the species throughout its range is important to provide the species with the capability to recover from catastrophic events affecting suitable habitat in a portion of its range.

Approximately 73,396 acres of suitable marbled murrelet habitat occur on DNR-managed lands in marbled murrelet CHUs in Washington. Suitable habitat, as defined from late-seral mapping, is being used in this analysis as a surrogate for the primary constituent elements since mapping of these elements by remote sensing is not feasible. The GIS analysis of marbled murrelet habitat, as defined in the DEIS, provides a reasonable estimate of that subset of habitat which has a high likelihood of being occupied, but it does not capture the lower quality habitat with low densities of platforms (fewer than two platforms per acre and smaller size platforms (Pacific Seabird Group 1996)). It is also too restrictive a definition of habitat to be used to estimate the acreage of primary constituent elements for the purposes of this analysis.

Projected rates of occupancy of DNR-defined marbled murrelet habitat were estimated by a planning unit based on past marbled murrelet survey results. These rates of occupancy are used to estimate the minimum amount of suitable surveyed habitat that would be released under the marbled murrelet strategy on DNR-managed lands in each CHU. The amount of DNR-defined surveyed, unoccupied

DNR-defined habitat which would be retained because it is within 0.5 mile of an occupied site is not known. Therefore, the calculated amount of habitat to be retained is a minimum amount.

There is also suitable marbled murrelet habitat in DNR-managed Natural Area Preserves and Natural Resource Conservation Areas. These lands are managed for ecological values, including the protection of endangered and threatened species. Timber harvest is not an authorized activity. Therefore, all suitable marbled murrelet habitat, occupied and unoccupied, would be protected in these areas. Suitable habitat in a Natural Resource Conservation Area or Natural Area Preserve would be included in determining the amount of habitat that needs to be protected in a WAU. The effect of the release of low quality, unsurveyed, suitable habitat and surveyed unoccupied habitat on critical habitat varies by CHU. These effects are described below and shown in Table 18.

Table 18. Estimated acres of suitable marbled murrelet habitat on DNR-managed lands to be released by CHU under the HCP.

CHU	Habitat Acres on DNR-managed Lands (Late-seral Mapping) in CHU (1)	Habitat Acres on DNR-managed Lands in CHU (DNR Estimate) (2)	Habitat Acres in all land manage-ment categories CHU (Late-seral mapping) (3)	DEIS GIS Estimate of Protected Acres of Habitat Unit); (2) x (.50) x (Est.Occupancy)[1] (4)	Maximum % suitable habitat available for harvest[3] in CHU (1-4)/(3)
1 (North Olympic)	5,600	77	36,763	202	15
2 (West Olympic)	39,937	37,549	79,628	13,611	33
4 (South Puget Sound)	45	72	45	18[2]	75
5 (Southwest Washington)	3,829	1,955	4,108	587	79
6 (East Olympic)	3,284	17	68,532	9[2]	5
7 (Skagit)	3	0	3	0	0
9 (Skykomish-Stillaguamish)	20,701	2,267	94,212	567 [2] (5067[4])	21(17[4])
Total	73,399	41,920	N/A[5]	N/A[5]	N/A[5]

[1] Estimated percent of suitable occupied habitat. From DEIS (USDI et al. 1996).

[2] Estimate based on 50 percent threshold of suitable habitat released. Estimated occupied habitat is lower.

[3] Does not include habitat protected by 0.5 mile circles around occupied sites, habitat in Natural Resource Conservation Areas or Natural Area Preserves, or occupied sites in habitat not identified by DNR mapping.

[4] Includes habitat protected by Natural Resource Conservation Areas or Natural Area Preserves.

[5] Not applicable for this analysis.

North Olympic Peninsula (CHU 1) - This CHU is a combination of State lands and Federal Late Successional Reserves, with State lands serving to link Federal Late-Successional Reserves and provide lower elevation habitat. Adjacent National Parks are assumed to be contributing significant amounts of nesting habitat. Conditions would be expected to improve in the future throughout much of the unit on Federal lands. Habitat on State lands is lower quality and fragmented and few occupied sites have been identified. A minimal amount of habitat is anticipated to be protected by the DNR conservation strategy. An estimated maximum of 15 percent of suitable marbled murrelet habitat on DNR-managed land in the CHU would be available for harvest (Table 17).

West Olympic Peninsula (CHU 2) - This unit is predominately on State lands, although some Federal lands are present as well. All of the DNR-managed lands are in the Olympic Experimental State Forest. Federal lands in the unit are designated as Federal Late-Successional Reserve and conditions would be expected to improve in the future within the Federal Late-Successional Reserve. Adjacent National Parks provide significant acres of suitable habitat in this unit. Within the unit, suitable habitat on State lands is highly fragmented. A significant number of known occupied sites are present on DNR-managed lands. Suitable habitat in Federal Late-Successional Reserves is more contiguous and occurs in larger blocks. Suitable habitat on State lands within this CHU has the highest rate of occupancy than on any planning unit. An estimated maximum 33 percent of lower quality suitable marbled murrelet habitat on DNR-managed land in the CHU would be available for harvest (Table 17). It is unlikely that this level of harvest would be reached in CHU 2 because: (1) the high rates of occupancy will likely protect a significant amount of adjacent unoccupied habitat; and, (2) some known occupied stands would be protected, even though the GIS analysis did not identify them as suitable habitat. The harvest plan for the OESF would also not harvest all suitable, unoccupied habitat because of the objective of having 20 percent old forest on the OESF.

South Puget Sound (CHU 4) - This unit is entirely managed by DNR in the Capitol Forest. While it has very little suitable habitat, it was identified as a critical habitat unit because of the need to develop suitable nesting habitat in south Puget Sound. The few potential nest trees that are present are likely to be located in riparian zones. Occupied sites have not been identified in the unit. Suitable habitat is not available on other lands in the vicinity. An estimated 72 acres of unsurveyed DNR-defined habitat are present in the CHU of which 75 percent would be available for harvest.

Southwest Washington (CHU 5) - This unit is primarily State managed, with some private ownership. This unit is important for maintaining current distribution of the species because of the small numbers of marbled murrelets, the limited amount and poor quality of habitat present in the CHU, and the lack of adjacent Federal ownership with nesting habitat. The probability of marbled murrelet occupancy of suitable habitat has been found to be high, possibly because of the limited availability of habitat. Surveyed, unoccupied DNR-defined habitat will not be released in this unit until the adaptive management phase of the marbled murrelet strategy is complete, or until 12 months from the initiation of negotiations on this phase . Under a worst-case analysis, 79 percent of the suitable habitat could be released for harvest if an adaptive management phase is not completed within 12 months of initial negotiations on the long-term strategy. However, it is expected that: (1) much of the high quality habitat (60 percent) would be occupied, which would protect a significant amount of unoccupied habitat; and, (2) approximately 50 percent of the known

occupied stands on DNR-managed lands in this CHU were not mapped by the DNR as habitat, although they would be protected. These factors would result in less than 79 percent of the habitat being released for harvest. Surveyed, unoccupied habitat within 0.5 mile of an occupied site would not be released, and it is expected, based on previous surveys, that much of the high quality habitat (60 percent) would be occupied.

East Olympic Peninsula (CHU 6) - This unit is primarily Federal lands in Late Successional Reserve, with only a small portion of State land on the north end. Large blocks of old-growth forest are present in the unit, as well as in adjacent National Parks. Habitat conditions in the CHU are expected to slowly improve as the forests within the Federal Late-Successional Reserves continue to develop. The anticipated level of occupancy on State lands is very low and therefore the amount of habitat protected by the DNR strategy is very small, and would only occur because of the 50 percent threshold on harvest of suitable habitat in a WAU. The amount of suitable habitat that would be released is 5 percent of the total suitable habitat in this CHU (Table 19).

Skagit (CHU 7) - DNR-managed lands within this CHU consist of approximately 40 acres. The 3 acres of habitat present is known to be occupied, and therefore would not be released.

Stillaguamish-Skykomish (CHU 9) - This large CHU contains a significant amount of State land, as well as Federal lands in Late Successional Reserves. Federal Late-Successional Reserves contain large blocks of suitable nesting habitat, and the quality of habitat is likely to gradually improve on these lands. There is also some suitable habitat on adjacent Federal land in wilderness status. The State lands contain scattered blocks of suitable habitat with a moderate probability of occupancy by marbled murrelets. Within the CHU, the initial analysis estimated that 21 percent of the suitable habitat (Table 17) could be available for harvest. However, approximately 4,500 acres of suitable habitat, which were not identified by the DNR as suitable habitat, are present in Natural Resource Conservation Areas and Natural Area Preserves and would not be available for harvest. Therefore, the amount of habitat for harvest is reduced to approximately 17 percent of the habitat in the unit.

The effects to the Marbled Murrelet Conservation Zones are described below and shown in Table 19.

Table 19. Acres of suitable marbled murrelet habitat by Conservation Zone in CHUs and the amount of suitable habitat to be released under the DNR HCP.

Marbled Murrelet Conservation Zone	Habitat Acres on DNR-managed lands (Late-Seral Mapping) in CHU (1)	Habitat Acres on DNR-managed Lands (DNR Estimate) (2)	Habitat Acres in All Land Management Categories in CHU (Late-seral Mapping) (3)	Estimate of Protected Acres of DNR-defined Habitat (from Table 17) (4)	% Suitable Habitat Available for Harvest in CHU[1] (1-4)/(3)
Western Washington	46,105	39,504	165,873	14,198	19
Puget Sound	27,294	2,416	384,169	5,108[2]	7
Total	73, 399	41,920	N/A[3]	N/A[3]	N/A[3]

[1] From DEIS (USDI et al. 1996).

[2] Includes suitable habitat in Natural Resource Conservation Areas and Natural Area Preserves in CHU 9.

[3] Not applicable for this analysis.

Western Washington Coast Range Conservation Zone - An estimated maximum of 19 percent of the suitable habitat in the CHUs in the Western Washington Coast Range Conservation Zone could be released for harvest under this HCP. The high rate of occupancy of suitable habitat in this Conservation Zone, however, will likely result in the protection of a considerable amount of surveyed, unoccupied habitat within 0.5 mile of known occupied sites. In the Western Washington Coast Range Conservation Zone, three CHUs have DNR-managed lands, CHUs 1, 2 and 5. The units could be adversely affected. The potentially high levels of harvest of suitable habitat in CHU 2 and CHU 5 are of particular concern. However, in CHU 2, projected levels of harvest will be minimized as previously described, and leave tree and riparian prescriptions will be implemented. In CHU 5, in addition to the measures just described, a significant number of occupied sites will be protected where the DNR did not identify habitat. In this Conservation Zone, there will be a 19 percent reduction in suitable habitat in the Western Washington Coast Range Conservation Zone. In summary, despite the overall reduction in suitable habitat, it is not believed that the ability of the Western Washington Coast Range Conservation Zone to provide for the survival and recovery of the marbled murrelet will be appreciably reduced because: (1) the highest quality of habitat, containing 95% of the occupied sites will be maintained; (2) high rates of occupancy would protect a significant amount of suitable, unoccupied habitat within 0.5 mile of known occupied sites; (3)

many known occupied sites which were not mapped by the DNR as suitable habitat would be protected; and, (4) 20% old forest would be maintained on the OESF.

Puget Sound Conservation Zone - An estimated 6 percent of the suitable habitat in the CHUs in Conservation Zone could be released for harvest as a result of this HCP. The relatively low rates of occupancy will result in low amounts of surveyed and unoccupied habitat being protected because it is not within 0.5 mile of an occupied site. In the Puget Sound Conservation Zone, five CHUs contain DNR-managed lands, units 1, 4, 6, 7 and 9. One unit and a portion of a third in the Puget Sound Conservation Zone do not have DNR-managed lands. The adverse effects to suitable habitat in CHUs 4, 6 and 7 are relatively small, and somewhat greater in that portion of CHU 1 found in the Puget Sound Conservation Zone. Development of higher quality suitable habitat may be precluded in CHU 4, where suitable habitat is currently nearly non-existent. However, improved riparian and leave tree prescriptions may result in improved, albeit low-quality, habitat conditions. There will be a significant adverse effect to CHU 9 with the removal of 17 percent of the suitable habitat, but this is the only CHU within the Puget Sound Conservation Zone where there will be a significant adverse effect. Overall, while there will be 6 percent reduction in suitable habitat in the Puget Sound Conservation Zone, the distribution of habitat throughout the Puget Sound Conservation Zone will be maintained, the highest quality habitat will be maintained, and primary constituent elements will be maintained and developed to some extent. Therefore the ability of the Conservation Zone to provide for the survival and recovery of the marbled murrelet would not be reduced.

Nontimber Resource Activities

It is assumed that proposed nontimber activities will be consistent with the conservation strategy for marbled murrelets. Therefore, removal of suitable habitat will only occur in those areas which were described as released in the analysis for timber harvest. Removal of habitat outside of those parameters would be inconsistent with the strategy. Timber harvest and clearing associated with nontimber activities could result in the degradation of adjacent suitable habitat through windthrow and resulting changes in microclimate in the suitable nesting habitat. Actions such as rights-of-way, sand and gravel mining, and recreational sites would also preclude the regeneration of forest on those lands. Even if the forest on these sites were never to become suitable habitat, they could serve to buffer suitable habitat from the edge effects previously described.

EFFECTS OF THE ACTION - GRAY WOLF

The current status of the gray wolf within the HCP area is not clearly known. However, it is likely that even though gray wolves occur now in small numbers, they will establish themselves in areas covered under the HCP during the 70-year incidental take permit period. So long as full or partial protection is provided to gray wolves and prey remains adequate, the only habitat or human-use restrictions necessary are those on activities that actually destroy gray wolf or prey habitat or that hinder gray wolf dispersal (Mech 1993).

DNR will continue to comply with Washington State Forest Practices Rules effective in 1996, which require a SEPA environmental checklist for harvesting, road construction, or site preparation within 1 mile of a known active den site between March 15 and July 30, or within 0.25 mile of the den at other times of the year (WAC 222-16-080). Known den sites are based on documentation by the WDFW. Under this HCP, all DNR forest management activities in the area covered by the HCP shall comply with Washington State Forest Practices Rules and State wildlife regulations. In addition, DNR will evaluate areas of habitat for preferred gray wolf prey species and prioritize areas to aid in planning for future management in those areas.

DNR will avoid or minimize potential impacts to gray wolves by maintaining habitat in a condition that allows gray wolves and their important prey species to meet their essential biological needs by implementing the following:

1. Den and rendezvous site will be protected within 1 mile of a known active den site between the dates from March 15 and July 30, and 0.25 mile from the den site at other times of the year.

2. Within 8 miles of a Class 1 gray wolf observation, DNR will, in cooperation with FWS, develop and implement practicable site-specific plans to limit human disturbance within gray wolf habitat management areas until 5 years after the last Class 1 gray wolf observation. If the FWS does not approve management plans, then a multi-agency team will be convened. The team will evaluate the management plans and determine if they are adequate, and if not, recommend additional measures that would be required to achieve adequacy.

3. DNR will provide more secure conditions for both prey species and gray wolves. DNR has been involved in cooperative road closures with WDFW and the Forest Service to restrict vehicular activity for maintaining or increasing big game security and reduce hunting pressure. DNR will continue to participate in such cooperative activities.

4. Ungulate fawning/calving and wintering areas are areas where gray wolves are most likely to occur. To the extent practicable, DNR will schedule forest management activities, including timber harvest, road construction, and road use, to occur at times of the year when gray wolves are least likely to be present.

5. Conservation measures for old-forest habitat and other species that benefit the gray wolf, as described below.

The conservation measures described in the HCP should offset impacts to the gray wolf by providing increased travel and hiding opportunities within the west-side planning units through the riparian and wetland conservation strategies which retains generally older forest cover in riparian ecosystems. Spotted owl NRF Management Areas adjacent to gray wolf habitat on Federal lands along the Cascade range, will generally have less disturbance, improving their potential as wolf habitat. The

conservation measures described in the HCP to reduce disturbance in areas of documented gray wolf use and protection measures for other species, will improve the habitat value of these ares. Protection of talus slopes, caves, and cliffs also provide important denning and/or shelter opportunities for gray wolves.

Although no proactive consideration is given to gray wolves or public access in DNR's road management, there would be a mechanism in place to protect gray wolves if they were observed on DNR-managed lands. Site-specific plans would be developed in consultation with WDFW or the FWS to limit human disturbance within 8 miles of a Class 1 gray wolf observation until 5 consecutive years pass without further observations. However, there is no process outlined for detecting such observations.

Nontimber Resource Activities

The DNR currently operates under the Washington Forest Practices Rules for gray wolves (WDNR 1995a). These rules restrict all timber harvest, road construction and site preparation within 1 mile of a known active gray wolf den site between March 15 and July 30, or within 0.25 mile at other times of the year.

There may be varying effects to gray wolves as a result of nontimber resource activities. These effects have the potential to range from no effect to adverse effects. A description of the types and amounts of activities associated with nontimber resource activities (in 1996) are discussed in Effects of the Action-Northern Spotted Owl. These activities are expected to have minimal impacts upon the gray wolf if nontimber resource activities remain at the 1996 level. The potential for impacts upon wolves would increase if: (1) the activity were located within close proximity to a den or rendezvous site; (2) the activity clearly hindered wolf dispersal; or (3) the activity affected the use of the project area by ungulates. Of particular concern are ungulate fawning/calving and wintering grounds.

Motorized recreation is permitted at 17 sites concentrated in 14 areas on DNR-managed State Forest lands within the HCP area. Sizes of many reported territories for packs of five or more wolves fall in the range of 50 to 200 square miles (USDI 1987). An 8-mile radius circle contains approximately 200 square miles. Therefore, the FWS analyzed the area affected within 1 mile of an ORV site and within 8 miles of all gray wolf observations to determine the potential for disturbance. The area of DNR land within 8 miles of a Class 1 or Class 2 gray wolf observation made since 1983 and within 1 mile of an ORV site is 4,520 acres. In the analysis, three ORV sites were associated with three gray wolf observations. None of these acres are within 1 mile of the gray wolf observations. Under worst-case scenario, FWS would assume that these acres are occupied by gray wolves, and that ORV use could impact gray wolves foraging or traveling in these acres sometime during the year. However, it is unlikely that all 4,520 acres would be occupied by gray wolves. Therefore, no den sites were disturbed and impacts to gray wolves by ORV use was negligible in 1996.

Summary of Effects

The FWS believes that actions associated with DNR forest management activities may adversely affect gray wolves through: (1) increased road density; (2) increased accessability into key habitats; and, (3) destruction of potential den and rendezvous site habitats.

The HCP proposes several measures that will benefit gray wolves using the project area. These measures include provisions for riparian and wetland protection on the west-side which should provide travel, thermal, and hiding cover for ungulates as well as for gray wolves. Cave and talus protection provided by the HCP on the west-side will also provide incidental protection to undiscovered den sites. The range of stand structures provided to benefit all species on the west-side may incidentally provide ungulates with adequate foraging and cover opportunities and, thus, contribute to maintaining healthy prey populations for gray wolves. DNR would consider seasonal restriction of road use by the public in ungulate fawning/calving and wintering areas to lessen impacts to ungulates during key seasons of gray wolf use. Measures proposed specifically for gray wolf conservation include known den and rendezvous site protection during the breeding season, and a proposal to limit human disturbance within a radius of 8 miles from a Class 1 sighting. This protection will have limited benefits to gray wolves due to the low likelihood of gray wolves being observed; they are secretive in nature and low numbers exist in the project area. In addition, there is a chance that some unknown den sites may be compromised as a result of habitat modification and ground-disturbing activities since surveys and monitoring for gray wolves are not anticipated under the HCP.

Potential incidental take of gray wolves from nontimber resource activities would be due to disturbance caused by these activities near known active gray wolf den sites during the critical denning season. The impacts from these activities except ORV use are negligible or nonexistent because of the small acreage affected (e.g. 40 acres per sand and gravel site), the location where they occur (e.g. far from known gray wolf observations), the timing of the activity (e.g. after the denning season), or because these activities did not occur in 1996. The potential disturbance to gray wolves at ORV sites is minimal because the acreage associated with ORV use and gray wolf observations included only three ORV sites and three gray wolf observations and it is unlikely that all this acreage was occupied by gray wolves. No disturbance of den sites occurred on DNR-managed lands as a result of nontimber resource activities in 1996. Generally, increased road densities have increasingly negative impacts to gray wolves. Most DNR-managed lands in areas likely to be inhabited by gray wolves are already at high road densities. Increased road densities, particularly in otherwise secluded areas, could increase the risk of direct mortality to wolves, and lessen the value of those DNR-managed lands, as well as adjacent lands, for gray wolf conservation.

EFFECTS OF THE ACTION - GRIZZLY BEAR

Harvesting, road construction, aerial application of pesticides, or site preparation would be precluded within 1 mile of a known active den site between October 1 and May 30, or within 0.25 mile of a den at other times of the year unless DNR completed a SEPA environmental checklist.

Within 10 miles of a Class 1 grizzly bear observation, DNR would establish a grizzly bear habitat management area on DNR-managed lands within the North Cascades Grizzly Bear Recovery Area. Class 1 observations are confirmed by a biologist and/or photograph, carcass, track, hair, dig, or food cache (Almack et al. 1993). Class 2 observations are probable bear observations where no visual observation was confirmed by a biologist. The observation does, however, include a physical description that differentiates the observed animal from a black bear. DNR, in cooperation with the FWS, would develop and implement practicable site-specific plans to limit human disturbance in the grizzly bear habitat management area. Measures to limit disturbance would remain in effect until five years after the last Class 1 grizzly bear observation in the grizzly bear habitat management area.

Figure 3 illustrates that 124 Class 1 and Class 2 grizzly bear observations recorded in the WDFW Non-Game Data Base from 1964 - 1996 that fall within 10 miles of the DNR HCP Planning Units. These include 17 Class 1 records and 107 Class 2 records. Of the 124 observations, 41 fall within a 10 mile radius of DNR-managed lands within the HCP area. Actions carried out in such areas on DNR-managed lands may have an adverse effect upon the grizzly bear. Most grizzly bear sightings recorded were the result of a 6-year habitat evaluation study that was conducted from 1986 through 1991. The study was conducted to examine the status of the grizzly bear and to evaluate North Cascade habitat capability to sustain a viable population of grizzly bears.

On the west side, the specific buffer distances and harvest restrictions applied to riparian management zones, wind buffers, and wetland buffers would result in higher riparian ecosystem quality perhaps increasing their value to grizzly bears as travel corridors and hiding cover, as well as foraging habitat. Protection of talus slopes, caves, and cliffs also may provide important shelter opportunities for grizzly bears on the west side. These measures do not apply on the East-side Planning Units. The DNR HCP may provide some incidental hiding cover for grizzly bears as a result of harvest unit size and configuration throughout the planning area and the leave tree strategy on the West-side Planning Units.

Roads

One of the most important aspects of grizzly bear habitat management is road density, because grizzly bears tend to avoid habitat near roads, and roads expose grizzly bears to direct human-related mortality (USDI 1993) Paquet and Hackman 1995 and references therein, cited in USDI et al. 1996). Impacts associated with roads and increased road densities have had a major influence on grizzly bear population and habitat use patterns in numerous, widespread areas (Tracy 1977, Elgmork 1978, Schallenberger and Jonkel 1980, Jonkel et al. 1981, Brannon 1984, Manley and Mace 1992, Mace and Manley 1993). These impacts reported in the literature include lethal encounters, habitat modification, and various stress related behavioral adaptations, including:

1. Avoidance/displacement of grizzly bears away from roads and road activity;

2. Changes in grizzly bear behavior, especially habituation, due to ongoing contact with roads and human activities conducted along roads;

3. Habitat loss, modification, and fragmentation due to roads and road construction, including vegetative and topographic disturbances; and,

4. Direct mortality from road kills, legal and illegal harvest, and other factors resulting from increased human-grizzly bear encounters (Le Franc et al. 1987).

The FWS believes that the existing and future loss of low elevation habitats to grizzly bears will have a negative effect on the population in the decades to come. This negative effect will continue to occur in the form of direct mortality caused by humans using highly roaded low-and mid-elevation habitats and indirect mortality caused by habitat avoidance and resultant decreased fitness which will affect survival and productivity. Based on the foregoing discussion, it is likely that some individual grizzly bears will not select home ranges which include highly roaded low elevation habitats and consequently may suffer from decreased opportunities for foraging and seclusion. Those that do select such low elevation habitats will suffer higher risks of human-caused mortality.

The HCP calls for the development of a comprehensive road management plan. That plan is expected to address road location, construction, maintenance, visual-screening buffers, public use patterns, seasonal restrictions, closures, abandonment, and road densities. These road-management activities are some of the most important to address in an effort to maintain suitable grizzly bear habitat. The FWS will work in conjunction with DNR in developing this plan and expect it to be developed in 5 years. The FWS anticipates that the potential level of impact may decrease following its completion, but this would depend on the sufficiency of the plan components.

Habitat Fragmentation

Daily movements of grizzly bears may exceed 60 airline miles, and their home ranges can encompass up to 1,000 to 1,500 square miles; thus, space is essential to grizzly bears. With a wide-ranging species like the grizzly bear, large expanses of unfragmented habitat are essential for feeding, breeding, sheltering, traveling, and other essential behavioral patterns. As roads increase in grizzly bear habitat, that habitat becomes fragmented and security areas become smaller and more isolated resulting in less bear use. As human populations increase and habitat becomes developed, grizzly bear populations become fragmented.

Nontimber Resource Activities

There may be varying effects to grizzly bears as a result of the nontimber resource activities which have the potential to range from no effect to adverse effects. Descriptions of these activities and the acreage figures discussed below are based on information received from the DNR (Hansen 1996).

The DNR currently operates under the Washington Forest Practices Rules (WDNR 1995a) for grizzly bears. These rules restrict all timber harvest, road construction and site preparation within 1 mile of a known active grizzly bear den site between October 1 and May 30 or 0.25 mile at other times of the year.

Impacts to grizzly bears due to the collection of special forest products or harvest activities associated with Christmas tree cutting are expected to be minimal. These activities mainly entail people on foot collecting forest products normally located close to a road and often in young forests. It is unlikely that this activity would cause disturbance to grizzly bears. Christmas tree cutting normally occurs while bears are in the den and is usually carried out on Christmas tree plantations that are typically located in lowland areas not likely to be near a den site.

The nature and the potential disturbance of firewood gathering activities are discussed in Effects of the Action-Northern Spotted Owl. Firewood gathering is believed to have little potential to impact grizzly bears because the activity normally occurs near roads or at the end of spur roads at lower elevations during the time of year when grizzly bears are expected to occur at higher elevations where shrubfields and fruit/nut sources exist.

Grazing permits and leases are in effect only on the east-side; approximately 5,000 acres in the Methow Valley and 100,000 acres in Yakima and Klickitat Counties. No grazing permits or leases are in effect on the West-side Planning Units. The areas to be grazed in Yakima and Klickitat Counties are outside of the North Cascades Grizzly Bear Recovery Zone. Grazing leases and permits in the Methow Valley may have adverse impacts to grizzly bears through livestock competition for early spring browse, livestock trampling and degradation of wetland sites used by bears. Livestock may reduce the vigor or destroy food sources by compacting soil on wetland sites. In addition, bear depredation of livestock could lead to bear/livestock conflicts that would require immediate FWS action to remove offending bears from the area. There has been no recent case of bears depredating upon livestock within the North Cascades Ecosystem.

Permitting of rights-of-way across DNR-managed lands is estimated to disturb approximately 192 acres per year subject to the restrictions cited above. This type of activity may impact grizzly bears as road or rights-of-way densities increase to a point that grizzly bears avoid the area or if rights-of-ways are located in or adjacent to areas used by bears as important foraging and seclusion areas. Important foraging areas for grizzly bears are low elevation riparian zones, avalanche chutes, and ungulate winter ranges in the spring (April-June), and areas where shrubfields and fruit/nut sources exist at higher elevations in late summer and fall.

The nature and the potential disturbance of the activity levels due to the permitting of sand and gravel extraction on DNR-managed lands are discussed in Effects of the Action-Northern Spotted Owl. This activity is expected to have minimal effects to the grizzly bear unless the activity is located near or within an important foraging, seclusion, or denning area, or involves road construction within those areas.

Prospecting leases and mining contracts on DNR-managed lands include several types of actions, discussed in Effects of the Action-Northern Spotted Owl. Drilling, as part of prospecting, and mining could impact grizzly bears if the activity were to occur near or within an important foraging, seclusion, or denning site and involves road construction within those areas. However, no drilling or mining occurred in 1996, therefore, no disturbance occurred.

Oil and gas leases are currently in effect for an estimated 20,000 to 25,000 acres of DNR-managed lands located mostly in the Puget Sound lowlands. The nature and the potential disturbance of the activities associated with these leases, primarily exploration, are discussed in Effects of the Action-Northern Spotted Owl. Due to the location of Oil and Gas exploration projects in 1996, they likely involved no impacts to grizzly bears. This activity is expected to have minimal effects to the grizzly bear unless the activity is located near or within an important foraging, seclusion, or denning area or involves road construction within those areas.

Current activity levels due to electronic lease sites are estimated to affect approximately 20 acres of second-growth forest. The remainder of these sites, approximately 80 acres, occur on non-forested mountain tops. This activity is expected to have minimal effects to the grizzly bear unless the activity is located near or within an important foraging, seclusion, or denning area or involves road construction within those areas.

The type and amount of activity and potential disturbance associated with recreation sites in 1996 are discussed in Effects of the Action-Northern Spotted Owl. This activity is expected to have minimal effects to the grizzly bear unless the activity is located near or within an important foraging, seclusion, or denning area or involves road construction within those areas.

Motorized recreation is permitted at 17 sites concentrated in 14 areas on DNR-managed State Forest lands within the HCP area. Ten miles is thought to be the minimum "long distance movement" for grizzlies in the Selkirk Mountains (Almack 1986). Therefore, the FWS analyzed the area affected within 1 mile of an ORV site and within 10 miles of all grizzly bear observations to determine the potential for disturbance. The area of DNR land within 10 miles of a Class 1 or Class 2 grizzly bear observation made since 1983 and within 1 mile of an ORV site is 1,910 acres. In the analysis, one ORV site was associated with one grizzly bear observation. None of these acres are within 1 mile of the grizzly bear observation. Under worst-case scenario, FWS would assume that these acres are occupied by grizzly bears, and that ORV use could impact grizzly bears foraging or traveling in these acres sometime during the year. However, it is unlikely that all 1,910 acres would be occupied by grizzly bears. Therefore, no grizzly bear den sites were disturbed and impacts to grizzly bears by ORV use were negligible in 1996.

Summary of Effects

DNR-managed lands in the West-side Planning Units have the potential of contributing to the conservation of the grizzly bear. The proposed measures, as described in the effects of the action section include riparian buffers, wind buffers, wetland buffers, and protection of talus slopes, caves, and cliffs. These measures do not apply to the East-side Planning Units. The HCP's proposed measure to establish a grizzly bear habitat management area for DNR-managed lands in the North Cascades Grizzly Bear Recovery Area within 10 miles of a Class 1 grizzly bear observation might contribute to the conservation of grizzly bears. However, due to the low likelihood of sighting a grizzly bear and given the low numbers of grizzly bears in the ecosystem, this contribution is expected to be minimal.

Potential incidental take of grizzly bears from nontimber resource activities would be due to disturbance caused by these activities and any associated road-building near important grizzly bear foraging, seclusion, or denning areas. The effects of timber harvest activities which includes associated road-building have been discussed above.

No disturbance occurred due to plant and firewood collection activities because of the locations where they are conducted and the timing in which it occurs. No disturbance occurred as a result of drilling associated with prospecting and mining and oil and gas exploration because these activities did not occur in 1996. Disturbance associated with permitting of rights-of-way, sand and gravel extraction, leasing of electronic sites, grazing, and recreation sites are negligible because of the small acreage affected (e.g. 40 acres per sand and gravel site), the location where they occur, and, the timing in which they occur (e.g. in summer when bears are foraging at high elevations). The potential disturbance to grizzly bears at ORV sites is minimal because the acreage associated with ORV use and grizzly bear observations included only one ORV site and one grizzly bear observation, and it is unlikely that all this acreage was occupied by grizzly bears. No disturbance of den sites occurred on DNR-managed lands as a result of nontimber resource activities in 1996.

EFFECTS OF THE ACTION - BALD EAGLE

Destruction and degradation of suitable habitats and environmental contaminants are two threats to bald eagles (USDI 1995c). Timber harvesting and forest management related activities within habitat having qualities similar to spotted owl habitat may adversely affect the bald eagle. Potential effects of timber harvesting and forest management activities on bald eagles depend on the location of the activities and the likelihood that bald eagles use those areas for nesting, wintering or roosting.

Figure 5 was developed by the FWS in an effort to analyze the effects that timber harvest and other forest management activities proposed in the DNR HCP may have on the bald eagle. It identifies lands within DNR-managed lands that occur within 3 miles of major streams or waterways containing anadromous fish. These DNR-managed lands were identified as the areas most likely to be used by bald eagles for nesting, wintering or communal night roosting in suitable habitats.

Bald eagles use habitat similar to suitable spotted owl habitat for nesting and roosting. An analysis of spotted owl habitat that may be harvested on DNR-managed lands within 3 miles of anadromous fish bearing streams was produced to evaluate the amount of potential bald eagle nesting and roosting habitat that may be harvested under the HCP. The FWS estimates that approximately 78 percent of DNR-managed lands fall within 3 miles of streams that contain anadromous fish. Within these DNR-managed lands, approximately 200,000 acres of habitat that may be used by bald eagles as nesting, foraging and communal night roosting could be harvested.

Annual timber harvest activites on DNR-managed lands within the range of the spotted owl may cause disturbance-related effects to bald eagles. Approximately 50,000 acres of timber harvest occur annually on DNR-managed lands within the range of the spotted owl; 17,000 acres are clearcut harvests and 33,000 acres are thinning harvests. Under the worst-case scenario, all this timber

harvest activity could be expected to affect occupied bald eagle habitat. However, some of these harvest activities occur outside the breeding season or prior to bald eagle use of winter roost sites. Approximately 70 percent of clearcut harvests and 67 percent of thinning activities occur during the breeding season or when bald eagles are using winter roost sites and have the potential for disturbance to bald eagles. These percentages represent 11,900 acres and 22,100 acres, respectively, for a total of 34,000 acres of timber harvest activities that could cause disturbance to occupied bald eagle habitat on an annual basis.

Under the HCP, all DNR forest management activities in the area covered by the HCP would comply with Washington State Forest Practices Rules effective in 1996 and State wildlife regulations. Harvesting, road construction, aerial application of pesticides, or site preparation within 0.5 mile an of active nest site documented by the WDFW will be limited between the dates of January 1 and August 15 and prohibited within 0.25 mile at other times of the year, and prohibited within 0.25 mile of a communal roosting site. State wildlife regulations (WAC 232-12-292) protect nests and communal roost sites. When developing site management plans for bald eagle habitat pursuant to WAC 232-12-292, DNR will protect nest and communal roost sites. DNR would consider protecting perch trees and adjacent foraging areas, and winter roost trees, in addition to protecting known nest trees. Winter feeding concentration areas would be avoided. Where a nest or roost was not detected, the HCP could result in habitat removal or disturbance to nesting, wintering, or roosting bald eagles if bald eagles were present within close proximity to timber harvest and other forest management activities.

In the West-Side Planning Units, the HCP riparian and wetland conservation strategies and the retention of very large old trees as described in the multi-species strategy on uncommon habitats should further the conservation of bald eagles through protection of potential nesting and foraging habitat during the nesting and wintering season. These measures should increase abundance and distribution of large trees in streamside areas for nesting and roosting and increase abundance and distribution of salmon, a primary prey species. Riparian buffers averaging 150 feet, including a 25-foot no-harvest zone, would provide essential nest trees and roost sites. Buffers around ponds and lakes that increase the abundance of waterfowl would benefit bald eagles by providing prey. The riparian management zones would be managed to provide large woody debris for salmonids, which should benefit bald eagles by maintaining large nest and/or roost trees (116 feet tall and 50 inch dbh) (Anthony et al. 1982; cited in USDI et al. 1996) along major watercourses.

Nontimber Resource Activities

Impacts due to habitat loss as a result of timber harvest associated with nontimber resource activities are included in the effects of timber harvest section above. The following discussion covers those impacts due to disturbance and habitat degradation as a result of nontimber resource activities.

There may be varying effects to bald eagles as a result of nontimber resource activities, including associated timber harvest. These effects have the potential to range from no effect to adverse affects. DNR has committed to initiate the HCP amendment process if the 1996 level of incidental take of the bald eagle is anticipated to increase as a result of expanding the level of nontimber resource

activities on DNR-managed lands covered by the HCP. Acreage figures discussed below are based on information received from the DNR (Hansen 1996).

The DNR currently operates under the Washington State Forest Practices Rules for the bald eagle (WDNR 1995a). These rules restrict all timber harvest, road construction and site preparation within 0.5 mile of a known active bald eagle nest site between January 1 and August 15 or 0.25 mile at other times of the year and within 0.25 mile of a communal roosting site. DNR also complies with state wildlife regulations to protect bald eagle nests and communal night roosting areas by developing site management plans specific to those sites.

The collection of special forest products such as Christmas greens and medicinals or Christmas tree cutting is likely to have minimal effect upon bald eagles. These activities mainly entail people on foot collecting forest products normally located close to a road and often in young forests where eagles are unlikely to nest or roost. Christmas tree cutting is likely to have no impact to nesting bald eagles because it does not involve the removal of bald eagle habitat and occurs outside the nesting season. Christmas tree cutting may result in disturbance to wintering bald eagles if carried out within close proximity to a communal night roost or major bald eagle foraging area. However, it is unlikely that a Christmas tree plantation would be located close enough to a bald eagle foraging area or communal night roost to result in disturbance to wintering eagles.

Firewood gathering involves the use of chainsaws and is characterized by short (not sustained) bursts of noise at designated areas such as timber harvest landings adjacent to roads or at the end of spur roads. Impacts upon the bald eagle as a result of this activity are expected to be minimal unless the activities occur within the standard buffer of a bald eagle nest, communal night roost, or winter concentration area.

Grazing permits and leases are in effect only on the east side; approximately 5,000 acres in the Methow Valley and 100,000 acres in Yakima and Klickitat Counties. No grazing permits or leases are in effect on the west side planning units. Grazing permits and leases are anticipated to have minimal effects upon nesting and wintering bald eagles. Some bald eagle habitat may be degraded due to grazing impacts on riparian areas near fish bearing streams and some disturbance to nesting and wintering bald eagles may result from livestock operations, but impacts to bald eagles by disturbance and/or habitat degradation are expected to be minimal.

Current activity levels due to the permitting of rights-of-way across DNR-managed lands are estimated to include approximately 192 acres of timber harvest per year. Impacts upon bald eagles as a result of this activity are expected to be minimal unless the activities occur within the standard buffer of a bald eagle nest, communal night roost, or winter concentration area.

Current activity levels due to the permitting of sand and gravel extraction on DNR-managed lands are estimated to impact approximately 800 acres of forested area adjacent to roads. Extraction may involve the use of heavy machinery or blasting with explosives. In the West-side Planning Units, approximately 4 percent of DNR-managed lands are fully functional forest (greater than 150 years old) (USDI et al. 1996). No age-class data was available for East-side Planning Units. Assuming

all of this forest type contains the structures preferred by bald eagles and that it is relatively evenly distributed, approximately 32 acres of sand and gravel sites could be expected to be adjacent to potential suitable bald eagle habitat. Impacts on bald eagles as a result of this activity are expected to be minimal unless the activities occur within the standard buffer of a bald eagle nest, communal night roost, or winter concentration area. Under the worst-case scenario, FWS assumes that disturbance associated with extraction and blasting could occur annually within close proximity to a bald eagle nest, communal night roost, or winter concentration area. However, it is believed unlikely that 32 acres of forested area would be affected each year for development of sand and gravel pits and that such forested areas would also be within or adjacent to important bald eagle habitat.

Prospecting leases and mining contracts on DNR-managed lands include several types of actions that are expected to have minimal, if any, impacts on bald eagles unless the activities occur within the standard buffer of a bald eagle nest, communal night roost, or winter concentration area. However, no drilling or mining occurred in 1996, and thus no habitat modification or disturbance of bald eagles occurred from either of these nontimber resource activities.

Current oil and gas leases are estimated to exist on 25,000 acres of DNR-managed lands, mostly in the Puget Sound lowlands. These types of actions are expected to have minimal impacts on bald eagles unless the activities occur within the standard buffer of a bald eagle nest, communal night roost, or winter concentration area. There is currently one active well, located 1 mile northeast of Morton. Exploration in 1996 occurred only around this well site and likely has a minimal impact, if any, on bald eagles.

Current activity levels due to electronic lease sites are estimated to affect approximately 20 acres of second-growth forest in 1996. The remainder of these sites occur on non-forested mountain tops, and are not expected to affect bald eagles from a habitat removal standpoint. This type of activity is expected to have minimal impacts upon the bald eagle unless the activities occur within the standard buffer of a bald eagle nest, communal night roost, or winter concentration area. In addition, guy wires, towers, cables and the associated electronic site devices can be fatal or injurious to bald eagles. In 1996, fewer than 20 acres of second-growth forest were disturbed, and thus it is likely that this activity will result in little or no impact to bald eagles.

Current activity levels due to recreation sites are estimated to affect approximately 1,832 acres across DNR-managed lands covered by the HCP, mainly in riparian areas. Maintenance and operation activities associated with recreation sites may involve the use of heavy equipment, and may involve hazard tree removal. In the West-side Planning Units where most recreation sites occur, approximately 4 percent of DNR-managed lands are fully functional forest (greater than 150 years old) (USDI et al. 1996). Assuming all of this forest type contains the structures preferred by bald eagles and that it is relatively evenly distributed, approximately 73 acres of recreation sites could be expected to be adjacent to potential suitable bald eagle habitat. The FWS assumes that maintenance and operation activities could have occurred on some portion of all recreation sites and that disturbance to bald eagles during the nesting season occurred as a result of maintenance and operations activities at these sites. However, it is unlikely that all these acres are adjacent to

occupied bald eagle habitat or that activities associated with these recreation sites occurred within 0.50 mile of a known active bald eagle nest during the breeding season. Therefore, disturbance at recreation sites was minimal.

Motorized recreation is permitted at 17 sites concentrated in 14 areas on DNR-managed State Forest lands within the HCP area. It was assumed that bald eagle nest and roost sites are concentrated within 3 miles of an anadromous fish-bearing stream. The amount of land within 3 miles of an anadromous fish-bearing stream and within 0.5 mile of an ORV site is 5,523 acres. However, it is unlikely that all this land is older forest with structures preferred by bald eagles. The amount of DNR-managed land within the West-side Planning Units that is greater than or equal to 150 years old is approximately 4 percent. Under worst-case scenario, FWS would assume that 4 percent of the acres within 3 miles of an anadromous fish-bearing stream, or approximately 221 acres, contain a bald eagle nest or roost site, and that disturbance from ORV use could occur annually at these sites. However, it is unlikely that all these acres contain a bald eagle nest or roost site, thus, impacts to bald eagles as a result of ORV use was minimal in 1996.

Summary of Effects

Under the HCP, DNR will prepare site management plans that will protect nest and communal roost sites of bald eagles. Implementation of these plans will promote the conservation of the eagle throughout the Action area. A potential adverse effect to eagles could result from the harvest of unknown nest or roost sites. However, most nests and important roost sites are identified prior to harvest, and the effect of such harvest will be negligible. The HCP will provide additional protection of foraging areas associated with nest sites, perch trees, and winter feeding concentration areas due to implementation of the leave tree strategy. In addition, implementation of the HCP would benefit bald eagles and their potential prey by providing riparian and wetland conservation strategies within the west-side planning units. This strategy will retain large trees in riparian and wetland management areas, and in harvest units to serve as potential nesting trees. These measures would not be provided for in the absence of the HCP.

Potential incidental take of bald eagles from nontimber resource activities would be due to disturbance caused by these activities and any associated timber harvest activities occurring within 0.5 mile of a known active bald eagle nest site or 0.25 mile of a bald eagle communal roost site. Disturbance due to plant and firewood collection activities, grazing, sand and gravel extraction, and permitting of rights-of-way are negligible because of the small acreage affected (e.g. 40 acres per sand and gravel site), the location where they occur (e.g. young forests, along roads) and the timing of the activity (e.g. after nesting season). No disturbance occurred as a result of drilling associated with prospecting and mining, oil and gas exploration, and electronic lease sites due to the location of these activities or because these activities did not occur in 1996. Disturbance may have occurred on the 73 acres of recreation sites but it is unlikely that all these acres and the associated activities that occur on them are within the 0.25 to 0.5 buffer for bald eagle nest sites and communal roost sites. Most DNR ORV sites are located within young second growth forests. Disturbance to bald eagles from ORV use in 1996 was unlikely because of the low number of acres of suitable bald eagle habitat near fish-bearing streams that is within 0.5 mile of an ORV site.

EFFECTS OF THE ACTION - PEREGRINE FALCON

DNR will continue to comply with Washington State Forest Practices Rules, which currently require a SEPA environmental checklist for harvesting, road construction, aerial application of pesticides, or site preparation within 0.5 mile of a known active nest site between March 1 and July 30 or within 0.25 mile of the nest at other times of the year (WAC 222-16-080). All DNR forest management activities in the area covered by the HCP would comply with Washington State Forest Practices Rules and State wildlife regulations.

In addition, in east side and west side planning units and the OESF, DNR would:

1. Review and, where necessary, manage, public access to DNR-managed lands within 0.5 mile of a known peregrine falcon aerie;

2. Conduct field reviews, by staff knowledgeable of peregrine falcon biology and requirements, of all cliffs in excess of 150 feet high, and conduct surveys for peregrine falcon aeries at cliffs judged to have potential for use;

3. Protect ledges on cliffs judged suitable for aeries;

4. Retain trees along the base and top of cliffs judged suitable for aeries, especially perch trees along the top of cliffs; and,

5. Keep the location of peregrine falcon aeries on DNR-managed lands confidential to the extent permitted by law.

In general, the measures included in the HCP would provide protection to known sites but the protection of undetected nest sites would be uncertain. In the West-Side Planning Units and the OESF, additional conservation of peregrine falcons on DNR-managed lands would be provided by the generally improved wildlife habitat that would result from the HCP and OESF riparian and wetland conservation strategies. In addition, there is the site-specific conservation of cliff habitat as described in the multi-species strategy on uncommon habitats.

DNR expects that incidental take of peregrine falcons will be minimal. Of 51 known nesting sites in the area covered by the HCP, 5 are located on DNR-managed lands, 6 sites are located within 1 mile of the DNR-managed lands, and the other 40 are located more than 1 mile from DNR-managed lands.

Protection provided to nesting sites through July 31 may not be adequate for all nest sites. The peregrine falcon nesting season can extend from January through August depending upon the elevation of the site. Potential effects of disturbances vary with their timing and proximity to the aerie. In early spring during courtship, disturbed birds are particularly liable to desert an area. Part of the male's courtship ritual involves ledge displays to attract a female to a particular ledge for use

as a nest site (Nelson 1970). The female will accept or reject the ledge, and it is generally believed that this is based largely on the protection from predators it offers and the degree of disturbances. If human activities are centered generally throughout the nesting area the pair may not nest or, the entire territory may be abandoned (Fyfe and Olendorff 1976). In addition, disturbances at the nest just prior to the young fledging may cause the nestlings to fledge prematurely, which may result in injury, death or exposure to predators.

Nontimber Resource Activities

Effects to peregrine falcons as a result of the nontimber resource activities range from no effect to adverse effects. A description of the types and amounts of activities associated with nontimber resource activities in 1996 are discussed in Effects of the Action/Northern Spotted Owl, Nontimber Resource Activities. Nontimber resource activities are expected to have minimal impacts upon the peregrine falcon if the activities remain at the 1996 level. The potential for impacts on the peregrine falcon through habitat degradation and/or disturbance could increase if any of the actions or associated activities are carried out within the standard 1-mile buffer area of a known aerie site. Impacts to spring and fall migrant falcons are also of concern. Guy wires, towers, cables and the like, associated with electronic lease sites, can be fatal or injurious to falcons if falcons are known to occur in the project area. Because there are only 6 peregrine aeries located on or within 1-mile of DNR managed lands and potential nesting sites are to be surveyed for occupancy prior to implementation of an action, it is considered unlikely that any of the nontimber resource activities in 1996 had more than minimal impacts, if any, upon nesting peregrine falcons. In addition, it is believed that most nontimber resource activities would have minimal impact on spring and fall migrant falcons because the activities would most likely be carried out inland of the marine environment where migrant falcons would be expected to occur.

Motorized recreation is permitted at 17 sites concentrated in 14 areas on DNR-managed State Forest lands within the HCP area. No peregrine falcon aeries are within 1 mile of an ORV site, and, thus, no impacts to peregrine falcons occurred from ORV use in 1996.

Summary of Effects

Protection of cliff habitat would benefit undiscovered and future nest sites. Public access to DNR-managed lands within 0.5 miles of peregrine falcon aeries would be restricted where practicable. Riparian and wetlands conservation strategies would help to prevent loss of potential prey habitat and improve habitat quality. These provisions would benefit peregrine falcons and contribute to the conservation of the species if the areas selected for carrying out conservation measures were areas to be used by peregrine falcons in the future. It would depend on the location of suitable cliff sites in proximity to the riparian areas. Measures that would minimize effects upon peregrine falcons would be avoidance of road construction and disturbance related activities within close proximity to cliffs known to be used by peregrine falcons for nesting or cliffs having the potential to be used for nesting.

Potential incidental take of peregrine falcons from nontimber resource activities would be due to disturbance caused by these activities near known active peregrine falcon aeries during the critical nesting season. The impacts from all nontimber resource activities are negligible or nonexistent because of the small acreages affected, the location where they occur (e.g. greater than 1 mile from known active aeries), the timing of the activity (e.g. outside the nesting season), or because these activities did not occur in 1996.

EFFECTS OF THE ACTION - ALEUTIAN CANADA GOOSE

Although there is no specific management guidance in any of the alternatives for the management of grasslands or meadows, conservation of the Aleutian Canada goose would be peripheral to DNR's forest management activities due to the rare occurrence of the geese on DNR-managed lands and their lack of association with forested habitats.

General habitat protection would be afforded to the Aleutian Canada goose under the HCP by compliance with Washington Forest Practices Rules. Maintaining water quality and protecting lakes and ponds classified as Type 1, 2, 3, or 4 Waters would enhance resting areas, and protecting associated riparian vegetation would maintain foraging opportunities. Wetland buffers would maintain forage opportunities due to the restriction on the types of timber harvest activities that would be allowed within them.

The explicit riparian conservation strategy of larger and less manipulated buffers on ponds and lakes (Type 1 through 4 Waters), including inner riparian management zones (minimum 100 feet) and outer wind buffers where there is a moderate potential for windthrow, will effectively maintain or increase the amount and quality of resting and foraging areas available to the species. With its increased buffers and restrictions of harvest activities within riparian management zones, the Aleutian Canada goose would benefit by maintaining the quality of aquatic systems, including lakes and ponds it might use for foraging and resting sites along its migratory route.

Within the OESF, enhanced riparian ecosystem quality derived from 150-foot average inner-core buffers on Type 1 through 3 Waters and 50-foot inner buffers on Type 4 and 5 Waters will minimize the impact of forest management activities on Aleutian Canada goose habitat. Furthermore, protection of forage and resting opportunities as a direct result of prohibited harvest within 50 feet of nonforested wetlands will likely occur.

DNR's nontimber resource activities occur almost exclusively in forested habitat and along roads with the exception of grazing leases, which occur east of the Cascade crest, and approximately 80 acres of leased electronic sites situated on non-forested mountain tops. Due to the rare occurrence of Aleutian Canada geese on DNR-managed lands and their lack of association with forested habitats, DNR's nontimber resource activities in 1996 had no impact on the Aleutian Canada goose.

EFFECTS OF THE ACTION- COLUMBIAN WHITE-TAILED DEER

The Columbian white-tailed deer's current range in the action area is limited to bottom lands and several islands in an 18-mile reach of the Columbia River near Cathlamet, Washington. The DNR owns several parcels of land in this area, which are leased to private landowners and the FWS. Those leased to FWS are within the Mainland Unit of the Julia Butler Hansen National Wildlife Refuge, and are not used for agriculture. The agricultural parcels, located on Puget Island, are used for grazing by Columbian white-tailed deer, which use farm fields and pastures within a short distance of forest cover. The potential exists that any remaining forest cover on these lands could be harvested, or that the agricultural fields could be converted to hybrid poplar or other forest management. Short-term impacts could result if harvest occurs. It is therefore expected that there could be potentially minor impacts occurring under the HCP. The HCP does not address agricultural activities and the leasing of agricultural lands, and take resulting from agricultural activities is not authorized under the HCP.

DNR-managed lands on Puget Island are leased to private entities for use as agricultural lands. These lands are not included in the HCP area and, therefore, any disturbance that occurs on these lands due to nontimber resource activities would not be authorized.

EFFECTS OF THE ACTION - OREGON SILVERSPOT BUTTERFLY

In areas where the Oregon Silverspot Butterfly is found, DNR will not harvest timber, construct roads, or apply pesticides within 0.25 mile of any individual occurrence of the species, documented by WDFW. It is not likely that Oregon Silverspot butterfly will be found in areas managed for timber production. The removal of timber for restoration purposes is likely to improve habitat for the Oregon silverspot butterfly. In places where the DNR believes that effective conservation can be provided in a efficient manner, DNR may present to the FWS a site-specific management plan intended to provide adequate protection for the species or any habitat occurring at that site. If the USFWS does not approve of the plan, then a multi-agency science team will be convened. The team will evaluate the plan and determine if it is adequate, and if it is not, recommend additional measures that should be taken to provide adequate conservation measures.

The Oregon silverspot butterfly is not known to exist on any DNR-managed lands nor are there any DNR-managed lands near the coastal grasslands of the Long Beach Peninsula where potential butterfly habitat exists. DNR nontimber resource activities were not conducted in Oregon silverpspot butterfly habitat in 1996 and there was no impact to this species from these activities.

INTERRELATED AND INTERDEPENDENT EFFECTS

Regulations implementing Section 7(a)(2) of the Act require the Service to consider the effects of activities that are interrelated or interdependent with the proposed federal action (50 CFR 402.02).

Interrelated actions are those that are part of a larger action and depend upon the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consultation. Both interrelated and interdependent activities are assessed by applying the "but-for test" which asks whether any action and its resulting impact would occur "but-for" the proposed action.

Issuance of the Section 10(a)(1)(B) permit for the DNR HCP would allow the incidental take of spotted owls, marbled murrelets, bald eagles, Aleutian Canada geese, gray wolves, grizzly bears, Columbian white-tailed deer and Oregon silverspot butterflies, in accordance with the approved provisions of the HCP. This allows DNR to conduct normal timber management and related activities on their lands subject to the HCP. The HCP also provides for the operations of nontimber related activities such as gravel pits, telecommunication sites, administrative facilities and grazing on DNR-managed lands. Analyses of impacts of these activities on the listed species subject to consultation were addressed in the previous Effects of the Action section.

The effects of interrelated and interdependent activities associated with the timber and nontimber related activities as allowed under the HCP are as follows:

Timber-related activities

Timber-related activities included increased public use of DNR-managed lands due to increased roading, increased incident of fire starts, and construction and operation of temporary and/or permanent scaling stations. The effects of these actions range from minor disturbance to nesting owls and murrelets from increased road use during the breeding season to the loss of prey base or illegal shooting of wolves and bears from an increased road network. Increased fire risks could result in loss of habitat while construction of scaling stations would result in minor disturbances to listed species.

Nontimber related activities

Gathering

The gathering of forest commodities is expected to result in a minor increase in road use. The effect of this increase in use is expected to have minimal effects to listed species because the use is occurring on established, well-used roadways.

Firewood cutting

Firewood cutting is expected to result in a slight increase in the use of established roadways, an increased risk of fire, and an increased risk that snags and downed logs that were retained after timber harvest for listed species would be illegally removed. With the exception of fire, road use and illegal harvest of retained woody material are expected to have minor effects to listed species. Roadways are established and well used and DNR requires permits for

firewood cutting in designated cutting units. The risk of fire from firewood cutting is low, but could result in loss of habitat should a fire occur.

Trail and recreational facilities

The construction, maintenance, and use of trails and recreational facilities would result in a minor increase in road use. This use is expected to have minor effects to listed species because it is occurring on established, well-used roadways.

Sand and gravel operations

The hauling of materials mined at sand and gravel operations for road construction and maintenance is expected to result in seasonal increases in road use. This is expected to have minor effects to listed species because the hauling is occurring over established, well used roadways. Construction of new roadways is addressed in the Effects of the Action section.

Right-of-way access

The proposed action would not grant incidental take associated with actions on adjacent lands. Therefore, the interrelated and interdependent effects of right-of-way access on adjacent lands is not addressed in this opinion.

Grazing

The construction and maintenance of fences, watering facilities, feeding stations, and corrals are activities that are likely to occur on leased grazing land. These activities are seasonal and are expected to have minimal effects to listed species. Livestock are transported to and from leased lands over DNR roadways. The effect to listed species is expected to be minor because the transport is occasional and established roadways are used.

ORV lease sites

Use of designated ORV areas for races or rallies could attract spectators and venders that normally would not visit these areas. These activities are likely to increase the use of roadways accessing these areas. The effects to listed species are expected to be minimal because use of designated ORV areas is well established and spectator activities are confined to established and well used areas. Roadways accessing the ORV areas are well established and heavily used.

Oil and gas leases

Increased use of roadways are likely to occur as a result of transporting personnel and equipment to lease sites. Impacts to listed species are expected to be minimal because use will be limited to established roadways. Only one lease was active in 1996.

Recreational placer mining

These activities are likely to increase roadway and campsite use by the public. Placer mining is limited to those few regions in the state that contain recoverable gold. Because existing roadways and campsites are likely to be used and the areas where the activities occur are limited, effects to listed species are expected to be minimal.

Electronic lease sites

Construction and maintenance of electronic facilities are likely to result in increased road use by personnel and equipment accessing these facilities. Effects to listed species are expected to be minimal because only established, well-traveled roadways are likely to be used.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Impacts from future Federal actions that are unrelated to the HCP are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Species considered for this analysis of cumulative effects include those species addressed in this opinion including spotted owls, marbled murrelets, gray wolves, grizzly bears, bald eagles, peregrine falcons, Aleutian Canada geese, Columbian white-tailed deer, and Oregon silverspot butterflies. Suitable habitats refer to habitats which provide life requisites for any of these species such as nesting, denning, spawning, germinating, roosting, perching, foraging, hunting, rearing, dispersing, hibernating, or migrating.

For the purpose of assessing cumulative effects, the action area includes the portion of Washington within the range of the spotted owl. This area extends from the spotted owl eastern range boundary on the east slopes of the Cascade Mountains, west to the Pacific Ocean and Strait of Juan de Fuca. The HCP includes lands managed by DNR within the action area. Activities considered include those which may occur on lands not managed by DNR or Federal agencies, or which are not permitted by a Federal agency.

In general, DNR-managed lands include large parcels as well as smaller parcels of land. The DNR-managed lands covered by the HCP are widely distributed within the identified action area. Due to this wide distribution of DNR-managed lands within the landscape of western Washington, actions on other lands within this larger area may have cumulative effects on listed species or critical habitats when considered in conjunction with effects of the proposed action. This cumulative effects analysis will address broad categories of nonfederal actions on lands not managed by DNR, which are reasonably certain to occur and general trends.

Although identification of individual future nonfederal actions is not discussed, the types and amounts of potential actions which may occur are identified and impacts in relation to the HCP are discussed. Three broad categories of impacts, based upon the types of impacts posed to species discussed in this opinion, are described including: (1) growth and development; (2) forest management; and, (3) other management actions. Growth and development refer to permanent loss of suitable habitats. Growth and development actions include suitable habitat conversion for urban, other residential, commercial, or agricultural uses, and for structures or networks providing infrastructure support such as hydropower and irrigation diversions, roads, and power-lines. Forest management refers to temporal and spatial changes from other State or private actions in suitable habitats across the landscape in the action area. Examples include age or structural changes resulting from harvest and other forest management actions such as planting, pruning, fertilizing, forest growth, and wildland fires. Other management actions refer to actions within suitable habitats which impact habitat structures or composition such as recreation, grazing, fishing, hunting, and mining. Each of these categories of impacts may result in the loss of secure habitat for species using suitable habitats within the action area. Examples of this include physical displacement, noise disturbance, exposure to contaminants, and declining air and water quality.

Growth and Development

According to the 1995 Washington State Data Book, Washington's population grew by more than 560,000 between 1990 and 1993 to a total of nearly 5.5 million in 1995. This growth reflects a natural increase (estimated births minus estimated deaths) of more than 200,000 and a net immigration of more than 360,000 (Washington State 1995) for the reported period. The action area occurs in all or part of 24 of Washington's 39 counties. These 24 western counties account for 84 percent of the total population and 83 percent of the total growth. More than 44,000 housing permits were issued in Washington in 1994. Housing permits issued show a positive trend from the early 1990s, with 4 to 20 percent annual change. It is likely that future population growth and housing starts will exhibit similar trends outside of DNR-managed lands.

Eight of Washington's top ten ranking counties for total population occur within the action area including, in order, King, Pierce, Snohomish, Clark, Kitsap, Yakima, Thurston, and Whatcom counties. Population growth and residential development are centered in the Puget Trough near Seattle, Tacoma, and Olympia as well as in Vancouver. Expansion of these developed areas east toward the Cascade foothills and passes, west toward the Kitsap Peninsula, and north and south along the I-5 corridor is also occurring. Residential growth on the Olympic Peninsula has occurred in towns such as Pt. Angeles, Shelton, and Aberdeen. On the east side of the Cascades, residential development is occurring in several locations such as Yakima, Wenatchee, and Ellensburg as well as along the I-90 corridor. Residential and commercial development tends to occur in low-elevation, low-gradient flood plains. This type of development permanently converts suitable habitats and provides little to no benefits for species addressed in this opinion. As development increases, the portion of Washington providing suitable habitats outside of Federal and DNR-managed lands will continue to decline.

Farmlands also tend to occur in low elevation, low gradient areas in the action area. In Western Washington it is likely that most suitable habitat conversion to agricultural lands occurs along valleys and the Puget Trough. East of the Cascade crest, availability of irrigation water influences conversion to agricultural lands. Additional diversion and storage projects will likely be proposed and completed during the life of the HCP to accommodate an increasing demand for irrigation water. Residential and commercial development could likely occur in current agriculture areas displacing farmland development to marginal areas where lower yields could require conversion of a greater amount of suitable habitats. Although suitable habitats converted to agricultural lands do not provide habitats for life requisites of all species, farmlands do provide habitats for some species such as potential prey species. However, accompanying human occupation and management makes such habitats less secure for species addressed in this opinion than unconverted suitable habitats outside of DNR-managed lands as well as on adjacent DNR-managed lands.

Increased residential, commercial, and agricultural development will place increased demands on the existing infrastructures such as the transportation system. Highway expansion and upgrading of the current road system will likely be emphasized over new highway construction. Increasing trends in conversion of suitable habitats for pipelines, aqueducts, power lines, rail system transportation, hydroelectric and water supply dams, and airport facilities are likely to occur during the HCP incidental take permit period. Development of such projects which include the participation of a Federal agency or utilize Federal funding would require further analysis under section 7 of the Act. Suitable habitats converted for infrastructures will provide few life requisites. Roads and other corridor developments can impact access such as restricting use of habitats on the opposite sides of a highway or blocking passage from downstream to upstream habitats. Accompanying human use and management outside of DNR-managed lands may also impact security of adjacent suitable habitats.

Forest Management

There are approximately eight million acres of private and corporate owned (i.e., not Federal and not DNR-managed) forest land in western Washington (WDNR 1996a). Intensive forest management would likely maintain these lands in early seral stages (e.g., 40 to 50 years of age on the west side) with few structures such as snags, down logs, large trees, variable vertical layers, and endemic levels of forest "pests" and "diseases." Over the recent years (1994-1996), an average of 6,428 forest-practice applications for 379,044 acres have been submitted to DNR each year. This amount may decline as growth and development continues into forest lands and until recently harvested areas regrow. Only about 227 acres per year were harvested for conversion purposes according to the applications. Due to a monetary disincentive to claim that the harvest is for conversion this amount may be underestimated. Intensive forest management outside of DNR-managed lands generally results in adverse impacts to species addressed such as loss of older forest habitats and habitat structures, increased fragmentation of forest age classes, loss of large contiguous and interior forest habitats, decreased water quality, degradation of riparian and aquatic habitats, and increased displacement of individuals.

Development of HCPs or other wildlife management plans will alter the basic management of these lands. The FWS has completed HCPs for 231,000 acres as described under the baseline, and is currently providing technical assistance on another two million acres of nonfederal lands within the range of the spotted owl in Washington. As HCPs are completed, the FWS would conduct a section 7 analysis prior to issuing any incidental take permit. Therefore, potential future HCPs are not considered a cumulative impact for this HCP.

Forest roads impact usability of adjacent suitable habitats. Managed forest lands outside of DNR-managed lands generally are already at higher road densities than the recommendation of 2 miles of road per square mile by WDFW. Construction of timber haul roads is expected to continue to access small parcels within the managed forest landscape. Roads densities in forested landscapes negatively impact species by impeding use of habitats on the opposite sides of roads, blocking passage from downstream to upstream habitats, and providing increased human access which may impact security of adjacent suitable habitats.

The 1995 Washington State Data Book indicates that generally between 4,000 and 100,000 acres of forest land might burn each year (statistics from 1981 to 1994 reported). Nearly 300,000 acres burned in 1994, a relatively severe fire year. Some believe that a fire year such as seen in 1994 was inevitable based on past forest management practices which limited the role of natural fires in ecosystem maintenance. Post-burn areas generally exhibit greater habitat structure compared to traditional clearcut harvest areas. Fires ranging from intense burns to light burns also tend to result in a mosaic of post-burn habitat conditions. Historic "natural" fire patterns also vary from fire patterns within the last 100 years or so of forest management and fire suppression.

Fires resulting rom lightning are natural disturbances in the Pacific Northwest which impact suitable habitats. Other natural disturbances include endemic levels of "pests" and "diseases," high winds, and volcanic eruptions. Impacts to suitable habitats and species addressed in this opinion from natural disturbance may be similar to those listed under forest management. However, generally these impacts are less severe than harvest impacts. Recently forest managers have focused on comparisons of difference between forest management and natural disturbances in order to more closely mimic potential positive impacts (such as providing a food source or nesting substrate) and ecosystem dynamics of natural disturbance patterns. Future trends of natural disturbances and potential effects of these disturbances are difficult to predict. Unexpected catastrophic natural disturbances could negatively affect species, suitable habitats, and species recovery planning.

Other Management Actions

Other management actions outside of DNR-managed lands can occur in and adjacent to suitable habitats. Such actions may result in the conversion of suitable habitats to unsuitable conditions and also may affect the security and use of adjacent suitable habitats.

Recreation: Recreational settings and experiences range from primitive, semiprimitive nonmotorized, semiprimitive motorized, roaded natural, and roaded modified rural such as campgrounds and summer homes. There is evidence of an excess supply of the more developed,

motorized forms of recreation, and a high and increasing demand for recreation settings with little development, little management activity, and no motorized access (USDA et al. 1993). More than 47 million people visited the 270,000 acres of Washington State Parks in 1994, an increase of more than five million from 1987 attendance (Washington State 1995). Although some private lands may be developed for recreation in the future, it is likely that trends in recreational use will be similar to current trends (e.g., high use on public lands). The majority of developed recreation sites occur in roaded settings.

Grazing: Grazing of cattle, and less commonly, sheep and horses, is more common on lands on the east slopes of the Cascades within the range of the spotted owl. Typical impacts to suitable habitats include removal of native vegetation, change in vegetative species composition, introduction of invasive nonnative species, degradation of water quality, and erosion of streambanks and springs.

Fishing: The quality of water and stream habitats within nonfederal lands influences commercial, recreational, and subsistence fisheries production. The principal commercial species categories in the region are salmon, tuna, groundfish, crab, and shrimp. Salmon are the most directly impacted by forest management activities. Though the volume and value of commercial seafood landed in Pacific Northwest ports fell substantially from 1989 to 1991, the most significant decline occurred in salmon catch (USDA et al. 1993). A variety of factors contributed to this including depressed fish prices, unfavorable ocean conditions, deceased habitat, and increased competition. These declines also affect recreational and subsistence fisheries. Short-term changes cannot be extrapolated to determine long-term projections. Fishing demand is likely to remain high. Potential impacts outside of DNR-managed lands include increased risks to salmon stock viability, declines of salmon carcasses for bald eagle foraging, and displacement during fishing activities.

Hunting: Hunting fluctuates in response to population levels, weather, and regulation by WDFW. The number of deer and elk licenses sold has decreased from around 230,000 and 104,000, respectively, in 1975 to 190,000 and 85,000 in 1994. Numbers of resident small game harvested have also declined steadily from nearly 1.48 million in 1975 to around 0.43 million in 1994 (Washington State 1995). Generally, adverse impacts to wildlife are from displacement during hunting activities.

Gathering: The role of nontraditional or special forest products has increased in recent years. Currently major products within the industry include floral greens, Christmas ornamentals, wild edible mushrooms, other edibles and medicinals, and firewood. It is likely these types of activities will continue and increase in the future outside of DNR-managed lands. Potential impacts to species and suitable habitats from such activities include change in species composition and structures and displacement during collection activities.

Extraction: Mining and mineral production include valuable material sales, prospecting and mining contracts, and oil and gas leases. The 1995 Washington State Data Book indicates that the value of mineral production has steadily increased since 1975, despite the fact that data are not always available for all categories due to disclosure laws. It is likely that additional mineral deposit discoveries will lead to further activities in mining and mineral processing in the action area.

Potential impacts outside of DNR-managed lands to species and suitable habitats from such activities include loss of habitats, displacement during activities, and decreases in habitat quality.

Habitat quality: Both number of and dollars assessed for air quality, water quality, and hazardous waste, and oil spill penalties increased between 1982 and 1994 (Washington State 1995) indicating a decrease in environmental quality. It is likely that trends will continue. Poor air and water quality, as well as hazardous wastes and oil spills diminish the quality and usability of habitats outside of DNR-managed lands. Potential impacts include displacement and loss of individuals of species addressed, as well as decreased habitat quality.

Summary of Cumulative Effects

Actions on private lands and other non-DNR-managed lands, such as urban development, logging, road building, and recreation will continue to contribute to habitat degradation and loss which will affect species. The development of private lands and associated loss of habitats is anticipated to continue. Habitat fragmentation, habitat loss, and habitat degradation are expected to continue as development creates a demand for new public services and facilities. Disturbances caused by human development in low elevation areas have, and will continue to have, a cumulative impact on species through loss of habitat and displacement of individuals of wildlife species.

CONCLUSION

After reviewing the current status of the species discussed above, the environmental baseline for the action area and the range of the species affected, the effects of the HCP and the cumulative effects, it is the FWS's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of spotted owls, marbled murrelets, gray wolves, grizzly bears, bald eagles, peregrine falcons, Aleutian Canada geese, Oregon silverspot butterflies, and Columbian white-tailed deer. Marbled murrelet critical habitat has been designated in the action area on DNR-managed lands, however, the HCP is not likely to destroy or adversely modify designated marbled murrelet critical habitat. No critical habitat has been designated for gray wolves, grizzly bears, bald eagles, peregrine falcons, Aleutian Canada geese, Oregon silverspot butterflies, and Columbian white-tailed deer, therefore, none will be affected. Critical habitat for spotted owls has been designated on Federal lands, however, this HCP does not directly affect spotted owl critical habitat areas and no destruction or adverse modification of that critical habitat is anticipated.

Should DNR request that any of the other species covered by the HCP and IA be added to the incidental take permit, the FWS will reinitiate section 7 consultation for those species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined by the FWS to include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by FWS as an act or omission which create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this incidental take statement.

The proposed DNR HCP and its associated documents identify the measures that are necessary and appropriate to minimize impacts to affected species likely to result from the proposed taking. All conservation measures described in the proposed HCP, together with the terms and conditions described in any associated Implementing Agreement and any incidental take permit or permits issued with respect to the proposed HCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions in this Incidental Take Statement. Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the permittee fails to adhere to these terms and conditions, the amount of take authorized may be exceeded and the protective coverage of the section 10(a)(1)(B) permit and section 7(o)(2) of the Act may lapse.

Generally, section 9 take prohibitions do not apply to listed plant species on nonfederal lands. However, FWS must review the effects of its own actions on listed plants, even when those listed plants are found on non-federal lands. In approving an HCP and issuing an incidental take permit, the FWS must determine that such an action is not likely to jeopardize the continued existence of any listed plant. Also, in the interest of conserving listed plants, the FWS may request that a landowner voluntarily assist the FWS in restoring or enhancing listed plant habitats that are present within the area covered by the HCP.

AMOUNT OR EXTENT OF TAKE - NORTHERN SPOTTED OWL

The FWS anticipates incidental take of spotted owl pairs, young, and/or territorial singles associated with harvest of suitable habitat as outlined below. Incidental take on these acres may be in the form of harm due to the removal of suitable habitat on DNR-managed lands, as well as harassment when harvest of this habitat occurs during the nesting season. The FWS anticipates incidental take of spotted owls associated with nontimber resource activities will be in the form of disturbance and is also summarized below.

West-side Planning Units

In the near term (within the first 10 years), the FWS anticipates the incidental take in the form of harm or harassment of up to 70 known and 15 projected unknown spotted owl pairs, young, and/or territorial singles. In the long term (10 to 70 years), the FWS anticipates the incidental take in the form of harm or harassment of up to 36 potential future spotted owl pairs, young, and/or territorial singles..

East-side Planning Units

In the near term, the FWS anticipates the incidental take in the form of harm or harassment of up to 47 known and 16 projected unknown spotted owl pairs, young, and/or territorial singles. In the long term, the FWS anticipates the incidental take in the form of harm or harassment of up to 36 potential future spotted owl pairs, young, and/or territorial singles.

Olympic Experimental State Forest

In the near-term, the FWS anticipates the incidental take in the form of harm or harassment of up to 31 spotted owl pairs, young, and/or territorial singles. In the long-term, the FWS anticipates the incidental take in the form of harm or harassment of spotted owls associated with harvest of 3,300 to 16,300 acres per decade.

Disturbance-related Take

In addition, the FWS anticipates the incidental take of spotted owls adjacent to disturbance type activities which may occur on DNR-managed lands in all three areas. Disturbance may be caused by timber harvest activities as well as nontimber resource activities. The FWS anticipates that take may occur on an average of 26,675 acres of timber harvest activities per year for the first decade. The FWS anticipates that disturbance from nontimber resource activities could affect up to 1,060 acres per year. Incidental take due to these activities will be in the form of harassment, when activities occur during the nesting season and significantly disrupt normal behavior patterns.

AMOUNT OR EXTENT OF TAKE - MARBLED MURRELET

Over the length of the permit, the FWS anticipates incidental take of marbled murrelets associated with the harvest of between 18,245 and 74,286 acres of unsurveyed, suitable marbled murrelet habitat on DNR-managed lands, as discussed under Effects of the Action. Incidental take on these acres may be in the form of harm due to the removal of suitable, occupied habitat, as well as harassment, when harvest of this habitat occurs during the nesting season.

The FWS also anticipates the incidental take of marbled murrelets located on properties adjacent to disturbance type activities which may occur on DNR-managed lands. Disturbance may be caused by timber harvest activities as well as nontimber resource activities. The FWS anticipates that take from disturbance may occur on an average of 23,500 acres of timber harvest activities per year. The FWS anticipates that disturbance from nontimber resource activities could affect up to 338 acres per year. Incidental take due to these activities will be in the form of harassment, when such harvest or nontimber resource activities occur during the nesting season and significantly disrupt normal behavior patterns.

AMOUNT OR EXTENT OF TAKE - GRAY WOLF

The FWS anticipates incidental take of gray wolves with the harvest of timber on approximately 430,900 acres within 8 miles of Class 1 or Class 2 gray wolf sightings on DNR-managed lands over the life of the project, as discussed under Effects of the Action. Incidental take on these acres may be in the form of harm due to the removal of suitable habitat, as well as harassment, when harvest of this habitat occurs during the denning season and significantly disrupts normal behavior patterns.

Disturbance may also be caused by nontimber resource activities. The FWS anticipates that disturbance from nontimber resource activities could occur on approximately 4,520 acres per year from ORV use only. Incidental take due to these activities will be in the form of harassment, when such harvest or nontimber resource activities occur during the denning season. The FWS anticipates no incidental take of den sites occurred from nontimber resource activities.

AMOUNT OR EXTENT OF TAKE - GRIZZLY BEAR

The FWS anticipates incidental take of grizzly bears associated with approximately 159,000 acres of timber harvest that are within 10 miles of Class 1 or Class 2 grizzly bear sightings over the life of the project. Incidental take of grizzly bears associated with the timber harvest of these acres may be in the form of harm due to the removal of suitable habitat on DNR-managed lands, as well as harassment from disturbance when harvest of this habitat occurs during the denning season.

Disturbance may also be caused by nontimber resource activities. The FWS anticipates that disturbance from nontimber resource activities in the form of harrassment could occur on approximately 1,010 acres per year from ORV use only. The FWS anticipates no incidental take of den sites from nontimber resource activities.

AMOUNT OR EXTENT OF TAKE - BALD EAGLE

The FWS anticipates incidental take of bald eagles associated with the harvest of timber on approximately 200,000 acres that are within 3 miles of anadromous fish bearing streams over the life

of the project. Incidental take on these acres may be in the form of harm due to the removal of suitable habitat on DNR-managed lands. Incidental take in the form of harassment may occur when harvest of this habitat occurs during the nesting or wintering season, and it significantly disrupts normal behavior patterns. The FWS anticipates that disturbance associated with 34,000 acres of timber harvest may occur annually on DNR-managed lands.

The FWS also anticipates the incidental take of bald eagles from nontimber resource activities could affect up to 326 acres per year. Incidental take due to these activities will be in the form of harassment, when such harvest or nontimber resource activities occur during the nesting or wintering season, and it significantly disrupts normal behavior patterns.

AMOUNT OR EXTENT OF TAKE - PEREGRINE FALCON

The FWS anticipates the incidental take of up to one pair of peregrine falcons due to disturbance from timber harvest activities on DNR-managed lands. Incidental take at these sites may be in the form of harassment when such disturbance occurs during the nesting season, and results in a significant disruption of normal behavior patterns. The FWS anticipates no incidental take of peregrine falcons due to disturbance from nontimber resource activities.

AMOUNT OR EXTENT OF TAKE - ALEUTIAN CANADA GOOSE

Incidental take in the form of harassment (disturbance) may be caused by timber harvest and nontimber resource activities. Due to the rare occurrence of Aleutian Canada geese on DNR-managed lands and their lack of association with habitats where these activities occur, the FWS does not anticipate these activities will incidentally take any Aleutian Canada geese.

AMOUNT OR EXTENT OF TAKE - COLUMBIAN WHITE-TAILED DEER

Incidental take in the form of harassment (disturbance) may be caused by timber harvest and nontimber resource activities. DNR-managed lands inhabited by the Columbian white-tailed deer are not part of the HCP area. The FWS does not anticipate any incidental take through implementation of the HCP.

AMOUNT OR EXTENT OF TAKE - OREGON SILVERSPOT BUTTERFLY

Incidental take in the form of harassment (disturbance) may be caused by timber harvest and nontimber resource activities. The Oregon silverspot butterfly is not known to exist on any DNR-managed lands and DNR-managed lands contain no potential habitat. The FWS does not anticipate these activities will incidentally take any Oregon silverspot butterflies.

EFFECT OF THE TAKE

In this Biological Opinion, the FWS has determined that the level of anticipated incidental take is not likely to jeopardize the continued existence of spotted owls, marbled murrelets, gray wolves, grizzly bears, bald eagles, peregrine falcons, Aleutian Canada geese, Columbian white-tailed deer, or Oregon silverspot butterflies, or result in the destruction or adverse modification of designated marbled murrelet critical habitat.

REASONABLE AND PRUDENT MEASURES

The FWS believes the following reasonable and prudent measure necessary and appropriate to minimize incidental take:

> Any incidental take of spotted owls, marbled murrelets, gray wolves, grizzly bears, bald eagles, peregrine falcons, Aleutian Canada geese, Columbian white-tailed deer, or Oregon silverspot butterflies, must comply with all the terms and conditions of an incidental take permit issued to DNR under section 10(a) of the Act, including the provisions of the HCP and Implementation Agreement submitted with the DNR application (PRT 812521).

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the FWS must comply with the following term and condition, which implements the reasonable and prudent measure described above. This term and condition is nondiscretionary.

1. An incidental take permit issued to DNR is accordance with section 10(a) of the Act as evaluated in this biological opinion, must require compliance with all terms and conditions of the HCP and IA submitted with the DNR application (PRT 812521).

To the extent that this statement concludes that take of any threatened or endangered species of migratory bird will result from the agency action for which consultation is being made, the FWS will not consider such take to be a violation under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. 668-668d), if such take is in compliance with the terms and conditions (including amount and/or numbers) specified herein.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans or to develop information.

The FWS recommends that the following conservation measures be implemented:

1. The FWS should provide technical assistance to DNR through the term of the permit and provide technical advice on monitoring and other biological issues associated with implementation of the HCP, as well as assist in the development of conservation strategies such as the comprehensive road-management plan.

2. The FWS should conduct regular and frequent compliance monitoring, including review of the periodic reports.

3. The FWS should assist with coordination among other State and Federal agencies. This should include, but not be limited to, providing DNR with habitat data to be used in assessing WAU targets and their relative priorities, as well as location data for owl nest sites.

4. The FWS should review progress made by DNR to update and improve the forest inventory data base, particularly east of the crest, and provide technical advice.

5. The FWS should present DNR with guidelines to avoid destruction of habitats and/or disturbance to species which could result in incidental take of species beyond 1996 levels, in order to ensure that incidental take of species from nontimber resource activities remain at 1996 levels.

6. When the FWS is notified by DNR that any of the 154 acres of suitable marbled murrelet habitat on DNR-managed lands, located between 50 and 55 miles from the marine environment may be subject to harvest, the FWS should work cooperatively with DNR, WDFW, and other wildlife monitoring cooperators to conduct surveys, if needed.

7. The FWS should recommend to the DNR that they prioritize harvest of suitable marbled murrelet habitat in such a way that harvest occurs in the lowest quality habitats first. This includes prioritization within the categories of both low-quality and high-quality marbled murrelet habitat, which will be identified through the habitat relationship study.

8. The FWS should recommend to the DNR that after felling, and before limbing, DNR search limbs of downed potential murrelet nest trees for evidence of marbled murrelet nests. Only those trees which had the potential to contain a nesting platform should be searched.

9. If activities occur near occupied murrelet sites that have the potential to disturb murrelets, the FWS should work cooperatively with DNR to minimize the effects of such activities.

10. The FWS should recommend to the DNR that they conduct research on effects of human disturbance on marbled murrelets. If, in the course of their regular survey work, the DNR detects a murrelet pair nesting in proximity to a proposed activity which has the potential to disturb murrelets, the DNR should monitor the behavioral responses of the birds to noise associated with harvest, road construction, blasting, and other activities. The FWS should be informed if such an opportunity arises.

11. The FWS should work cooperatively with DNR to develop and implement a public education program on the positive effects of road closures for fish and wildlife, water quality, and other forest resources.

12. The FWS should work cooperatively with DNR in development of the comprehensive road management plan to: (1) prioritize and implement seasonal restrictions on open roads which would minimize mortality risk, habituation, and displacement of wildlife; (2) incorporate road construction and reconstruction with minimum design specifications to facilitate eventual reclamation; and, (3) identify potential single purpose road construction and reconstruction for timber sales.

13. When the FWS is notified by DNR that an area near cliffs between 75 and 150 feet in height may be suitable for peregrine falcon nesting may be subject to harvest, the FWS should work collaboratively with DNR, WDFW, and other wildlife monitoring cooperators to assure that surveys of the area are conducted prior to harvesting. Surveys should be carried out using standard accepted techniques appropriate when peregrine falcons would be expected to use that area (e.g., season and time of day).

14. Within the first year of HCP implementation, the FWS should provide to the DNR, in cooperation with WDFW, an incidental take schedule for spotted owl sites for consideration by DNR as specified in the HCP. Prioritization of sites should be based upon site-specific factors which may include location, reproductive history, and likelihood of persistence.

15. The FWS should work cooperatively with DNR to identify spotted owl activity centers on DNR-managed lands. This information should be included in the DNR annual report.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the HCP outlined in the November 19, 1996 consultation request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or, (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such incidental take must cease pending reinitiation.

FIGURES

Figure 1. Map of DNR HCP Planning Units and spotted owl physiographic provinces in Washington.

Figure 2. DNR managed HCP lands designated as NRF or dispersal areas, state spotted owl special emphasis areas, and Federal reserve lands under the Northwest Forest Plan.

Figure 3. Map of all Class 1 and Class 2 gray wolf sightings since 1983 within the DNR HCP action area buffered by 8-mile radius circles.

Figure 4. Map of Class 1 and Class 2 grizzly bear sightings since 1964 within the DNR HCP action area by 10-mile radius circles.

Figure 5. Map of bald eagle potential use areas as defined by 3-mile buffers around selected anadromous fish streams in the DNR HCP action area.

TABLES

Table 1. Known territorial spotted owl site centers (WDFW status 1, 2, or 3) on Federal, DNR, or other nonfederal lands in Washington State.

Table 2. Acres of suitable spotted owl (owl) habitat by land manager and by physiographic province in Washington State.

Table 3. Condition of estimated spotted owl home ranges centered on Federal reserves in Washington, by Physiographic Province and by National Forest.

Table 4. Spotted owl suitable habitat acres removed or degraded, and spotted owl pair or territorial single sites (sites) incidentally taken on National Forest lands in Washington, as authorized through the section 7 consultation process since adoption of the Record of Decision (USDA and USDI 1994b) (April 1994) and through salvage rider (Rescissions Act - P.L. 104-19).

Table 5. Number of active or historic known occupied marbled murrelet sites by land management category by Conservation Zone.

Table 6. Acres of suitable marbled murrelet habitat by land management category by Conservation Zone.

Table 7. Acres of Federal, State (DNR-managed), and private lands within Marbled Murrelet Critical Habitat Units (CHUs) in Washington State.

Table 8. Acres and percents of DNR-managed lands within Marbled Murrelet Critical Habitat Units (CHUs) within various areas of the State.

Table 9. Existing suitable spotted owl habitat (SH) acres and landscape conditions in the five West-side Planning Units. All acres and percentages are calculated only for DNR-managed lands within the planning units.

Table 10. Projected percent of DNR-managed lands within various stand stages at current year, 1996, for the OESF and West-side Planning Units.

Table 11. Projected percent of DNR-managed lands within various stand stages at year 2096, for the OESF and West-side Planning Units.

Table 12. Known territorial spotted owl site centers (WDFW status 1, 2, or 3) on DNR-managed lands in the five West-side Planning Units.

Table 13. Spotted owl sites not likely to persist as a result of habitat loss due to HCP implementation in the five West-side Planning Units. The numbers include spotted owls likely to be harassed due to disturbance within NRF Management Areas.

Table 14. Existing suitable spotted owl habitat (SH) acres and landscape conditions in the three East-side Planning Units. All acres and percentages are calculated only for DNR-managed lands within the planning units.

Table 15. Spotted owl sites not likely to persist as a result of HCP implementation in the three East-side Planning Units. The numbers include spotted owls likely to be harassed due to disturbance within NRF Management Areas.

Table 16. Known territorial spotted owl site centers (WDFW status 1, 2, or 3) by land manager in the three East-side Planning Units.

Table 17. Areas of concern and their spotted owl conservation functions within nonfederal lands in the East-side Planning Units of the DNR HCP (Adapted from the Scientific Analysis Team report, 1993).

Table 18. Estimated acres of suitable marbled murrelet habitat on DNR-managed lands to be released by CHU under the HCP.

Table 19. Acres of suitable marbled murrelet habitat by Conservation Zone in CHUs and the amount of suitable habitat to be released under the DNR HCP.

LIST OF ABBREVIATIONS and SYMBOLS

<, ≤ - less than, less than or equal to
>,≥ - greater than, greater than or equal to
% - percent
AC - Age Class
dbh - diameter at breast height
CDFG - California Department of Fish and Game
CFR - Code of Federal Regulations
CHU - Critical Habitat Unit
DCA - Designated Conservation Areas
DDT - Dichlorodiphenyltrichloroethane
DMA - Dispersal Management Area
DNR - Washington Department of Natural Resources
EIS - Environmental Impact Analysis
FEIS - Final Environmental Impact Statement
FR - Federal Register
FWS - U.S. Fish and Wildlife Service
GIS - Geographical Information System
HCA - Habitat Conservation Area
HCP - Habitat Conservation Plan
IA - Implementation Agreement
ISC - Interagency Scientific Committee
MDS - Multiple Data Source
MESC. - Mid Continental Ecological Service Center
NEPA - National Environmental Policy Act
NF - National Forest
NMFS - National Marine Fisheries Service
NRF - Nesting, roosting and foraging
NRFMA - Nesting, roosting and foraging Management Area
ODFW - Oregon Department of Fish and Wildlife
OESF - Olympic Experimental State Forest
PFSH - Protected Federal Suitable Habitat
SE - Standard Error
SEIS - Supplemental Environmental Impact Statement
SEPA - State Environmental Policy Act
SH - Suitable spotted owl habitat
tpa - trees per acre
USDA - United States Department of Agriculture
USDI - United States Department of Interior
WA - Washington
WAU - Watershed Administrative Unit
WDFW - Washington Department of Fish and Wildlife

DATA SOURCES FOR FWS ANALYSIS OF THE DNR HCP

November 25, 1996
Prepared by T. Young

The analysis to support the assessments in the FWS's biological opinion for the Washington DNR HCP was dependent on the integration of many data sets. The following list identifies specific data sets and their source by geographic theme. Data set names are listed in brackets ([ ]).

OWNERSHIP

This theme was based on data supporting the FWS's 4(d) rule development for the Northern Spotted Owl [COMBO100]. It was compiled by the Mid Continent Ecological Service Center Technology Applications Team of the Biological Resources Division of the U.S. Geological Survey (MESC) from best available existing data sets and delivered to the FWS on October 3, 1996.

Because COMBO100 did not distinguish between DNR and other State-managed lands, DNR-managed lands across the range of the spotted owl in Washington State were identified using data received by the FWS from DNR on May 29, 1996. This data represents DNR's HCP lands as identified in their DNR-managed lands layer (POCA) as of April 1995 and conforms with data used by DNR in development of their HCP.

In cases where analysis involved several land management categories inside designated Critical Habitat Units for the Marbled Murrelet, land management categories were based on the FWS's own compilation [MMCH_FINAL] dated May 1996. This layer used DNR-managed lands as contained in the POCA data layer as of April 1996 and Federal lands as obtained from Federal land management agencies in the Spring of 1996.

PHYSIOGRAPHIC PROVINCES

This layer is based on designations made in the Forest Ecosystem Management Assessment Team report (USDA et al. 1993).

WASHINGTON DNR Planning Units and OWL MANAGEMENT AREAS

Planning unit boundaries [PLANUNITS] and landscape planning units within the Olympic Experimental Forest [OESFBASINS] were acquired by the FWS from DNR in September 1996. Information regarding the location of designated NRF Management Areas and dispersal areas are based on a data layer [OWLMGMT] also acquired from DNR in September 1996.

WATERSHED ADMINISTRATIVE UNITS

The location of these boundaries are contained in a layer [WAU] acquired from DNR in May 1993.

MARBLED MURRELET CRITICAL HABITAT UNITS

This layer was developed by the Office of Technical Support - Forest Resources, North Pacific Coast Ecoregion of the FWS in the Spring of 1996 [MMCH_FINAL].

POTENTIAL MARBLED MURRELET HABITAT

Virtually no information is available about the distribuition of potential marbled murrelet nesting habitat in Washington State. In an attempt to establish some baseline of habitat including quantity and distribution, the FWS used the following process and data sets:

The distribution of late seral conifer stands across the action area was identified using DNR's Classified Canopy Coverage (Collins) as received by the FWS in January, 1996. This layer is based on 1991 Landsat/TM imagery. The information was supplemented with old growth conifer distributions based on Washington Department of Fish and Wildlife's old growth conifer inventory ("The Status of Old Growth in Western Washington, A Landsat Perspective", Eby and Snyder, 1990). The composite distribution was updated using DNR's 1991-1993 rate of harvest information received by the FWS in August of 1996. This information allowed eliminating old growth/late seral stands in the composite identified as clearcut in the rate of harvest layer. The resulting layer was further refined to limit possible habitat designation to stands below 3500 feet elevation using USGS digital elevation models and within approximately 57 miles of marine waters.

SPOTTED OWL SITE CENTERS

The location of spotted owl site centers is based on information compiled by MESC for the 4d rule development for the Northern Spotted Owl [MEGAOWL] and delivered to the FWS in September 1996. Site centers are based on Washington Department of Fish and Wildlife's (WDFW) OWLS data layer supplemented with additional observations in Federal wilderness areas. WDFW sightings are limited to observations of spotted owl pairs and resident singles made between 1986 and 1995 and reported to WDFW by July 1, 1996.

SPOTTED OWL HABITAT

The distribution of spotted owl habitat in Washington is based on data compiled by MESC and delivered to the FWS in October 1996 [COMBO100] in support of the 4d rule development for the Northern Spotted Owl. The layer is a composite formed from the following sources:

OWLMOSAIC (Version 2) - Acquired from DNR, Forest Practices Division, this layer combines what DNR has identified as the 'best available source' for spotted owl habitat information. Sources vary in accuracy and acquisition date ranging from photo interpreted, field verified mapping to Landsat derived cover typing between the years 1988 and 1994.

US FOREST SERVICE MAPPING - Data layers identifying the distribution of spotted owl habitat where acquired from all National Forests in Washington with the exception of the Okanogan NF. in the Spring of 1996. On Federal lands, this information was used in preference to that contained in OWLMOSAIC.

RATE OF HARVEST - This data layer acquired from DNR (Collins) identifies the location of timber harvest activities which occurred between 1988 and 1993 across the action area. It was used to eliminate spotted owl habitat coincident with identified clearcuts.

FOREST FIRES - Where available, data depicting the location of recent forest fires was used to update the composite habitat layer. Fire information was acquired from the Mt Baker/Snoqualmie NF (1994-1995), Okanogan NF (1994-1995), and the Wenatchee NF (1994).

OTHER SPECIES LOCATIONS

The locations of Marbled Murrelet, Grizzly Bear, Peregrine Falcon, and Gray Wolves are based on Washington Department of Fish and Wildlife's Natural Heritage Data Base [HRTG] as of November 1, 1996.

The distribution of anadromous fish in the study area is based on Washington Department of Fish and Wildlife's Washington Rivers Information System [WARIS] as of February, 1995.

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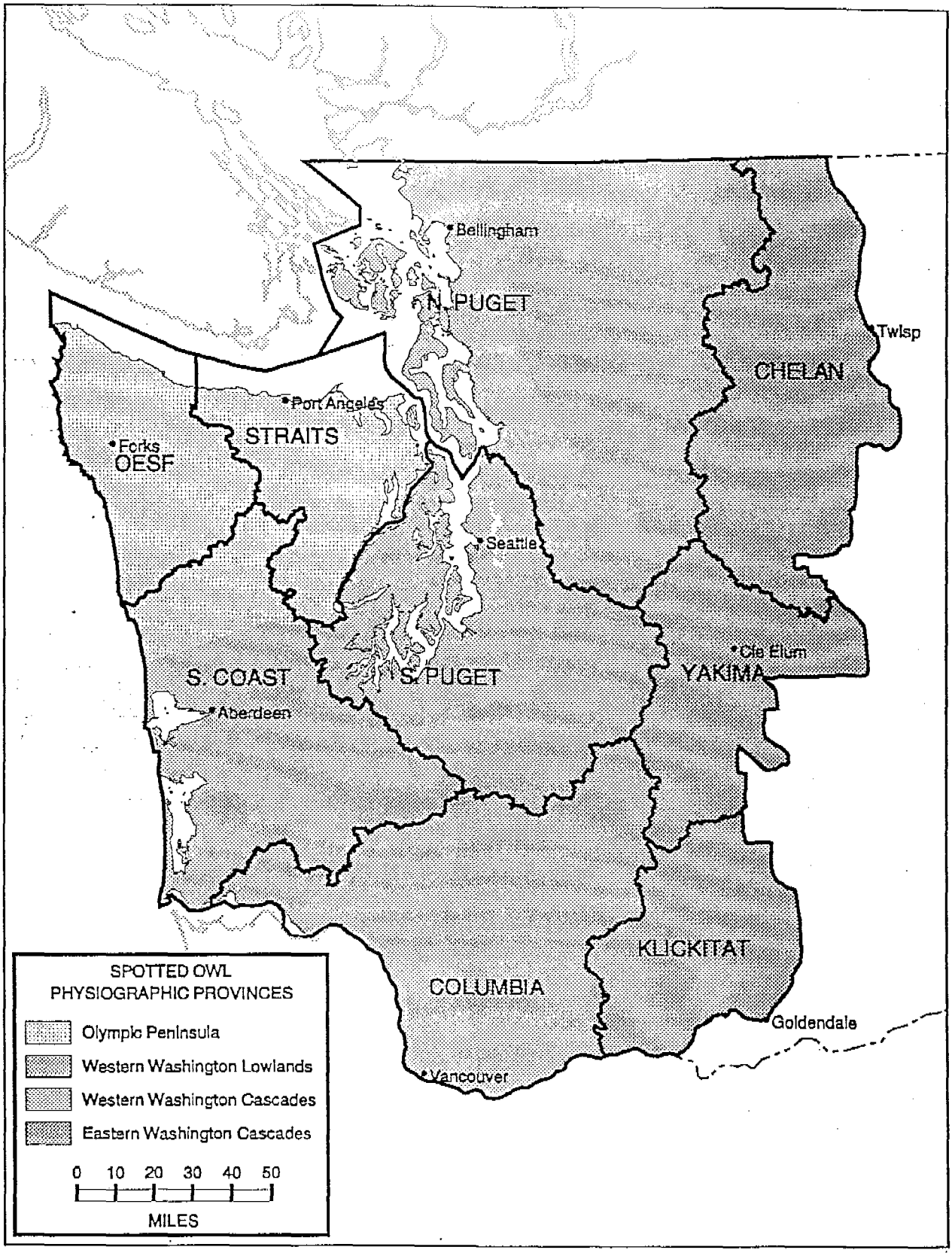

Figure 1. DNR HCP planning units and spotted owl physiographic provinces in Washington.

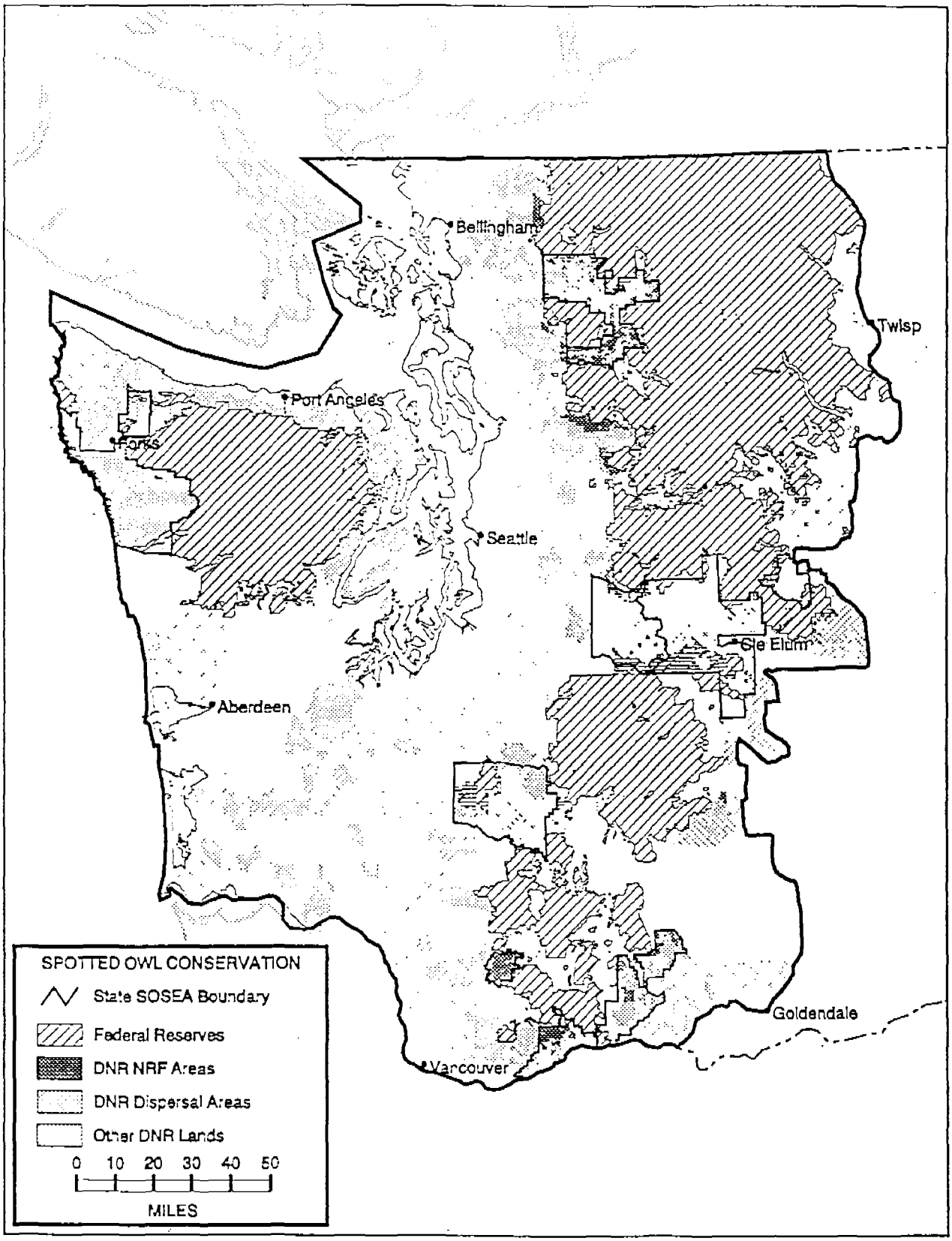

Figure 2. DNR managed HCP lands designated as NRF or dispersal areas, state spotted owl special emphasis areas, and Federal reserve lands under the Northwest Forest Plan.

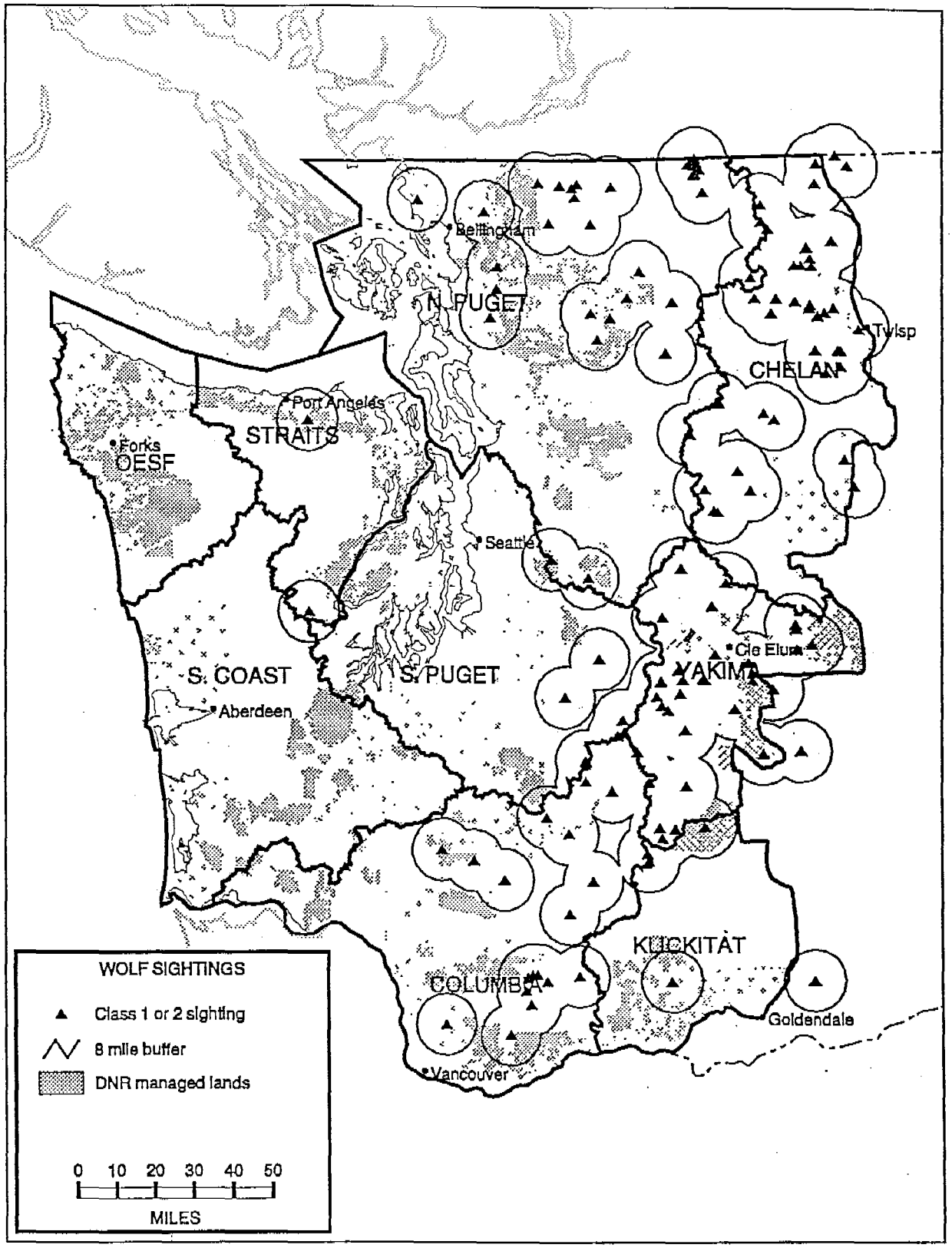

Figure 3. Class 1 and Class 2 gray wolf sightings since 1983 within the DNR HCP action area buffered by 8-mile radius circles.

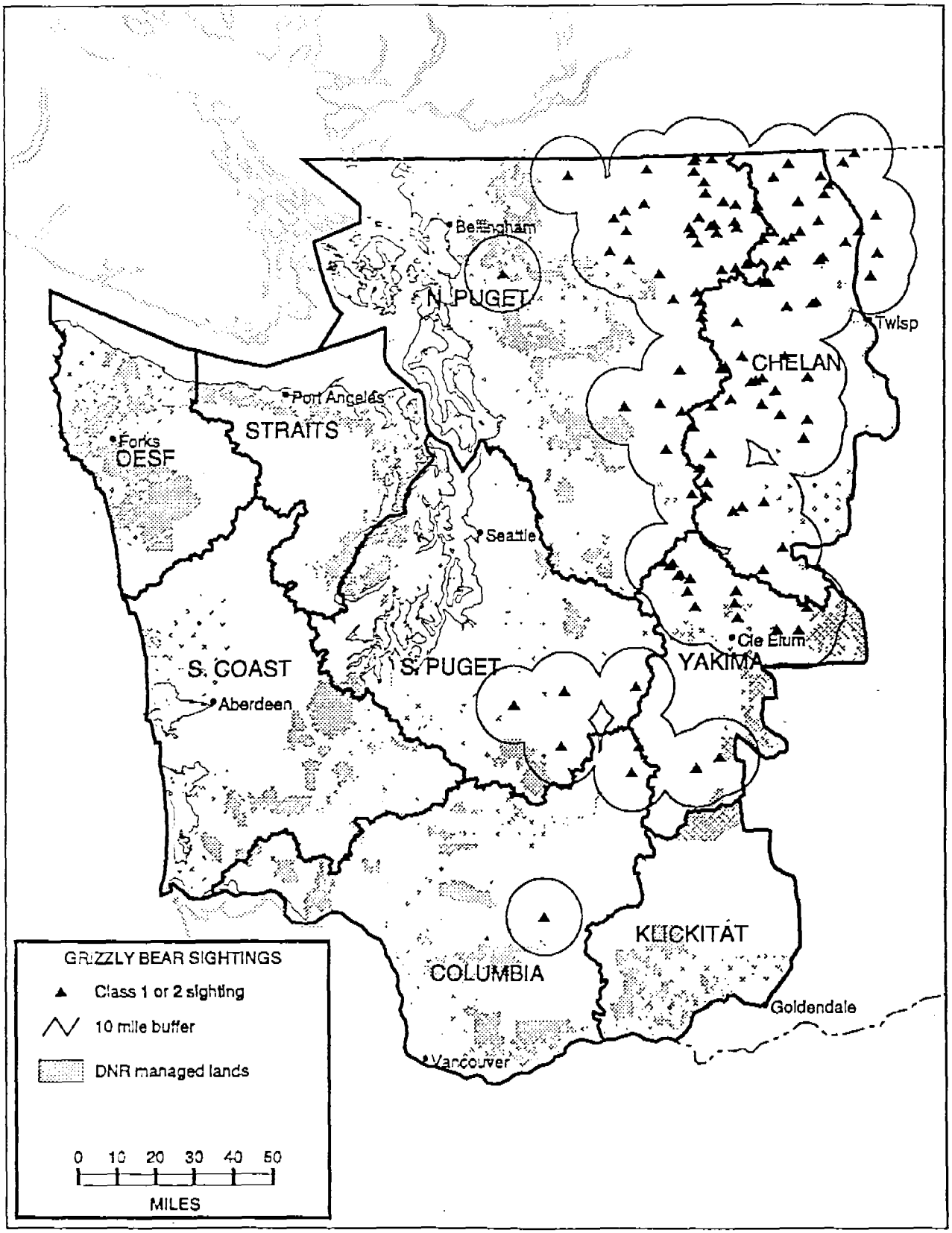

Figure 4. Class 1 and Class 2 grizzly bear sightings since 1964 within the DNR HCP action area buffered by 10-mile radius circles.

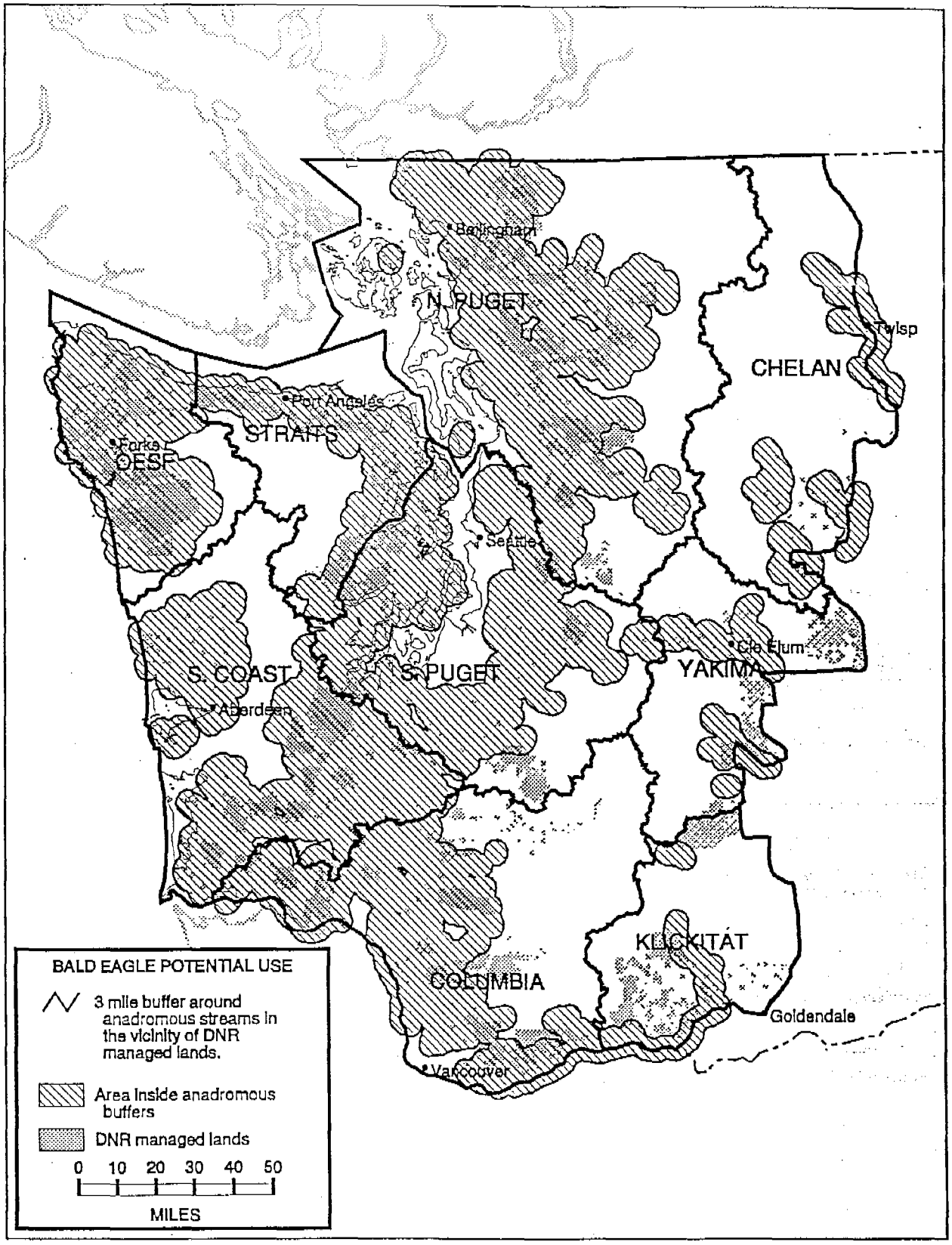

Figure 5. Bald eagle potential use areas as defined by 3-mile buffers around selected anadromous fish streams in the DNR HCP action area.