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F. Multispecies Conservation Strategy for Unlisted Species in the Five West-side Planning Units

Introduction

The multispecies conservation strategy for the five west-side planning units is directed at providing habitat for animal species of concern and other unlisted animal species and at special landscape features identified as uncommon habitats or habitat elements. For the purposes of this HCP, species of concern are federally listed, state-listed, federal candidate, and state candidate animal species. (See Table III.7 for the federally listed species and Table III.13 for the other species of concern excluding anadromous salmonids and bull trout. Those are named in Table III.10.) Other unlisted species include other animal species that may use the types of habitat found within the five west-side planning units and that may become listed or candidates for listing in the future. For the purposes of this HCP, uncommon habitats on DNR-managed lands are talus fields, caves, cliffs, oak woodlands, large snags, balds, mineral springs, and large, structurally unique trees.

Under this HCP, multispecies conservation strategies shall be implemented on DNR-managed lands in the five west-side planning units and the Olympic Experimental State Forest (OESF). The multispecies conservation strategy for the OESF is discussed in Section E of this chapter. Briefly, the OESF strategy differs somewhat from that for the five west-side planning units because:

(1) the emphasis in the OESF on research and systematic application and refinement of knowledge gained to achieve effective and efficient integration of commodity production and conservation will likely lead to changes in conservation strategies over time; and

(2) the conservation strategies for salmonids and the northern spotted owl, which are the foundation of the multispecies conservation strategies, are different for the OESF. (See Section E of this chapter for a complete discussion of the OESF conservation strategies.)

Neither multispecies conservation strategy will be applied in the east-side planning units. But all DNR management activities there will still comply with state Forest Practices Rules and applicable state wildlife regulations and will be consistent with the policies set forth by the Board of Natural Resources.

DNR will continue to participate in watershed analysis according to state Forest Practices Rules (WFPB 1994). If watershed analysis indicates that public resources require a greater level of protection than that specified by the HCP, the prescriptions developed through watershed analysis to provide this additional protection shall be implemented. However, because (as of the writing of this HCP) watershed analysis does not address wildlife, the HCP multispecies conservation strategy shall continue to apply to DNR-managed lands in Watershed Administrative Units (WAU) for which watershed analysis has been conducted, unless stated otherwise elsewhere in this HCP.

For uncommon habitats and certain species of concern, the multispecies conservation strategy specifies special management prescriptions and/or additional mitigation. The management prescriptions and mitigation are

intended to be straightforward ways to provide a standard level of protection. In some instances, these will not be the most efficient means available to provide effective wildlife conservation. Therefore, in places where DNR believes that effective conservation can be provided in a more efficient way, DNR through cooperation with the U.S. Fish and Wildlife Service, may develop a site-specific management plan that provides adequate protection for the species or habitat occurring at that site. When a management plan approved by the U.S. Fish and Wildlife Service is in place, the special management prescriptions and/or additional mitigation specified in this HCP shall be waived.

If, however, DNR discovers some active nesting, denning, or roosting sites in the course of forest management activities, or through voluntary surveys, or such sites are documented by the Washington Department of Fish and Wildlife on DNR-managed lands, DNR shall provide the special protection described in the subsection titled Species by Species Conservation. At the time a new species is proposed for listing, and a written request to add that species to the permit is made by DNR, DNR will evaluate and consider additional protection measures such as seasonal restrictions and protection of nesting/denning sites.

Within the five west-side planning units, 62 animal species are considered species of concern because information indicates they face some risk of extinction: nine are federally listed, two, including the bull trout, are federal candidates, 23 are federal species of concern, two are listed by the state but have no special federal status, 12 are state candidates with no special federal status, seven are sensitive species, and seven species of anadromous salmonids have been or are under review by the federal government for listing. (The federally listed species are shown in Table III.8, the salmonids in Table III.11, and the other species in Table III.14.) Other species will probably be added to this list in the coming decades, but it is difficult to predict which species are at the brink of "at risk."

Federal guidelines (e.g., spotted owl circles) and state rules (WAC 232-12-292, WAC 222-16-080) place species-specific constraints on forest practices for the benefit of federally listed and state-listed species. But, given the large and probably expanding array of listed and candidate species, species-specific forest practices have become an inefficient and impractical means of attaining wildlife conservation objectives and providing income to the trusts. Within the confines of a managed forest, the most effective means for the conservation of wildlife is to provide functional habitat. Under this HCP, DNR will contribute to the survival of species of concern and other unlisted species through forest management that provides a variety of well-distributed, interconnected habitats.

The multispecies strategy discusses the objectives for conservation of habitat for unlisted species of concern and other unlisted species. Then the benefits to habitat of unlisted species through the other HCP conservation strategies are described, followed by a discussion of protection of uncommon habitats. The strategy closes with a description of conservation for habitat of specific unlisted species of concern and a summary of habitat types provided on DNR-managed lands in the five west-side planning units.

Conservation Objectives

DNR had identified three conservation objectives for its multispecies strategy on DNR-managed lands in the five west-side planning units to provide habitat that:

(1) helps maintain the geographic distribution of unlisted species that have small annual or breeding-season home range areas;

(2) contributes to demographic support of populations of unlisted species with large home ranges on federal forest reserves (National Parks, National Forest Wilderness Areas, National Forest Late successional Reserves, etc.); and

(3) facilitates the dispersal of these wide-ranging species among federal forest reserves.

Maintenance of geographic distribution means supporting the continued presence of the species, or its habitat, over as much of its historic range as possible. Therefore, objective (1) requires that habitat supporting the life needs of unlisted species with small ranges be provided throughout the range of the species on DNR-managed lands in the five west-side planning units. Demographic support refers to the continued viability of populations through the reproductive contribution of individuals. Therefore, objective (2) requires that habitat capable of supporting the successful reproduction of wide-ranging unlisted species be provided on DNR-managed lands in the five west-side planning units near federal reserves. Dispersal entails the movement of individuals from one subpopulation to another. Therefore, objective (3) requires that foraging and resting habitat of wide-ranging unlisted species be provided on DNR-managed lands in the five west-side planning units between blocks of federal reserves.

The habitats most critical for the conservation of unlisted species on DNR-managed lands in the five west-side planning units contain elements of late successional coniferous forest, riparian areas and wetlands, or both. The aggregate landscape-level effects of the HCP riparian, spotted owl, and marbled murrelet conservation strategies, as described below, are expected to provide habitat for most unlisted species. However, some unlisted species require special landscape features or habitat elements that may not be adequately conserved by the species-specific strategies. Thus, the special protection of talus fields, caves, cliffs, oak woodlands, and very large old trees are considered necessary to provide conservation for these species. Furthermore, some unlisted species are known or thought to be highly sensitive to human disturbance, and therefore, in the context of a managed forest, special management to reduce human disturbance is warranted.

Conservation Strategy

The HCP multispecies conservation strategy is built upon conservation measures directed at providing habitat for three taxa: salmonids (the riparian strategy), the northern spotted owl, and the marbled murrelet. (See Sections C, A, and B, respectively, of this chapter for more detail on each strategy.) The aggregate effect of this species-specific conservation is the creation of landscapes containing interconnected patches of late successional forest. Late successional forests consist of both mature (80-200 years old) and old-growth (greater than 200 years old) forest age classes (Thomas et al. 1993; FEMAT 1993; Spies and Franklin 1991). In addition, the other managed forests will provide early and mid-seral stage forest habitat.

RIPARIAN CONSERVATION STRATEGY

This strategy benefits nearly all aquatic, wetland, riparian obligate, and upland species that may occupy DNR-managed lands. The riparian management zones established along all Types 1, 2, 3, and 4 waters should provide suitable habitat for aquatic and riparian obligate species. Wetland species will be protected through DNR's continued commitment to "no overall net loss of naturally occurring wetland acreage and function" (DNR 1992 p. 36). For upland species, the long-term benefit of salmonid conservation is a network of riparian corridors connecting upland patches of late successional forest on unstable hillslopes.

The riparian buffer of the riparian management zone is estimated to occupy 69,000 acres along Types 1, 2, 3, and 4 waters (6 percent of DNR-managed forest lands in the five west-side planning units). The riparian management zone will be managed to maintain or restore salmonid habitat. Given this objective, most of the no-harvest and minimal-harvest areas (58,000 acres) in the riparian management zone will likely develop into forest that has old-growth characteristics. The low-harvest area (11,000 acres) is managed according to the same objective, but its distance from water may permit more management activities, and therefore, in most places, the low-harvest area will likely eventually contain forests with a range of late successional characteristics. Unstable hillslopes are estimated to occupy an additional 5 to 10 percent of DNR-managed forest land outside the riparian management zone. Unstable areas will be managed to minimize the risk of mass wasting, and it is likely that little harvest will occur there. Unstable hillslopes should add another 60,000 to 120,000 acres of late successional forest, with some portion being old growth.

Overall, salmonid and riparian conservation is expected to result in the maintenance or restoration of 129,000 to 189,000 acres of forest with mature and old-growth characteristics (11 to 16 percent of the five west-side planning units). However, natural disturbances will cause the amount to vary over time. Approximately 9 percent of these areas are currently in a late successional stage, and 84 percent are expected to be in a late successional stage by the year 2195. The ubiquity of streams, particularly Type 4 waters and Type 5 waters on unstable hillslopes, will ensure connectivity among patches of late successional forest.

Management within the wind buffers of the riparian management zone will be largely experimental, and therefore, the forest conditions within the wind buffer cannot be accurately predicted. Wind buffers may occupy up to 1 percent (10,000 acres) of DNR-managed forest land in the five west-side planning units.

MARBLED MURRELET CONSERVATION STRATEGY

Landscape conditions outside riparian areas and not on unstable hillslopes will be enhanced by management for marbled murrelets. Preliminary estimates of marbled murrelet habitat suggest that between 47,000 and 108,000 acres of habitat exists outside riparian management zones and not on unstable hillslopes — another 4 to 9 percent of the west-side planning units. The long-term murrelet conservation strategy is not yet developed, but it will quite likely entail the preservation of some marbled murrelet nesting habitat, and this will increase the amount of late successional forest available to other species.

NORTHERN SPOTTED OWL CONSERVATION STRATEGY

In the five west-side planning units, the spotted owl strategy designates 163,000 acres to be managed as nesting, roosting, and foraging (NRF)

habitat for the spotted owl. There will be two 300-acre nest patches per 5,000 acres of managed forest in NRF management areas, for a total of approximately 20,000 acres. These nest patches will consist of high quality spotted owl nesting habitat with old-growth forest characteristics. The nest patches will occur within a larger, contiguous 500-acre area, of which the remaining 200 acres shall be sub-mature forest (as defined in Hanson et al. 1993) or higher quality habitat. At least 50 percent of the designated NRF management area in each WAU (including the nest patches) will be sub-mature forest or higher quality habitat.

The riparian conservation strategy will result in 11 to 16 percent of the NRF management area in a late successional condition. High-quality spotted owl nesting habitat in nest patches will occupy 12 percent of NRF management areas, but portions of the nests patches will be in riparian areas or on unstable hillslopes. The nest patches are estimated to occupy 10 percent of the NRF management area outside those areas protected by the riparian conservation strategy. The marbled murrelet strategy will contribute additional late successional forest, but an accurate estimate of amount cannot be made at this time. Nest patches and the riparian conservation strategy will result in late successional forest over 21 to 26 percent of designated NRF management areas. Therefore, on average, another 24 to 29 percent of the area designated for NRF management in each WAU will need to be submature forest or better to meet the 50 percent requirement for each WAU with designated NRF habitat.

A working hypothesis of the spotted owl conservation strategy is that the development of spotted owl habitat may be accelerated through special forest management. The calculation of harvest rotations are based on the assumption that managed forests can attain sub-mature characteristics at approximately age 70 years. Designated NRF management areas may be managed under an even-aged regulated forest system, and under such management, the 50 percent sub-mature forest prescription would require a harvest rotation of at least 100 years. Consequently, an additional 14 to 21 percent of the area designated for NRF management in each WAU will be mature forest (i.e., more than 80 years old). On average, 40 to 42 percent of the designated NRF management area in each WAU will be late successional forest, with some portion possessing old-growth characteristics.

In the five west-side planning units, the spotted owl strategy designates 117,000 acres to be managed as spotted owl dispersal habitat, which supports the movement of juvenile spotted owls among sub-populations on federal reserves. Dispersal habitat must provide foraging and roosting opportunities in amounts adequate to promote the survival of spotted owls. At least 50 percent of the designated dispersal management areas in each WAU will meet the minimum specifications for dispersal habitat.

Using the average site productivity of DNR-managed forests on the west side, dispersal habitat characteristics are estimated to be attained at approximately 40 years of age. Dispersal habitat areas will be managed under an even-aged regulated forest system, and therefore, the 50 percent prescription will require a harvest rotation greater than 40 years. The riparian conservation strategy will result in 11 to 16 percent of the land base in a late successional forest. The marbled murrelet strategy will contribute additional late successional forest, but an accurate estimate of amount cannot be made at this time. To meet the 50 percent prescription, another 34 to 39 percent of the land base must be dispersal or higher quality owl habitat, and therefore, a harvest rotation between 65 and 70 years is necessary.

OTHER MANAGED FORESTS

In conjunction with the conservation strategies described for spotted owls, marbled murrelets, riparian ecosystems (salmonids), and uncommon habitats, DNR will continue with a wide range of forest land management activities. (See Section H of this chapter, titled Forest Land Management Activities, for more discussion.) Typically, even-aged management is based on either an economic rotation or a maximum volume rotation. Currently, the most widely used harvest age is based on the economic rotation, which is approximately 50 to 60 years in west-side forests. Maximum volume rotations are approximately 80 to 100 years, the age at which stands reach maturity.

After a natural disturbance, such as fire, a stand regenerates and develops through a succession of seral stages. Managed forests often follow a similar, yet altered, pattern of sucession after a clearcut timber harvest. Various systems have been used to describe forest succession. The system used by Brown (1985) is based on the structural condition of the stand and identifies six stages: grass/forb, shrub, open sapling/pole, closed sapling/pole/sawtimber, large sawtimber, and old growth. Large saw timber is approximately equivalent to mature forest. Mature and old-growth forests are considered to be late successional (Thomas et al. 1993). Conifer forest stands develop closed sapling/pole/sawtimber structural conditions at approximately 30 to 80 years of age (Brown 1985), and stands exhibiting such conditions are generally considered to be young forest (Spies and Franklin 1991). Forests managed on an economic or maximum volume rotation should provide suitable habitat for species that utilize grass/forb, shrub, open sapling/pole, and closed sapling/pole/sawtimber stages of forest succession.

Benefits of the Species-Specific Strategies to Unlisted Species

A population's extinction risk, or conversely, its viability, is primarily a function of population size. Larger populations are more resilient to adverse environmental changes, whether such changes are natural or human-caused. Reductions in a species' habitat quality or quantity are necessarily followed by a decrease in population size, and a substantial decrease in population size increases the risk of extinction. Improving habitat quality or quantity should, in theory, lead to a larger population and decreased risk of extinction.

Geographic distribution is also a factor in risk of extinction. Maintaining a species over a large geographic area decreases the risk of extinction caused by environmental change. Over a sufficiently large area, it is unlikely that catastrophic disturbances (e.g., forest fires), harsh weather, or disease will directly affect all sub-populations. Ecological distribution may also play a role in long-term population viability. Exposing sub-populations to a range of ecological conditions maintains the genetic variation in a population. Genetic variation at the population level is essential for adaptation to changing environmental conditions.

DNR-managed forests on the west side are distributed from the Canadian border to the Columbia River Gorge and from the Cascade crest to the Pacific Coast. The five west-side planning units include portions of five physiographic provinces (Northern Cascades, Southern Washington Cascades, Puget Trough, Olympic Peninsula, and the Coast Ranges — see Map III.1), three major vegetational zones (Sitka spruce, western hemlock, and silver fir — see discussion in the section of Chapter I titled Land Covered by the HCP), and a range of climatic conditions (Franklin

and Dyrness 1973; see also section of Chapter I titled Land Covered). This mix of soils, vegetation, and climate exposes sub-populations to a range of ecological conditions. The large geographic area covered by the five west-side planning units and the range of ecological conditions within them will contribute to the long-term viability of unlisted species populations.

The conservation strategies for salmonids and marbled murrelets should serve to reduce the risk of extinction for many unlisted species, in particular those that have small home ranges and depend on riparian/wetland ecosystems or late successional forests. The riparian (salmonid) strategy will maintain or restore the quantity, quality, and geographic distribution of riparian/wetland habitats. The murrelet strategy is expected to result in the retention of a significant amount of late successional forest. Even-aged forest management will provide habitat for species that utilize young forests. Some unlisted species depend on special landscape features or habitat elements that have yet to be addressed. The conservation measures for talus fields, caves, cliffs, oak woodlands, large snags, balds, mineral springs, and large, structurally unique trees described later in this section are intended to provide habitat for these species.

The spotted owl conservation strategy positions large landscapes of mature and old-growth forest within 2 miles of federal reserves (National Parks, National Forest Wilderness Areas, National Forest Late successional Reserves, etc.). For wide-ranging species (northern goshawk, Pacific fisher, California wolverine, grizzly bear, gray wolf), the conservation benefits of this HCP are seen as adjunct to those provided by federal reserves. Wildlife populations on federal lands will benefit from the proximity of additional riparian and late successional forests on DNR-managed lands. The HCP conservation strategies will broaden the geographic distribution of late successional forest and improve connectivity between noncontiguous blocks of federal land. For those unlisted species sensitive to human disturbance, special management as described below will enhance the reproductive success of individuals.

Protection of Uncommon Habitats

The conservation strategies for salmonids, spotted owls, and marbled murrelets protect habitat for many unlisted species, particularly those associated with late successional forests or riparian ecosystems. For species that rely on uncommon habitats or habitat elements, additional measures are necessary to meet the conservation objectives of the HCP. These measures specifically address talus, caves, cliffs, oak woodlands, large snags, and large, structurally unique trees. The protection of talus, caves, cliffs, and oak woodlands is important because once altered or destroyed, these habitats are difficult to restore or recreate. Large snags and large, structurally unique trees are essential habitat elements that are generally scarce in managed forest

TALUS

Talus has been designated a priority habitat by the Washington Department of Fish and Wildlife (WDFW 1995). It is a homogenous area of rock rubble ranging in size from 1 inch to 6.5 feet (WDFW 1995a; Herrington and Larsen 1985). Naturally occurring talus fields often develop at the base of cliffs or steep hillslopes as gravitational forces act upon disintegrating rock. As more rock accumulates, talus fields expand into adjacent areas of vegetation. Organic soils and pioneering vegetation may also begin to appear in some portions of talus fields in the primary stage of forest succession.

The Larch Mountain salamander requires talus in upland areas (Leonard et al. 1993). Dunn's and Van Dyke's salamanders are also known to inhabit the moist spaces between and under the rocks in talus fields (WDW 1991). Several bat species of concern use rock crevices in large talus for solitary roosts (Christy and West 1993; Holroyd et al. 1994). The microclimatic conditions and shelter provided in the spaces between and under rocks are the elements that make talus an important habitat. Because talus with a high soil content lacks such spaces, it is less important as habitat.

The rock rubble that forms talus fields accumulates where the slope is less than the angle of repose. Although talus provides habitat for some species, the talus fields are also used as road beds and the rocks are used to build roads. (Forty-seven percent is the average angle of repose for unconsolidated materials). The stability of these areas, as evidenced by these accumulations, often make them highly suitable for road beds. Routing roads around all talus fields to preserve them as habitat would mean building on less stable parts of a hillslope, creating the potential for mass wasting and sedimentation. This would be contrary to the riparian conservation strategy, which seeks to reduce the adverse impacts of roads on salmonid habitat.

Much talus is composed of hard rock, which may be suitable material for road construction. Mining talus fields for road construction can result in both short-term and long-term minimization of adverse impacts to salmonid habitat. Heavy trucks hauling construction materials can cause a short-term increase in road erosion and stream sediment concentrations, which can be lessened by using rocks from nearby talus fields (Cederholm et al. 1981). In addition, the use of construction materials inferior to hard rock talus can lead to increased risk of road failure and long-term increases in stream sedimentation caused by surface erosion. Therefore, the protection of all talus fields would conflict with the riparian conservation strategy, which requires that the adverse affects of upland management activities on salmonid habitat be minimized. Besides which, the hauling of materials to a road construction site can be prohibitively expensive compared to the mining of talus.

The conservation objectives for the talus habitat are to maintain its physical integrity and minimize microclimatic change. To meet these objectives, avoid conflict with the conservation of salmonid habitat, and promote cost effective forest management, naturally occurring talus fields shall be protected as follows:

(1) Nonforested Talus - defined as exposed talus with 30 percent or less canopy closure.

- No timber harvest will occur in talus fields greater than or equal to 1 acre.

- No timber harvest will occur in talus fields greater than 1/4 acre in spotted owl NRF and dispersal habitat management areas in the Columbia Planning Unit, except for the western half of the Siouxon Block and 2 isolated sections near Highway 12 where no timber harvest will occur in talus fields greater than 1 acre.

- A 100-foot-wide timber buffer will be applied around talus fields identified above. The buffer will be measured from the edge of the nonforested talus field, i.e. where canopy closure first exceeds 30 percent.

- Timber harvest in the buffer must retain at least 60 percent canopy closure. Any yarding within the buffer will protect the integrity of the talus field.

(2) Forested Talus - defined as exposed talus with greater than 30 percent canopy closure.

- Timber harvest may not remove more than one-third of standing timber volume each harvest rotation from forested talus not located in talus buffers.

(3) Nonforested and Forested Talus

- Road construction through talus fields and buffers will be avoided, provided that the routing of roads will be accomplished in a practicable and economically feasible manner, that is consistent with other objectives of a comprehensive landscape-based road network planning process.

- The mining of rock from talus fields and buffers for road construction will be avoided, provided construction materials can be acquired in a practicable manner, consistent with other objectives of a comprehensive road network planning process.

If a functional relationship between relative density and canopy closure can be demonstrated, then relative density can be substituted for canopy closure in the above definitions of talus.

CAVES

The Washington Department of Fish and Wildlife (1995) defines cave as "a naturally occurring cavity, recess, void, or system of interconnected passages which occurs under the earth in soils, rock, ice, or other geological formations, and is large enough to contain a human." This landscape feature has been designated a priority habitat by the Washington Department of Fish and Wildlife (1995a). Caves possess unique microclimates: constant high humidity levels, low evaporation rates, stable temperatures, and an absence of light. The archetypal cave possesses three zones: entrance zone, twilight zone, and dark zone. The entrance zone receives direct light and commonly has a vegetative component. The twilight and dark zones lie beyond the entrance zone in cave passages, i.e., the corridors and chambers that constitute a cave. The twilight zone receives no direct light, but light is detectable. Shade tolerant plants may inhabit this zone. The dark zone is devoid of light and photosynthetic plant life. In terms of species richness, the cave ecosystem is relatively simple, and therefore it is more vulnerable to environmental disturbances.

Species associated with caves in western Washington include the Larch Mountain salamander (WDW 1991), Townsend's big-eared bat (WDW 1991), long-legged myotis, long-eared myotis, fringed myotis, and Yuma myotis (Christy and West 1993). Only six caves are known on DNR-managed land (WDFW Priority Habitats Database 1995). Most caves in western Washington are lava tubes, which are long passages typically close to the surface.

The Washington Department of Fish and Wildlife definition of a cave is extraordinarily broad, and it is unlikely that all geomorphological features that fit this definition are important to wildlife. Under this HCP, when a cave is found, DNR shall determine, in cooperation with the the U.S. Fish

and Wildlife Service, whether it is important to wildlife habitat, and only those caves identified as important habitat shall be protected. The conservation objectives for such caves are to:

(1) maintain the microclimate at the cave entrance;

(2) maintain the physical integrity of cave passages; and

(3) minimize human disturbance to bat hibernacula and maternity colonies.

Caves and cave passages that have been identified as important wildlife habitat shall be protected as follows:

- A 250-foot-wide buffer shall be established around cave entrances. No disturbance of soils or vegetation shall occur within these buffers.
- Where surface activities may disturb a cave passage, a 100-foot-wide buffer shall be established on both sides of the cave passage. No disturbance of soils or vegetation shall occur within these buffers.
- Roads shall not be constructed within 0.25 mile of a cave entrance, provided that the routing of roads around caves can be accomplished in a practicable manner, consistent with other objectives of a comprehensive landscape-based road network planning process.
- Where surface activities may disturb a cave passage, roads shall not be constructed within 300 feet of the cave passage, provided that the routing of roads around caves can be accomplished in a practicable manner, consistent with other objectives of a comprehensive landscape-based road network planning process.
- Newly discovered caves shall be explored and mapped before forest management activities in their vicinity may commence. Explorations will be timed to avoid active maternity colonies or hibernacula.
- The location of caves will be kept confidential by DNR, to the extent permitted by law.

CLIFFS

Cliffs are steep, vertical, or overhanging rock faces; those greater than 25 feet tall and below 5,000 feet in elevation are considered a priority habitat by Washington Department of Fish and Wildlife (1995a). Ledges provide important nesting sites for peregrine falcons. Fissures and overhanging rock provide roosting and hibernation sites for several unlisted bat species of concern (Sarell et al. 1993).

Cliffs are often composed of hard rock that is suitable for road construction. The occasional proximity of cliffs to road construction reduces the hauling distance of road construction materials. The use of construction materials inferior to hard rock can lead to increased risk of road failure and long-term increases in stream sedimentation caused by surface erosion. Furthermore, the acquisition and hauling of materials to a road construction site can be prohibitively expensive compared to the mining of cliffs.

The conservation objectives for cliff habitat are to minimize disturbance to geomorphic features and to protect species that inhabit cliffs. However, few

management practices have been specifically developed for cliffs in managed forests. Therefore, management prescriptions to meet these objectives shall be developed on a site-specific basis with consideration given to the following:

(1) During planning for harvest activities around cliffs greater than 25 feet tall and below 5,000 feet in elevation, DNR shall evaluate the cliff to determine if use by wildlife is likely (e.g., are fissures/overhangs present suitable for bats, are ledges/perch trees present suitable for nesting raptors, etc.) and, if so, provide adequate protection measures including, but not limited to:

   a. protection of integrity of cliffs judged suitable and likely for wildlife use (e.g., during felling/yarding, logs should not be allowed to disturb cliff face);

   b. retention of trees on cliff benches and along the base and top of cliffs judged suitable for nesting raptors, especially perch trees along the top of cliffs; and

   c. avoidance of damage to significant cavities, fissures, and ledges.

(2) All cliffs in excess of 150 feet in height will be evaluated for peregrine falcon use as described elsewhere in this HCP (see Minimization and Mitigation for Other Federally Listed Species in All Planning Units)

(3) All cliffs with known peregrine falcon aeries will be protected according to Forest Practice regulations and the commitments contained in this HCP for peregrines (see Minimization and Mitigation for Other Federally Listed Species in All HCP Planning Units).

The mining of rock from cliffs for road construction shall be avoided, provided construction materials can be acquired in a practicable manner, and is consistent with other objectives of a comprehensive landscape-based road-network planning process.

OAK WOODLANDS

Oak woodlands have been designated a priority habitat by the Washington Department of Fish and Wildlife (1995a). Oregon white oak (*Quercus garryana*) is the only native oak in Washington. The center of its range is the Willamette Valley of Oregon; the northern limit of its range is along the lower east slopes of the central Washington Cascades. Scattered Oregon white oak woodlands occur in the Puget Trough, the Columbia Gorge, and along the east slope of the southern Washington Cascades (Franklin and Dyrness 1973). Oregon white oak is also an important component of some ponderosa pine stands along the east slope of the southern and central Washington Cascades (Franklin and Dyrness 1973). In the area covered by the HCP, DNR manages about 4,000 acres of oak woodland (e.g., where oak is the primary tree species) and an additional 7,000 acres of mostly ponderosa pine stands in which oak is a significant associate (e.g., where oak is a secondary or tertiary tree species), but only about 500 acres of oak woodland are in the five west-side planning units (DNR GIS 1995).

Fire is believed to have had a crucial role in the maintenance of oak woodlands by limiting and reducing the number of encroaching conifers. Fire may also stimulate sprouting in Oregon white oaks and enhance the growth of seedlings by removing competing herbaceous vegetation. Without natural wildfires or managed periodic burns, the vegetative composition of the

woodland changes. Douglas fir becomes established, and within three to four decades, the rapidly growing conifer overtops the oak, at which point the plant community may be irreversibly altered.

Oak woodlands are a rare plant community in Washington and provide important habitat for several high priority species, including Lewis' woodpecker and the western gray squirrel, which is listed by the state as threatened. Species that find significant habitat in these areas are primarily those that are at the center of their ranges farther south.

The conservation objectives for this habitat are to:

(1) maintain the current quality and distribution of oak habitat to the extent possible considering air quality, fire management, and other constraints; and

(2) restore the quality and distribution of oak habitat where consistent with the above constraints.

Oak woodlands shall be managed as follows:

(1) Partial harvest may occur in oak woodlands. Such harvest will:

- retain all very large dominant oaks (greater than 20 inches dbh);
- maintain 25 to 50 percent canopy cover;
- remove encroaching conifers, except western white pine; and
- retain standing dead and dying oak trees.

(2) Prescribed underburns shall be conducted where appropriate.

(3) Road construction through oak woodlands shall be avoided, provided that the routing of roads around oak woodlands can be accomplished in a practicable manner, consistent with other objectives of a comprehensive landscape-based road network planning process.

LARGE, STRUCTURALLY UNIQUE TREES

Very large trees with certain structural characteristics are important habitat elements in conifer forests of western Washington. Individual trees most valuable for wildlife possess large strong limbs, open crowns, large hollow trunks, and broken tops or limbs. Many live trees that exhibit such characteristics are described by foresters as "deformed" or "defective". These trees provide important, perhaps essential, nesting and/or roosting habitat for two listed species, the marbled murrelet and bald eagle, and several bird species of concern including Vaux's swift, and the pileated woodpecker, as well as forest bats. In western Washington, three species of trees attain enormous size, are very long-lived, and are generally quite wind-firm persisting through numerous disturbances — Sitka spruce (*Picea sitchensis*), Douglas fir (*Pseudotsuga menziesii*), and western redcedar (*Thuja plicata*). According to Waring and Franklin (1979), on "better sites" in the Pacific Northwest, Douglas fir, Sitka spruce, and western redcedar can attain typically large diameters, from 60 to 87 inches, 70 to 90 inches, and 60 to 118 inches, respectively. In a managed forest, the largest examples of such trees are sometimes referred to as old-growth remnants.

The conservation objectives for this habitat element are to:

(1) retain very large trees with certain structural characteristics important to wildlife, and

(2) retain large trees that may develop these structural characteristics.

Research on animal species using large, structurally unique trees provides guidance for retention criteria. In western Washington, the mean diameter of Douglas fir used for nesting by bald eagles was 50 inches dbh (n = 70) and ranged from 24 to 90 inches dbh (Anthony et al. 1982). Bald eagles used Sitka spruce that ranged from 41 to 109 inches dbh and averaged 75 inches dbh (n = 17) (Anthony et al. 1982). Raley et al. (1994) found more than two-thirds of the roost trees used by radio-tagged pileated woodpeckers were large hollow western redcedars (mean diameter = 81 inches dbh). Vaux's swifts have been found roosting and nesting in hollow western redcedars similar to those used by pileated woodpeckers. Hamer and Nelson (1995) found that in Washington, marbled murrelets nest in trees that average 60 inches dbh (n = 6) and range in size from 35 to 87 inches dbh.

DNR shall conserve the habitat elements provided by large, structurally unique trees as follows:

- When selecting trees for retention, a preference shall be shown for large trees with structural characteristics important to wildlife, or those considered to be old-growth remnants.
- At least 1 tree per acre selected for retention shall belong to the largest diameter class of living trees in the management unit before harvest (by 2-inch increments). At least 1 other tree per acre shall belong to the dominant crown class.
- The trees selected for retention will be left in the harvest unit where practicable, and may be clumped to improve wildlife habitat, protect trees from severe weather, or facilitate operational efficiency, but where practicable, the density of clumps may not be less than 1 clump per 5 acres.
- Trees selected for retention will pose no hazard to workers during harvest operations per the safety standards of the Washington Department of Labor and Industries (WAC 296-54).

SNAGS

DNR shall conserve the habitat elements provided by large snags as follows:

- At least three snags shall be retained for each acre harvested, on average. DNR will try to leave all snags where safe and practical.
- If available, snags retained will be at least 15 inches dbh and 30 feet tall. DNR will try to leave all snags where safe and practical.
- Priority for retention will be given to large hollow snags, hard snags with bark, and snags that are at least 20 inches dbh and 40 feet tall.
- At least five live trees shall be retained permanently for each acre harvested, on average. Two of these trees will be as described in the section on large, structurally unique trees. The other three trees per acre will belong to the dominant, codominant, or intermediate crown classes, and, when available, will have at least one-third of their height in live crown.
- Priority for retention will be given to tree species which have a propensity to develop cavities (e.g., maple), but the stand tree species diversity after harvest should be generally representative of the tree species diversity prior to harvest.

- If fewer than three snags per acre are available prior to harvest, or if fewer than three snags can be left because of safety concerns, additional live trees will be retained so that the total number of stems per acre retained after harvest is, on average, at least 8 per acre. If additional live trees belong to the co-dominant or intermediate crown classes, and when available, will have at least one-third of their height in live crown. If intermediate crown-class trees are retained, shade-tolerant species with at least one-third of their height in live crown will be selected.

- Snags and trees selected for retention within the harvest units may be clumped to improve wildlife habitat, protect trees from severe weather, or facilitate operational efficiency, but where practicable, the density of clumps may not be less than one clump per five acres.

- Snags and trees selected for retention will pose no hazard to workers during harvest operations per safety standards of the Washington Department of Labor and Industries (WAC 296-54).

BALDS

Road construction through balds shall be avoided, provided that the routing of roads around balds can be accomplished in a practicable manner and is consistent with other objectives of a comprehensive landscape-based road network planning process.

MINERAL SPRINGS

Mineral springs provide important resources for certain animal species, e.g., the band-tailed pigeon (*Columbia fasciata).* To prevent or reduce adverse impacts to this landscape feature and the wildlife species associated with it, DNR will cooperate with the U.S. Fish and Wildlife Service in planning management activities within 200 feet of known mineral springs. Such activities will be designed to: (1) retain adequate trees for perching; and (2) maintain berry, fruit, and mast producing shrubs and trees, particularly in openings near mineral springs. Trees harvested near mineral springs will be felled away from the spring. DNR will avoid crossing mineral springs with yarding equipment and will prohibit the crossing of mineral springs by ground-based logging equipment. Residual large green trees and snags within 25 feet of mineral springs will be left, and either clumped or scattered depending upon operational feasibility. In addition, DNR will continue to minimize the use of herbicides as directed by Forest Resource Plan Policy No. 33.

Species by Species Conservation for Unlisted Species of Concern

Habitat for these species will be protected through the conservation strategies for the northern spotted owl and the marbled murrelet, and particularly through the riparian conservation strategy. Please refer to the full descriptions of these strategies as discussed in Sections A, B, and C, respectively, of this chapter for more details.

MOLLUSKS

Newcomb's Littorine Snail

DNR manages several parcels of land near the southern shores of Grays Harbor. The riparian conservation strategy of the HCP is expected to provide protection of the estuarine and wetland habitats considered

important to the Newcomb's littorine snail. This protection will be achieved primarily through:

(1) the application of the riparian management zone to estuaries, all of which are shorelines of the state (RCW 90.58.030) and therefore Type 1 waters; and

(2) riparian buffers along Types 1, 2, 3, and 4 waters. Riparian buffers will mediate the delivery of sediment, detrital nutrients, and large woody debris from inland areas to estuaries.

Furthermore, although no specific HCP strategies have been designed for the protection of estuarine areas, some additional protection is expected through DNR's compliance with the Shoreline Management Act (RCW 90.58) and the guidelines for forest management practices promulgated under this Act (WAC 173-16-060).

California Floater and Great Columbia River Spire Snail

DNR expects the riparian conservation strategy of the HCP to protect the rivers and large streams (Types 1, 2 and 3 waters) considered important to the California floater and the great Columbia River spire snail.

ARTHROPODS

Beller's Ground Beetle, Long-horned Leaf Beetle, and Hatch's Click Beetle

DNR expects the riparian conservation strategy of the HCP to protect the sphagnum bog habitat in which these three species of beetles occur through a commitment to "no overall net loss of naturally occurring wetland acreage and function" (DNR 1992 p 36). Sphagnum bogs associated with low-elevation lakes will be provided further protection when the lake is a Type 1, 2, or 3 water.

Fender's Soliperlan Stonefly and Lynn's Clubtail

DNR expects the riparian conservation strategy of the HCP to protect the aquatic habitats considered important to the Fender's soliperlan stonefly and Lynn's clubtail. The riparian conservation strategy should facilitate the redevelopment of riparian plant communities and the natural variability of the aquatic environment. The natural mix of conifer and deciduous species within the riparian buffer should occur through ecosystem restoration. Also, natural disturbances, such as floods and channel migration will continue to create the silty waters that Lynn's clubtail uses for breeding.

FISH

Olympic Mudminnow

The riparian conservation strategy is expected to protect the spawning and rearing habitats of the Olympic mudminnow through:

(1) committing to "no overall net loss of naturally occurring wetland acreage and function" (DNR 1992 p. 36);

(2) protecting lakes and ponds classifies as Types 1, 2, and 3 waters;

(3) protecting Types 1, 2, 3, and 4 rivers and streams; and

(4) treating Type 4 and 5 waters documented to contain fish that are proposed candidates for federal listing as Type 3 waters, if appropriate.

Additional protection of aquatic habitat will occur through the prohibition of timber harvest on unstable hillslopes and road network management that minimizes adverse impacts to salmonid habitat.

Pacific Lamprey and River Lamprey

The riparian conservation strategy as described above for the Olympic mudminnow should protect the spawning and rearing habitats of the Pacific and river lampreys.

Green Sturgeon

Green sturgeon spawning and juvenile rearing habitats are not known to occur in Washington, and thus are out of the bounds of the area covered by the HCP. However, some adult habitat occurs in Grays Harbor, Willapa Bay, and along the Columbia River and its estuaries. This habitat would receive some protection through the riparian conservation strategy as described above for Newcomb's littorine snail.

AMPHIBIANS

Larch Mountain Salamander

This species is strongly associated with talus. Talus fields that are 1 acre or larger in size will be protected as previously described in the subsection titled Protection of Uncommon Habitats. Also, DNR expects the riparian conservation strategy to protect talus fields within or immediately below unstable areas because no harvest will occur on hillslopes with a high risk of mass wasting. In addition, the riparian management zone along Types 1, 2, 3, and 4 waters may encompass some talus fields.

Dunn's and Van Dyke's Salamanders and the Tailed Frog

The riparian conservation strategy is expected to protect the breeding, foraging, and resting habitats of Dunn's and Van Dyke's salamanders and the tailed frog. Riparian buffers along Types 1, 2, and 3 waters will be approximately equal to the site potential height of trees in a mature conifer stand, or 100 feet, whichever is greater. A riparian buffer 100 feet wide will be applied to both sides of Type 4 waters. Management of the no-harvest and minimal-harvest areas of the riparian buffer is anticipated to maintain or restore forests with mature or old-growth characteristics.

Some seeps will be protected through Type 5 stream protection. Type 5 waters that flow through an area with a high risk for mass wasting will be protected under the riparian conservation strategy, and other Type 5 waters will be protected where necessary for key nontimber resources, such as water quality, fish, wildlife habitat, and sensitive plant species (DNR 1992 p. 35).

Dunn's and Van Dyke's salamanders are occasionally found in upland talus (WDW 1991). Talus fields that are 1 acre or larger will be protected as described previously in the subsection titled Uncommon Habitats.

Northern Red-legged Frog, Cascades Frog, and Spotted Frog

The riparian conservation strategy is expected to protect the breeding, foraging, and resting habitats of the northern red-legged, Cascades, and spotted frogs through:

(1) committing to "no overall net loss of naturally occurring wetland acreage and function" (DNR 1992 p. 36);

(2) protecting lakes and ponds classified as Types 1, 2, or 3 waters; and

(3) protecting Types 1, 2, 3, and 4 rivers and streams.

The riparian conservation strategy should facilitate the redevelopment of riparian plant communities and the natural variability of the aquatic environment. The natural mix of conifer and deciduous species within the riparian buffer should occur through ecosystem restoration.

REPTILES

Northwestern Pond Turtle

The riparian conservation strategy is expected to protect the breeding, foraging, and resting habitats of the northwestern pond turtle through:

(1) committing to "no overall net loss of naturally occurring wetland acreage and function" (DNR 1992 p. 36);

(2) protecting lakes and ponds classified as Types 1, 2, or 3 waters; and

(3) protecting Types 1, 2, 3, and 4 rivers and streams.

In addition, under WAC 222-16-080 of the state Forest Practices Rules, harvesting, road construction, aerial application of pesticides, or site preparation within 0.25 mile of a known individual occurrence, documented by the Washington Department of Fish and Wildlife, of a northwestern pond turtle are Class IV-Special forest practices and require an environmental checklist in compliance with the State Environmental Policy Act. The environmental checklist may indicate a need for further protection of the species' critical wildlife habitat.

California Mountain Kingsnake

The California mountain kingsnake occupies oak and pine forests. Oak woodlands have been designated a priority habitat by the Washington Department of Fish and Wildlife (1995a). Oak woodlands will be protected as described previously in the subsection titled Protection of Uncommon Habitats.

The riparian conservation strategy is expected to provide protection of the habitat of the California mountain kingsnake. No harvest will occur on hillslopes with a high risk of mass wasting, and some oak forest exists within unstable areas. The riparian management zone along Types 1, 2, 3, and 4 waters may also encompass some oak forest.

BIRDS

Harlequin Duck

The riparian conservation strategy is expected to protect the breeding, foraging, and resting habitats of the harlequin duck. Buffers along Types 1, 2, and 3 waters will be approximately equal to the site potential height of trees in a mature conifer stand, or 100 feet, whichever is greater. A riparian buffer 100 feet wide will be applied to both sides of Type 4 waters. Management of the no-harvest and minimal-harvest areas of the riparian buffer is anticipated to maintain or restore forests with mature or old-growth characteristics.

Forest management in the riparian buffer must maintain or restore the quality of salmonid habitat, and the resulting conditions should also be conducive to natural densities of aquatic macro-invertebrates upon which the Harlequin duck feeds. The adverse impacts of human disturbance will be minimized by the riparian buffer, which is estimated to have an average width of 150 to 160 feet. Human disturbance will be further reduced by the wind buffer that will be placed where needed along the windward side of many reaches of Types 1, 2, and 3 waters.

ADDITIONAL MITIGATION

DNR shall place restrictions in its contracts for sales of timber and other valuable materials, as well as in its grants of rights of way and easements, to prohibit activities within 165 feet of a known active harlequin duck nest site between May 1 and September 1 where such activities would appreciably reduce the likelihood of nesting success.

Northern Goshawk

The combination of the riparian, spotted owl, and marbled murrelet conservation strategies is expected to provide forest conditions suitable for northern goshawk breeding, foraging, and resting habitat. In concert, these three strategies ensure the development of large landscapes of mature and old-growth forest. In spotted owl NRF management areas, there will be two 300-acre nest patches per 5,000 acres of managed forest. These nest patches will consist of high quality spotted owl nesting habitat that has old-growth characteristics. The nest patches will occur within a larger, contiguous 500-acre area, of which the remaining 200 acres shall be sub-mature forest or higher quality habitat. At least 50 percent of the designated NRF management areas in each WAU (including the nest patches) will be sub-mature forest (as defined in Hanson et al. 1993) or higher quality habitat. On average, 40 to 42 percent of the designated NRF management area in each WAU will be mature or old-growth forest. The landscape conditions in the NRF management areas will meet or exceed the habitat recommendations made by Reynolds et al. (1992) for northern goshawks.

In the five west-side planning units, the spotted owl strategy designates 117,000 acres to be managed as spotted owl dispersal habitat, which supports the movement of juvenile spotted owls among sub-populations on federal reserves. It is likely the availability of this habitat will enhance the survival of dispersing juvenile goshawks as well. At least 50 percent of the designated dispersal management areas in each WAU will meet the minimum specifications for spotted owl dispersal habitat.

Outside the spotted owl NRF management areas, the riparian and murrelet conservation strategies will protect goshawk breeding, foraging, and resting habitat. Management within the riparian buffer, particularly in the no-harvest and minimal-harvest areas, should eventually result in forests with mature and old-growth characteristics. Mature and old-growth forests will also exist on hillslopes with a high risk of mass wasting. The long-term murrelet conservation strategy is not yet developed, but it will quite likely entail the preservation of some late successional forest. Consistent with RCW 77.16.120, outside NRF management areas, trees or snags that are known to contain active goshawk nests will not be harvested.

To meet the objective of providing habitat for demographic support of goshawk populations on federal forest reserves, additional mitigation is necessary to ensure the reproductive success of goshawk breeding pairs in

DNR-managed forests. In particular, special management is necessary to minimize human disturbance around active nest sites.

ADDITIONAL MITIGATION

DNR shall place restrictions in its contracts for sales of timber and other valuable materials, as well as in its grants of rights of way and easements, to prohibit activities within 0.55 mile of a known active northern goshawk nest site located in a NRF management area between April 1 and August 31 where such activities would appreciably reduce the likelihood of nesting success. A circle of radius 0.55 mile will circumscribe the entire post-fledgling family area (600 acres).

Sandhill Crane and Black Tern

The riparian conservation strategy is expected to protect the wetland habitats of the sandhill crane and black tern through: (1) committing to "no overall net loss of naturally occurring wetland acreage and function" (DNR 1992 p. 36), and (2) protecting lakes and ponds classified as Types 1, 2, or 3 waters.

In addition, under WAC 222-16-080 of the state Forest Practices Rules, harvesting, road construction, aerial application of pesticides, or site preparation within 0.25 mile of a known active nesting area, documented by the Washington Department of Fish and Wildlife, of a sandhill crane are Class IV-Special forest practices and require an environmental checklist in compliance with the State Environmental Policy Act. The environmental checklist may indicate a need for further protection of the species' critical wildlife habitat.

Olive-sided Flycatcher

The combination of the riparian, spotted owl, and marbled murrelet conservation strategies should provide forest conditions suitable for olive-sided flycatcher breeding, foraging, and resting habitat. In concert, these three strategies ensure the development of large contiguous landscapes of mature and old-growth forest. At least 50 percent of the designated NRF management areas in each WAU (including the spotted owl nest patches) will be sub-mature forest (as defined in Hanson et al. 1993) or higher quality habitat. On average, 40 to 42 percent of the designated NRF management area in each WAU will be mature or old-growth forest.

Outside spotted owl NRF management areas, the riparian and murrelet conservation strategies will protect breeding, foraging, and resting habitat. Management within the riparian buffer, particularly in the no-harvest and minimal-harvest areas, should eventually result in forests with mature and old-growth characteristics. Mature and old-growth forests will also exist on hillslopes with a high risk of mass wasting. The long-term murrelet conservation strategy is not yet developed, but it will quite likely entail the preservation of some late successional forest.

Little Willow Flycatcher

The riparian conservation strategy and forest management in the five west-side planning units are expected to provide breeding, foraging, and resting habitat for the little willow flycatcher. Buffers along Types 1, 2, and 3 waters will be approximately equal to the site potential height of trees in a mature conifer stand, or 100 feet, whichever is greater. A riparian buffer 100 feet wide will be applied to both sides of Type 4 waters. The natural mix of conifer and deciduous species should occur through ecosystem restoration. Also, natural disturbances such as floods, and channel migration will

continue to create the alder and willow riparian habitat preferred by this species.

Even-aged forest management throughout the five west-side planning units will continue to provide shrubby habitats in regenerating clearcuts and sapling stands.

Common Loon

The riparian conservation strategy is expected to protect the loon's lake habitat. The adverse impacts of human disturbance will be minimized by the riparian buffer, which is estimated to have an average width of 150 to 160 feet and will be applied along the shoreline of Types 1, 2, and 3 lakes and ponds. Human disturbance will be further reduced by the wind buffer that will be placed where needed along the riparian buffer on the windward side of Types 1, 2, and 3 waters. In order to meet the conservation objectives, further mitigation is required to reduce the adverse affects of human disturbance.

ADDITIONAL MITIGATION

DNR shall place restrictions in its contracts for sales of timber and other valuable materials, as well as in its grants of rights of way and easements, to prohibit activities within 500 feet of a known active common loon nest site between April 1 and September 1 where such activities would appreciably reduce the likelihood of nesting success.

Golden Eagle

Golden eagles nest in large trees or on cliffs. These uncommon habitats and habitat elements will be protected as described earlier in this section. The combination of the riparian conservation strategy and forest management in the five west-side planning units should provide breeding, foraging, and resting habitat for the golden eagle. Many forests on unstable hillslopes will not be harvested and some of these areas will contain large trees. Buffers along Types 1, 2, and 3 waters will be approximately equal to the site potential height of trees in a mature conifer stand, or 100 feet, whichever is greater. A riparian buffer 100 feet wide will be applied to both sides of Type 4 waters. Management within the riparian buffer is expected to result in the development of late successional forest containing large live trees. Even-aged forest management throughout the five west-side planning units will continue to provide openings for foraging habitat.

Golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668, Revised 1978). Under this Act, it is unlawful to molest or disturb golden eagles and their nests. RCW 77.16.120 of the Wildlife Code of Washington prohibits destroying the nests of protected wildlife. Consistent with these regulations, trees or snags that contain known active golden eagle nests shall not be harvested.

Vaux's Swift

The combination of the riparian, spotted owl, and marbled murrelet conservation strategies is expected to provide forest conditions suitable for Vaux's swift breeding, foraging, and resting habitat. In concert, these three strategies ensure the development of large contiguous landscapes of mature and old-growth forests containing large live tree and snags. In spotted owl NRF management areas, there will be two 300-acre nest patches per 5,000 acres of managed forest. These nest patches will consist of high quality spotted owl nesting habitat, which will have old-growth forest characteristics. The nest patches will occur within a larger, contiguous 500-acre area, of which

the remaining 200 acres shall be sub-mature forest or higher quality habitat. At least 50 percent of the designated NRF management areas in each WAU (including the nest patches) will be sub-mature forest or higher quality habitat.

Even-aged forest management will provide a full range of seral stages for foraging. No harvest will occur on unstable hillslopes with a high risk of mass wasting, and some of these areas will contain large live trees and large snags. Management activities within the riparian buffer are expected to result in the development of late successional forest containing large live trees.

Outside the NRF management areas, the riparian and murrelet conservation strategies will protect breeding and resting habitat. Management within the riparian buffer, particularly in the no-harvest and minimal-harvest areas, should eventually result in forests with mature and old-growth characteristics. Mature and old-growth forests will also exist on hillslopes with a high risk of mass wasting. The long-term murrelet conservation strategy is not yet developed, but it will quite likely entail the preservation of some late successional forest.

Large, structurally unique trees and large hollow snags will be protected as described previously in the subsection titled Protection of Uncommon Habitat. In addition, consistent with RCW 77.16.120, trees or snags that are known to contain active Vaux's swift nests shall not be harvested. Green tree and snag retention are subject to the safety standards of the Department of Labor and Industries (WAC 296-54).

ADDITIONAL MITIGATION

Live trees or snags that are known to be used by Vaux's swifts as night roosts shall not be harvested. Green tree and snag retention are subject to the safety standards of the Department of Labor and Industries (WAC 296-54).

Lewis' Woodpecker

Oak woodlands are used for breeding, foraging, and resting habitat by Lewis' woodpecker. Oak woodlands have been designated a priority habitat by the Washington Department of Fish and Wildlife (1995a) and will be protected as described previously in the subsection titled Protection of Uncommon Habitats. The riparian conservation strategy is expected to guarantee some protection of this habitat within unstable areas because no harvest will occur on hillslopes with a high risk of mass wasting areas. The riparian management zone along Types 1, 2, 3, and 4 waters may also encompass some oak forests.

The riparian conservation strategy should protect some deciduous riparian habitat. Buffers along Types 1, 2, and 3 waters will be approximately equal to the site potential height of trees in a mature conifer stand. A riparian buffer 100 feet wide will be applied to both sides of Type 4 waters. DNR expects this management to result in the development of late successional forest containing large snags. The natural mix of conifer and deciduous species should occur through ecosystem restoration, and natural disturbances, such as floods, and channel migration will continue to create the cottonwood riparian habitat preferred by this species.

Pileated Woodpecker

The combination of the riparian, spotted owl, and marbled murrelet conservation strategies is expected to provide forest conditions suitable for pileated woodpecker breeding, foraging, and resting habitat. In concert, these three strategies ensure the development of large contiguous landscapes of mature and old-growth forest containing large live tree and snags. At least 50 percent of the NRF management area in each WAU will be sub-mature forest (as defined in Hanson et al. 1993) or higher quality. There will be two 300-acre nest patches per 5,000 acres of managed forest in NRF management areas. These nest patches will consist of high quality spotted owl nesting habitat, which has old-growth forest characteristics. The nest patches will occur within a larger, contiguous 500-acre area, of which the remaining 200 acres shall be sub-mature forest or higher quality habitat. On average, 40 to 42 percent of the designated NRF management area in each WAU will be mature or old-growth forest.

Outside of spotted owl NRF management areas, the riparian and murrelet conservation strategies will protect breeding and resting habitat. Management within the riparian buffer, particularly in the no-harvest and minimal-harvest areas, should eventually result in forests with mature and old-growth characteristics. Mature and old-growth forests will also exist on hillslopes with a high risk of mass wasting. The long-term murrelet conservation strategy is not yet developed, but it will quite likely entail the preservation of some late successional forest.

Snags will be retained according to state Forest Practices Rules. Under WAC 222-30-020(11), three wildlife reserve trees (typically snags) are left for each acre harvested in western Washington. The wildlife reserve trees must be 10 or more feet in height and 12 or more inches dbh. These minimum sizes do not guarantee that wildlife trees suitable for pileated woodpeckers will be retained. The retention of large, structurally unique trees, as described previously in the subsection titled Protection of Uncommon Habitats, will provide a source for large snags.

Conservation measures for large snags and large, structurally unique trees will retain structural elements required by pileated woodpeckers for nesting and roosting. Additional conservation measures for snags will increase the density of snags, and consequently, opportunities for foraging.

Consistent with RCW 77.16.120, trees or snags that are known to contain active pileated woodpecker nests will not be harvested. In addition, trees or snags that are known to have been used by pileated woodpeckers for nesting will not be harvested. Green tree and snag retention are subject to the safety standards of the Department of Labor and Industries (WAC 296-54).

Purple Martin

The riparian conservation strategy is expected to protect the open riparian/wetland habitat of purple martins through:

(1) committing to "no overall net loss of naturally occurring wetland acreage and function" (DNR 1992 p. 36); and

(2) the protection of lakes and ponds classified as Types 1, 2, or 3 waters.

Conservation measures for large snags and large, structurally unique trees will retain structural elements required by purple martins for nesting.

In addition, consistent with RCW 77.16.120, trees or snags that are known to contain active purple martin nests will not be harvested. Green tree and snag retention are subject to the safety standards of the Department of Labor and Industries (WAC 296-54).

Western Bluebird

Even-aged forest management throughout the five west-side planning units will continue to provide openings suitable for breeding, foraging, and resting habitat. Conservation measures for large snags and large, structurally unique trees will retain structural elements required by western bluebirds for nesting.

In addition, consistent with RCW 77.16.120, trees or snags that are known to contain active western bluebird nests will not be harvested. Green tree and snag retention are subject to the safety standards of the Department of Labor and Industries (WAC 296-54).

MAMMALS

Myotis Bats

The combination of the riparian, spotted owl, and marbled murrelet conservation strategies should provide forest conditions suitable for myotis bat breeding, foraging, and resting habitat. In concert, these three strategies ensure the development of large contiguous landscapes of mature and old-growth forest. On average, 40 to 42 percent of the designated NRF management area in each WAU will be mature or old-growth forest.

Outside of spotted owl NRF management areas, the riparian and murrelet conservation strategies will protect breeding and resting habitat. Management within the riparian buffer, particularly in the no-harvest and minimal-harvest areas, should eventually result in forests with mature and old-growth characteristics. Mature and old-growth forests will also exist on hillslopes with a high risk of mass wasting. The long-term murrelet conservation strategy is not yet developed, but it will quite likely entail the preservation of some late successional forest.

Talus fields, cliffs, and caves will be protected as described previously in the subsection titled Protection of Uncommon Habitats, and DNR will also protect large, structurally unique trees and large snags as described in the same subsection.

ADDITIONAL MITIGATION

Live trees or snags that are known to be used by myotis bat species as communal roosts or maternity colonies shall not be harvested. Green tree and snag retention are subject to the safety standards of the Department of Labor and Industries (WAC 296-54).

Townsend's Big-eared Bat

Caves will be protected as described previously in the subsection titled Protection of Uncommon Habitats.

California Wolverine

There is very little montane forest on DNR-managed lands. But some parcels of DNR-managed forest are positioned adjacent to federal wilderness areas and federal Late successional Reserves that may serve as refugia for wolverines. Therefore, it is possible that wolverines could now or in the future be present in DNR-managed forests. The combination of the riparian, spotted owl, and marbled murrelet conservation strategies is expected to provide forest conditions suitable for wolverine breeding, foraging, and resting habitat. In concert, these three strategies should ensure the development of large landscapes of mature and old-growth forest. Forest management will create a range of habitat types from grass-forb to late-successional forest.

To meet the objective of providing habitat for demographic support of populations on federal forest reserves additional mitigation is necessary to ensure the reproductive success of breeding adults in DNR-managed forests. In particular, special management is necessary to minimize human disturbance around active den sites and eliminate trapping mortality.

DNR-managed roads are routinely closed for cost-effective forest management and protection of public resources, including wildlife (DNR 1992 p. 41). Road closures benefit the wolverine population by limiting human disturbance and reducing the likelihood of accidental trapping. Road closures will continue on DNR-managed lands and will be consistent with cost-effective forest management and policies set forth by the Board of Natural Resources.

ADDITIONAL MITIGATION

DNR shall place restrictions in its contracts for sales of timber and other valuable materials, as well as in its grants of rights of way and easements, to prohibit activities within 0.5 mile of a known active wolverine den site 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.

Pacific Fisher

The combination of the riparian, spotted owl, and marbled murrelet conservation strategies is expected to provide forest conditions suitable for fisher breeding, foraging, and resting habitat. In concert, these three strategies ensure the development of large landscapes of mature and old-growth forest. At least 50 percent of the designated NRF management areas in each WAU (inclusive of the nest patches) will be sub-mature forest (as defined in Hanson et al. 1993) or higher quality habitat. The high-quality owl nesting habitat in nest patches will have old-growth forest characteristics. On average, 40 to 42 percent of the designated NRF management area in each WAU will be mature or old-growth forest.

In the five west-side planning units, the spotted owl strategy designates 117,000 acres to be managed as spotted owl dispersal habitat. At least 50 percent of the designated dispersal management area in each WAU will meet the minimum specifications for spotted dispersal habitat. The purpose of dispersal habitat is to support the movement of juvenile spotted owls between sub-populations on federal reserves, and it is likely the availability of this habitat may also enhance the survival of dispersing juvenile fishers.

The geographical distribution of areas managed for spotted owl breeding habitat will maintain some of the elevational range of fisher habitat. DNR-managed forests are generally located at a lower elevation than federal

lands. To meet the objective of providing habitat for demographic support of populations on federal forest reserves, additional mitigation is necessary to ensure the reproductive success of breeding adults in DNR-managed forests. In particular, special management is necessary to minimize human disturbance around active den sites and eliminate trapping mortality.

DNR-managed roads are routinely closed for cost-effective forest management and protection of public resources including wildlife (DNR 1992 p. 41). Road closures benefit the fisher population by limiting human disturbance and reducing the likelihood of accidental trapping. Road closures will continue on DNR-managed lands and will be consistent with cost-effective forest management and policies set forth by the Board of Natural Resources.

Conservation measures for large snags and large, structurally unique trees will retain structural elements required by fishers for denning and resting.

ADDITIONAL MITIGATION

DNR shall place restrictions in its contracts for sales of timber and other valuable materials, as well as in its grants of rights of way and easements, to prohibit activities within 0.5 mile of a known active fisher den site 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.

Western Gray Squirrel

Oak woodlands are the breeding, foraging, and resting habitat of the western gray squirrel. Oak woodlands have been designated a priority habitat by the Washington Department of Fish and Wildlife (1995a), and will be protected as described previously in the subsection titled Protection of Uncommon Habitats.

The riparian conservation strategy is expected to provide some protection of the breeding, foraging, and resting habitat of the western gray squirrel. No harvest will occur on hillslopes with a high risk of mass wasting, and some oak forest will exist within unstable areas. The riparian management zone along Types 1, 2, 3, and 4 waters may also encompass some oak forest.

In addition, under WAC 222-16-080 of the state Forest Practices Rules, the Forest Practices Board may adopt rules pertaining to management activities which impact western gray squirrels. These rules would provide further protection of the species' critical wildlife habitat.

Lynx

Although the lynx may potentially occur in the area covered by the HCP, it is not known to occur in the five west-side planning units. Therefore, it is not discussed in this section.

California Bighorn Sheep

Although the California bighorn sheep may potentially occur in the area covered by the HCP, it is not known to occur in the five west-side planning units. Therefore, it is not discussed in this section.

Summary of Habitat Types Provided on DNR-managed Lands in the Five West-Side Planning Units

The type and distribution of habitat available during the term of this HCP will be the result of commitments under the HCP, natural events, forest management policies of the Board of Natural Resources and DNR, technological developments that influence management practices, and land transactions.

HABITATS TO BE MAINTAINED OR RESTORED UNDER THE HCP

Spotted Owl Nesting, Roosting, and Foraging (NRF) Areas

Two types of habitat are required within designated NRF areas:

(1) high quality nesting habitat; and

(2) areas that, at a minimum, meet the sub-mature habitat definition.

In every 5,000 acres, there shall be two 300-acre nest patches of high quality spotted owl nesting habitat that has old-growth characteristics. These nest patches will occur within a larger, contiguous 500-acre area, of which the remaining 200 acres shall be sub-mature forest or higher quality habitat. At least 50 percent of the designated NRF management areas in each WAU (Watershed Administrative Unit) shall be sub-mature, including the nest patches.

See Section A of Chapter IV on spotted owl mitigation for a full description of these habitats, their distribution, and the amount required. The definitions of these habitats are summarized below:

- High quality nesting habitat (average condition over a 300-acre nesting habitat patch)
  - at least 31 trees per acre greater than or equal to 21 inches dbh with at least 15 trees per acre greater than or equal to 31 inches dbh;
  - at least three trees from the above group of 31 trees have broken tops;
  - at least 12 snags per acre larger than 21 inches dbh;
  - a minimum of 70 percent canopy closure; and
  - a minimum of 5 percent ground cover of large woody debris.
- Sub-mature habitat (applied as average stand conditions)
  - forest community dominated by conifers or in mixed conifer/hardwood forest, the community is composed of at least 30 percent conifers (measured as stems per acre dominant, co-dominant, and intermediate trees);
  - at least 70 percent canopy closure;
  - tree density of between 115 and 280 trees per acre greater than 4 inches dbh;

- dominant and co-dominant trees at least 85 feet tall;
- at least three snags or cavity trees per acre that are at least 20 inches dbh; and
- a minimum of 5 percent ground cover of large down woody debris.

Spotted Owl Dispersal Areas

Within designated spotted owl dispersal areas, 50 percent of the area shall be maintained in stands that meet the dispersal habitat definition. See Section A of Chapter IV on spotted owl mitigation for a full description of this habitat. The definition of dispersal habitat is summarized below:

- canopy cover of at least 70 percent;
- quadratic mean diameter of at least 11 inches dbh for the 100 largest trees in a stand;
- top height of at least 85 feet; and
- at least four trees per acre from the largest size class retained for future snag and cavity trees.

Marbled Murrelet Habitat Blocks

The interim conservation strategy for the marbled murrelet calls for deferring harvest on suitable habitat blocks while studies are conducted to provide information for developing a long-term conservation strategy. The amount of habitat required for murrelets in the long-term strategy is expected to be less than is identified using the current definition. See Section B of Chapter IV for a complete discussion of the mitigation for marbled murrelets. Suitable marbled murrelet habitat that will be used for identifying blocks to be deferred is defined as a contiguous forested area meeting all of the following three criteria:

- at least five acres in size;
- containing an average of at least two potential nesting platforms per acre; and
- within 50 miles of marine waters.

Riparian Management Zones

Management activities allowed within riparian management zones will influence the type of habitat provided. The requirements for no harvest within the first 25 feet of the active channel margin and minimal harvest in the next 75 feet will tend to leave, or develop over time, timber stands with a range of mature to old-growth characteristics. Through restoration efforts consistent with the riparian conservation objective of maintaining or restoring salmonid freshwater habitat on DNR-managed lands, most riparian management zones will be coniferous with minor hardwood components. Hardwoods will be maintained on sites that are not environmentally suited to conifers. See Section D of Chapter IV for a detailed discussion of riparian management zones.

Wetlands

DNR will allow no overall net loss of naturally occurring wetland acreage or function. This applies to nonforested and forested wetlands. See Section D of Chapter IV on the riparian conservation strategy for a detailed discussion of wetland management activities and habitat. For forested wetlands and buffers of nonforested wetlands, timber harvests shall be designed to maintain the perpetuate stands that:

- are as wind-firm as possible;
- have large root systems to maintain the uptake and transpiration of ground water; and
- have a minimum basal area of 120 square feet per acre.

Uncommon Habitats

See Section F of Chapter IV on the multispecies conservation strategy for a discussion of uncommon habitats on DNR-managed lands. The following uncommon habitats will be identified and protected:

- cliffs;
- caves and cave passages that have been identified as important wildlife habitat;
- oak woodlands
  (Oak woodlands are very limited in the five west-side planning units. Where they occur, they will be managed to maintain the current quality and distribution of the habitat to the extent possible considering air quality, fire management, and other constraints and to restore the quality and distribution of this habitat where consistent with these constraints.); and
- talus fields that are one acre or larger.

HABITATS PROVIDED ON DNR-MANAGED LANDS

After a natural disturbance, such as fire, a stand regenerates and develops through a succession of seral stages. Managed forests follow a similar pattern of succession following clearcut timber harvest. A variety of wildlife habitats on DNR-managed lands will occur in the different seral stages (Brown 1985) described below:

- Grass/forb
  Grass/forb-dominated areas develop quickly on cleared lands and are common for a few years after harvest or site preparation activities. In cases where a significant shrub layer existed under the timber that was harvested, a grass/forb condition frequently will not develop. Generally, a grass/forb condition exists at the time sites are planted or develops shortly after planting.
- Shrub
  Shrubs develop on a site following harvests, including thinnings, or start developing at the same time as grasses and forbs. However, shrubs generally take a few years to develop to the point of dominating a site. The length of time shrubs dominate an area depends primarily on the development of trees. Tree seedlings are generally present on these sites but are not tall enough to impact the shrubs.

- Open sapling/pole
  In the open sapling/pole condition, shrubs are frequently the dominant vegetation, but trees are tall enough to prevent being suppressed by shrubs.

- Closed sapling/pole/sawtimber
  This condition is marked by very dense tree canopies which limit all ground vegetation. Thinning commonly opens the canopy sufficiently to allow shrubs to redevelop.

- Large sawtimber
  Large sawtimber is frequently defined as stands with an average diameter greater than 21 inches. In managed stands, trees often have a relatively uniform size and may approach the tree sizes found in old-growth stands. However, these stands generally lack characteristics such as snags, down woody debris, and the two or more canopy layers that are found in old-growth stands.

- Old growth
  Old-growth stands are characterized by the presence of snags, down woody debris, and two or more canopy layers that develop as a result of the mortality of overstory trees. Stand diameters may be similar to or larger than large sawtimber stands.

Table IV.13 lists the types of habitat expected to be provided under the HCP on DNR-managed lands in the five west-side planning units. Examples of representative species that might use that habitat type, management activities that may be conducted, potential negative impacts that may result from the management activities, and benefits expected to accrue from the HCP are given for each habitat type. Additional details regarding the management activities are included in Section H (Forest Land Management Activities) of this chapter.

Table IV.13: Habitats and representative wildlife species covered by this HCP for the west-side planning units

(Source: Brown 1985, Thomas et al. (1993), Parsons et al. (1991), and Pyle (1989)).

Type of habitat	Representative species that can use these habitat types
Spotted owl high quality nesting habitat	dusky shrew, long-eared myotis, northern flying squirrel, Pacific fisher, wood duck, northern goshawk, barred owl, pileated woodpecker, olive-sided flycatcher, northern spotted owl, hoary bat, bushy-tailed woodrat, red tree vole, harlequin duck, marbled murrelet, Vaux's swift, red-breasted nuthatch, Dunn's salamander, Larch Mountain salamander, Van Dyke's salamander, tailed frog, pine white butterfly, Johnson's hairstreak butterfly, *Acalypta saudersi* (a lace bug), *Cychrus tuberculatus* (a carabid beetle), *Lobosoma horridum* (a weevil), *Omus dejeani* (a tiger beetle)
Spotted owl sub-mature habitat	dusky shrew, long-legged myotis, northern flying squirrel, Pacific fisher, wood duck, hairy woodpecker, northern goshawk, barred owl, olive-sided flycatcher, northern spotted owl, hoary bat, bushy-tailed woodrat, red tree vole, red-breasted nuthatch, Dunn's salamander, northwestern salamander, Van Dyke's salamander, tailed frog, northern alligator lizard, pine white butterfly, coral hairstreak butterfly, California hairstreak butterfly, *Cychrus tuberculatus* (a carabid beetle), *Lobosoma horridum* (a weevil), *Omus dejeani* (a tiger beetle)
Spotted owl dispersal habitat	Douglas' squirrel, sharp-shinned hawk, Swainson's thrush, evening grosbeak, dusky shrew, northern spotted owl, long-legged myotis, mountain beaver, creeping vole, bobcat, elk, Vaux's swift, orange-crowned vireo, northern alligator lizard, rubber boa, long-toed salamander,

Table IV.13: Habitats and representative wildlife species covered by this HCP for the west-side planning units *(continued)*

Type of habitat	Representative species that can use these habitat types
Spotted owl dispersal habitat *(continued)*	*Cychrus tuberculatus* (a carabid beetle), *Lobosoma horridum* (a weevil), *Omus dejeani* (a tiger beetle)
Marbled murrelet habitat	dusky shrew, long-legged myotis, northern flying squirrel, Pacific fisher, wood duck, northern goshawk, barred owl, hairy woodpecker, Oliver-sided flycatcher, marbled murrelet, hoary bat, bushy-tailed woodrat, red tree vole, harlequin duck, Vaux's swift, red-breasted nuthatch, Dunn's salamander, Larch Mountain salamander, Van Dyke's salamander, tailed frog, pine white butterfly, Johnson's hair-streak butterfly, *Acalypta saudersi* (a lace bug), *Cychrus tuberculatus* (a carabid beetle), *Lobosoma horridum* (a weevil), *Omus dejeani* (a tiger beetle)
Conifer-dominated riparian ecosystems	long-legged myotis, Pacific fisher, mink, wood duck, sharp-shinned hawk, ruffed grouse, olive-sided flycatcher, purple martin, Dunn's salamander, Van Dyke's salamander, salamander, tailed frog, dusky shrew, Trowbridge's shrew, southern red-backed vole, river otter, Barrow's goldeneye, band-tailed pigeon, long-eared owl, red-breasted sapsucker, hermit thrush, evening grosbeak, Cascade frog, bull trout, coho salmon, steelhead salmon, mayflies, stoneflies, caddisflies, midges, arborvitae hair-streak butterfly
Hardwood-dominated riparian ecosystems	long-legged myotis, mink, wood duck, purple martin, northwestern pond turtle, common garter snake, Dunn's salamander, northern red-legged frog, ruffed grouse, dusky shrew, shrew mole, yellowpine chimunk, river otter,

Table IV.13: Habitats and representative wildlife species covered by this HCP for the west-side planning units *(continued)*

Type of habitat	Representative species that can use these habitat types
Hardwood-dominated riparian ecosystem *(continued)*	Barrow's goldeneye, Cooper's hawk, band-tailed pigeon, downy woodpecker, black-headed grosbeak, Olympic salamander, Olympic mudminnow, mayflies, stoneflies, caddisflies, dreamy duskywing butterfly, western tiger swallowtail
Nonforested wetland	northern harrier, common snipe, northwestern pond turtle, northern red-legged frog, spotted frog, Beller's ground beetle, long-horned leaf beetle, Hatch's click beetle, mallard, mink, dusky shrew, Pacific shrew, coast mole, Yuma myotis, long-tailed vole, American bittern, little willow flycatcher, common loon, sandhill crane, black tern, coho salmon, Olympic mudminnow, dragonflies, damselflies, sonora skipper butterfly
Forested wetland	long-legged myotis, Pacific fisher, ruffed grouse, sharp-shinned hawk, barred owl, olive-sided flycatcher, purple martin, Van Dyke's salamander, northern red-legged frog, mink, spotted frog, dusky shrew, water shrew, bushy-tailed woodrat, common merganser, band-tailed pigeon, northern saw-whet owl, red-breasted sapsucker, western toad, dragonflies, flies, cad-disflies, pale tiger swallowtail butterfly
Cliffs	fringed myotis, long-legged myotis, Yuma myotis, mountain goat, peregrine falcon, turkey vulture, black swift, cliff swallow, western fence lizard, bushy-tailed woodrat, golden eagle, wasps, shorttailed black swallowtail butterfly

Table IV.13: Habitats and representative wildlife species covered by this HCP for the west-side planning units *(continued)*

Type of habitat	Representative species that can use these habitat types
Caves	Townsend's big-eared bat, fringed myotis, long-legged myotis, Yuma myotis, coyote, California wolverine, mountain lion, bobcat, black swift, Larch Mountain salamander, crickets
Oak woodland	western gray squirrel, Lewis' woodpecker, California mountain kingsnake, Propertius' duskywing butterfly, Oregon green hairstreak butterfly
Talus	Cascade golden-mantled ground squirrel, mountain goat, Pacific fisher, California wolverine, bobcat, white-tailed ptarmigan, common nighthawk, rosy finch, western fence lizard, Larch Mountain salamander, Dunn's salamander, Van Dyke's salamander, wolf spiders, jumping spiders, small-footed myotis
Grass/forb forest stage	coast mole, vagrant shrew, Townsend's vole, coyote, long-tailed weasel, black-tailed deer, common nighthawk, white-crowned sparrow, northwestern garter snake, western fence lizard, northwestern salamander, western bluebird, wolf spiders, grasshoppers, mariposa copper butterfly, silvery blue butterfly, Blackmore's blue butterfly, western meadow fritillary butterfly, *Oncocnemis dunbari* (a moth), *Formica neorufibarbis* (an ant)
Shrub forest stage	coast mole, Townsend's vole, mountain beaver, coyote, long-tailed weasel, black-tailed deer, common nighthawk, blue grouse, rufous hummingbird, hermit thrush, white-crowned sparrow, rufous-sided towhee, northwestern garter snake, western fence lizard,

Table IV.13: Habitats and representative wildlife species covered by this HCP for the west-side planning units *(continued)*

Type of habitat	Representative species that can use these habitat types
Shrub forest stage *(continued)*	northwestern salamander, western bluebird, Pacuvius' duskywing butterfly, satyr anglewing butterfly
Open sapling/pole forest stage	coast mole, Douglas' squirrel, mountain beaver, black-tailed deer, long-tailed weasel, coyote, blue grouse, rufous hummingbird, American robin, hermit thrush, rufous-sided towhee, western fence lizard, western bluebird, Phoebus parnassian butterfly, golden hairstreak butterfly, western tailed blue butterfly, bobcat, snowshoe hare
Closed sapling/pole/sawtimber forest stage	Douglas' squirrel, sharp-shinned hawk, Swainson's thrush, evening grosbeak, dusky shrew, long-legged myotis, mountain beaver, creeping vole, bobcat, elk, Vaux's swift, orange-crowned vireo, northern alligator lizard, rubber boa, long-toed salamander, *Cychrustuberculatus* (a carabid beetle), *Lobosoma horridum* (a weevil), *Omus dejeani* (a tiger beetle)
Large sawtimber forest stage	dusky shrew, long-legged myotis, northern flying squirrel, Pacific fisher, wood duck, hairy woodpecker, northern goshawk, barred owl, olive-sided flycatcher, hoary bat, bushy-tailed woodrat, red tree vole, red-breasted nuthatch, Dunn's salamander, northwestern salamander, Van Dyke's salamander, tailed frog, northern alligator lizard, coral hairstreak butterfly, pine white butterfly, California hairstreak butterfly, *Cychrus tuberculatus* (a carabid beetle), *Lobosoma horridum* (a weevil), *Omus dejeani* (a tiger beetle)

Table IV.13: Habitats and representative wildlife species covered by this HCP for the west-side planning units *(continued)*

Type of habitat	Representative species that can use these habitat types
Old-growth forest stage	Johnson's hairstreak butterfly, pine white butterfly, *Acalypta saudersi* (a lace bug), *Cychrus tuberculatus* (a carabid beetle), *Lobosoma horridum* (a weevil), *Omus dejeani* (a tiger beetle); and see list for spotted owl high quality nesting habitat

Provision of a Range of Forest Types Across the HCP Landscape

DNR management activities that will occur under the HCP will ensure a range of forest types in adequate amounts to provide for multi-species conservation across the landscape covered by the HCP. DNR has modeled the age-class distribution that will likely result from expected management under the HCP and existing policies. Results from this modeling have been used to develop a table (see Table IV.14) of expected percentages of each of several forest habitat/structural types, using age-class as a surrogate, that would likely exist 100 years following implementation of such management.

Table IV.14: DNR HCP stand structure objectives at year 100 (in percent of land area)

Stand Stage[1]	West-side Planning Units Excluding the OESF	OESF Planning Unit
Open (0-10 Years)[2]	5-10	5-15
Regeneration (10-20 years)[2]	5-15	5-15
Pole (20-40 years)[2]	15-25	5-15
Closed (40-70 years)[2]	25-35	5-15
Complex (at least 70 years)[2]	25-35	60-70
Fully Functional	(At least 150 years)	(At least 200 years)
(Subset of Complex)	10-15	10-15

[1]Stand stages are defined as:
Open- earliest seral stage; overstory has been removed; dominated by herbs and shrubs with some young conifer and deciduous trees present.

Regeneration-shrubs and saplings; branches beginning to intertwine; dense canopies from ground-level upwards.

Pole - early stages of stem exclusion; stems closely spaced and numerous; little understory; limited self-pruning; and insufficient canopy lift to allow larger birds to penetrate.

Closed - have undergone some stem exclusion and competition mortality; have achieved some canopy lift from self-pruning; have well-developed, deep canopies; and lacking complex structural characteristics of older types.

Complex - stocked with large trees with a variety of diameters and heights evident; mortality within the stand (or residual trees, snags, and logs) provides cavities in standing snags, downed logs, deformities in standing live trees; large horizontal branches; and a complex canopy with conifer establishment occurring under opening in the canopy.

Fully Functional - a subset of complex forests but more mature and structurally complex.

[2]Age-classes shown are a surrogate for stand structure. If and when it can be shown that appropriate structure can be obtained at a different age, different age classes may be used.

The information in the above table was derived from modeling that contained assumptions based on the Forest Resource Plan policies. These assumptions are described in Appendix 5 of the Final EIS (available from DNR). The FRP states that the goal for average rotation age for west-side conifer dominated forests will be 60 years. At present, DNR expects to continue this policy and information regarding the average rotation age will be provided to the U.S. Fish and Wildlife Service and the National Marine Fisheries Service at scheduled inter-agency HCP reviews. However, as long as DNR can show that reaching the stand structure objectives is likely, other rotation ages may be used. Additionally, DNR maintains the flexibility to harvest specific stands at an earlier age to address specific silvicultural situations (i.e., a 30- to 35-year old stand that was not thinned at an appropriate age may be more quickly converted into a healthy, productive stand by clear-cutting the stand and "starting over").

Subsequent to the modeling exercise, DNR, the U.S. Fish & Wildlife Service and the National Marine Fisheries Service negotiated a 70-year term for this HCP, with provisions for up to three, 10-year extensions. (See the Implementation Agreement in Appendix B of this document.) Such exten-

sions could occur at DNR's option if commitments of the HCP are met at year 70, or at the U.S. Fish and Wildlife Service's option if commitments have not been met at year 70. Currently no projections are available for the forest structure expected at year 70. However, during the first year following approval of the HCP, additional modeling will be conducted by DNR. The modeling will be by decade and the results will be provided to the U.S. Fish and Wildlife Service at, or by, the first annual review. These decadal projections will be used by DNR as part of its monitoring process.

The projections for year 70 will be a part of the U.S. Fish and Wildlife Service's evaluation of whether DNR has met the commitments of the HCP at year 70. In that evaluation, the U.S. Fish and Wildlife Service will also review DNR's progress in meeting the conservation objectives included in Chapter IV of this HCP. DNR's HCP provides for the conservation of both listed and unlisted species. Detailed, specific conservation measures are described elsewhere in this chapter for the northern spotted owl and a long-term strategy will be developed for the marbled murrelet. Additional important, but more limited, measures will be described for certain other listed species. Conservation measures affecting the unlisted species include those undertaken for listed species with additional measures described for certain important habitat types. The most important conservation measures affecting unlisted species are those associated with the riparian conservation strategy.

Of the HCP's three primary conservation components (spotted owl conservation strategy, marbled murrelet conservation strategy, and riparian conservation strategy), the marbled murrelet strategy is the only one that is interim in nature. A long-term strategy will not be developed for a number of years. An adequate and appropriate means of evaluating commitments for the marbled murrelet at year 70 cannot be described, at this time, except in terms of compliance with the strategy described in Chapter IV.

The riparian conservation strategy will be implemented in the five west-side planning units and the OESF. DNR's compliance and effectiveness monitoring plan for the riparian areas should provide sufficient information for the U.S. Fish and Wildlife Service to determine whether commitments in this area have been met at year 70.

The spotted owl conservation strategy sets specific goals for developing and maintaining NRF and dispersal habitat in specific amounts and locations (by WAU). Approximately 200,000 acres are designated for a NRF habitat role and 125,000 of those acres (62.5 percent) are in WAUs that are already at or above the goals set in this HCP. The conditions in the WAUs that are not currently at or above the goal, will be reviewed by the U.S. Fish and Wildlife Service at year 70, when evaluating whether DNR has met its obligations under the HCP.

As described above, the 70 year term should be sufficient for all species based upon the anticipated habitats resulting from the HCP management strategies. Riparian areas and uncommon/special habitats (e.g., talus, caves, wetlands) are expected to provide improved wildlife habitat over the life of the plan. Older stand structures (i.e., structurally complex forests and fully functional forests) increase or remain constant when comparing the current conditions with those anticipated at the end of the permit period. Healthy riparian systems, mature forest with structure, and uncommon/special habitats comprise the major concerns regarding adequacy of habitats. Younger forests (between 40 and 70 years) will continue to be provided as a result of timber management. In addition, the long-term plan

for murrelets will be developed in consideration of the 70-year permit term to ensure its adequacy. Finally, as mentioned above in this section, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service will review DNR's progress in meeting the conservation objectives and may require an extension of the HCP if it can be demonstrated that DNR failed to achieve the commitments of the HCP.