

Section IV

The Conservation Plan

Introduction

This section presents the details of the conservation strategy for the northern spotted owl and marbled murrelet on the Elliott State Forest. It includes the following subsections.

- **The conservation strategy** — a detailed description of the conservation strategy, which is based on Alternative A.
- **Scope of the incidental take permit** — description of the permit period and area, and type of take applicable.
- **Level of possible incidental take and other impacts** — information on the estimated level of possible take, and other effects of the conservation strategy.
- **Mitigation and minimization measures** — measures that will be taken to mitigate and minimize the potential effects of habitat modification. Monitoring and adaptive management are included in this subsection.
- **Implementation** — how the conservation strategy will be implemented.

The Conservation Strategy

Objectives

The overall objectives of the Elliott State Forest Conservation Strategy are listed below.

- Contribute to the survival and recovery of northern spotted owl and marbled murrelet populations within both forest and regional contexts.
- Provide a long-term plan using principles of ecosystem-based management.
- Provide a predictable harvest volume to the State of Oregon.
- Reduce fragmentation within the forest.
- Increase superior late successional forest structure.
- Enhance ecosystem function, structure, and composition at the forest and stand level to accelerate the creation of northern spotted owl and marbled murrelet habitat and improve forest biodiversity.

Discussion

The conservation strategy is summarized on the next several pages. Specific parts of the strategy are discussed in more detail later in this chapter. The conservation strategy uses an ecosystem-based landscape management approach to provide and maintain habitat for the northern spotted owl and marbled murrelet that recognizes both the coarse and fine filter components as described by Malcolm Hunter (Hunter 1990). The coarse filter component addresses overall biodiversity goals (see Fish and Wildlife Goals, on page III-2); while the fine filter applies specific measures to maintain and improve habitat for the spotted owl and marbled murrelet. This strategy contributes to the survival and recovery of spotted owl and marbled murrelet populations on the regional level and the forest level.

The strategy's contribution at the regional level — The Record of Decision for the Northwest Forest Plan establishes management objectives for surrounding federal lands that emphasize the development of large blocks of late successional forests (USDA Forest Service et al. 1994a & b). These areas, upon reaching this objective, are expected to provide for viable spotted owl and marbled murrelet populations. Currently some of these older federal forests are fragmented (USDA Forest Service et al. 1993b). Like the Elliott, federal forests have been affected by natural and human caused fires, which have produced mosaics of mature stands and remnant old growth. In addition, many federal lands, especially those of the Bureau of Land Management, are intermixed with private lands in a checkerboard pattern of alternating square-mile sections. See pages I-4-5 and I-25-26 for more detail on how federal lands in the south coastal region will be managed under the Northwest Forest Plan.

The Elliott State Forest and Late Successional Reserve RO265, immediately north of the Elliott, provide a critical link within the Oregon Coast Range Province, connecting populations north and south of State Highway 38. USFWS assumes that population clusters within LSRs in the Oregon Coast Range Province may continue to decline for 30-50 years due to habitat conditions and poor reproductive output. Extirpation of one or more of these clusters is

possible within that timeframe. Regrowth of forests in Coast Range LSRs, and hence, demographic contribution, will not begin to occur for several decades. In the meantime, contributions to the provincial owl population by the Elliott will be very beneficial. Populations within the Klamath and West Cascades Provinces are more stable, and restocking of coastal LSRs will be enhanced by immigration from these. It is especially important to maintain dispersal linkages, such as the Elliott, between LSRs and potential source populations in the Klamath and West Cascades and other areas of the Coast Range Province to allow restocking of reserves.

To the south and west of the Elliott, there are privately owned timber lands. Most private timber lands near the Elliott currently have younger, early successional forests. It is likely that most of these lands will continue to be managed for early successional forests. Effective 1995, Weyerhaeuser Corporation has entered into an HCP with the USFWS to manage its 209,000 acre Millicoma Tree Farm, adjacent to the Elliott, as habitat conducive for dispersal of spotted owls. Weyerhaeuser has committed to having the ownership in dispersal condition by 2015, and will maintain this condition on the tree farm until 2045, and possibly until 2075, if the Service makes certain findings related to conservation of the owl (USDI 1995, Weyerhaeuser Co. 1994).

The Millicoma Tree Farm and the Elliott State Forest form the major linkage between three LSRs that will be critical in facilitating intra- and inter-provincial movement, and restocking of suitable, potentially vacant, habitat that will be developing in the LSRs. The remaining private forest lands are expected to make limited contributions to the survival and recovery of spotted owl and marbled murrelet populations. The Elliott State Forest will provide a transition over time between these areas, by maintaining some quality habitat for nesting and survival, and by providing habitat that allows spotted owls and marbled murrelets to move from lesser quality habitat on private lands to higher quality habitat on federal lands.

The strategy's contribution at the forest level — At the narrower landscape view of the Elliott, the conservation strategy manages ecosystems to provide a range of habitat types and structural conditions at both the forest and stand level. This objective is accomplished through the manipulation of stand age, management unit rotation length, species composition, and development of stand heterogeneity through creation of snags and retention of green trees. Landscape structure, function, and composition is managed through the development of the following landscape structures.

- Three successional forest types — older, late successional forests; middle-aged, mid-successional forests; and younger, early successional forests.
- Corridors linking the three forest types.
- Matrix conditions across the forest, ensuring a minimum mix of stand ages (minimizing fragmentation).
- Late successional reserves to protect and enhance biodiversity and T&E species habitat.

This strategy will produce a forest that is managed through time using ecosystem-based principles. This strategy will provide a balance of forest habitat conditions, both within the context of the region and across the forest; emphasize integrated resource values (instead of a single species or single resource focus); manage for biological diversity at the landscape

and stand levels; and manage the forest to contribute to the protection and restoration of northern spotted owl and marbled murrelet populations.

The features of this strategy discussed on the next several pages are designed to provide the basic building blocks necessary to provide the structure, function, and composition requirements of the coarse filter-fine filter strategy. The following discussion looks at the forest landscape and stand levels.

Landscape Level

Reserve Areas

Various blocks of forest habitat will be managed for non-commodity values. These reserve areas include zones adjacent to fish-bearing streams and areas with special interest, including Habitat Conservancy Areas (HCAs).

Habitat Conservancy Areas — Some areas with a high present value for spotted owls, marbled murrelets, and fish, or areas that can become high value areas, are protected as HCAs. These areas will provide late successional forest structure in discrete portions across the forest. The HCAs will supplement managed forests and provide refugia for the biodiversity that is inherent in late successional forests. Species using the HCAs can then disseminate to other areas (Franklin and Forman 1987). These areas are not the same as Habitat Conservation Areas, also known as HCAs, proposed under the 1990 ISC Report.

The HCAs are located in all management basins. The acreage in the HCAs varies by basin, but ranges from 3-25%. Total HCA acreage within the forest is 6,961 acres. HCAs are permanent and in fixed locations. Boundaries are located along recognizable geographic features such as roads, adjacent unit boundaries, streams, or ridges.

No clearcut harvesting will be allowed in HCAs. Only limited forest management activities will be allowed, to meet other forest management needs, or as necessitated by management in adjacent stands. Activities in HCAs will be restricted to vehicle traffic on forest roads, wildfire suppression and control, reforestation, precommercial thinning, slash burning, application of herbicides, hand release, road construction, sales of special forest products, road maintenance, forage seeding, pruning, harvest unit guylines or tailholds, stream rehabilitation work, stream survey work, and animal survey work. Forest management activities in the HCAs will be done with the objective of improving the late successional character of the stands. Within HCAs, stands that do not contain spotted owl or marbled murrelet habitat may be thinned or treated with other silvicultural activities, to create late successional stands. It is generally recognized that enhancement of late successional forests benefits most when management is conducted early in stand development (Tappeiner et al. 1992). Thus, thinning treatments will be restricted to stands 0-80 years old, with an emphasis on stands less than 40 years old.

Riparian reserves and protection — Late successional forests between 50 and 100 feet in width will be retained along both sides of fish-bearing and perennial non-fish-bearing

streams. These riparian reserves will provide streamside protection, contribute to the protection of aquatic species, and link areas of older forest structure between and within management basins and HCAs. The riparian strategy is described in detail in Table IV-2, on page IV-9. The highlights of this strategy are listed below. Approximately 5,889 acres, or 7.3% of the matrix lands, are in no harvest riparian reserves. These acres are in addition to the acres in HCAs. See the definition of matrix lands on the next page.

- Managed and no harvest riparian management areas vary from brush buffer only to 100 feet no harvest buffers. Buffer size and management depend on whether stream is perennial or intermittent, and whether or not it is fish-bearing.
- See Table IV-2 for additional management requirements for roads, yarding and line corridors, yarding suspension over stream banks, protection of wetlands next to streams, protection of slope hazard areas, and rehabilitation of stream structure.

Riparian reserves and protection provided in the conservation plan will protect all fish and riparian species, including those that may be listed as threatened or endangered in the future. If additional protection measures are found to be needed, they would be developed with input from the Oregon Department of Fish and Wildlife, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. Watershed analyses would be used as a basis for determining long-term needed protection measures.

Other reserves — Late successional habitat is managed within the Elliott State Forest in areas designated for a variety of non-timber production goals. Examples are scenic conservancy, protective conservancy, and noncommercial forest; there are additional classifications as well. The Elliott has a total of 5,667 acres in these non-timber land use classifications. Of this total, 457 acres are also in HCAs.

Total reserves — All reserves combined total 18,060 acres, or 19% of the forest.

Management Basins

The contiguous portion of the Elliott State Forest (about 93,000 acres) is divided into 17 management basins. The basins have been located to represent meaningful ecological units, using watersheds as a base unit whenever practical. The basins average 5,500 acres of state forest land each, with individual basin sizes ranging from 4,176 acres to 7,779 acres. Most basins contain the drainage of one or two primary streams. Boundaries are located on recognizable features such as ridge lines or roads.

Management basins serve as the basis to conduct watershed analysis, implement and monitor management activities, and to regulate the intensity of timber harvest. This approach is different from alternative strategies that would have focused on quarter township squares or single resource criteria such as spotted owl circles. A summary of the strategy for each management basin is found in Table IV-1 on page IV-8.

Matrix lands — The forest lands not in reserves are matrix lands. There are 74,794 acres, or 81% of the forest, in matrix lands. These lands will be managed for timber production in a way that allows other resource values to be emphasized. This objective is accomplished by

using target harvest age to control timber harvest rates in each management basin. Basins with longer rotation lengths (160-240 years) will emphasize late successional forest development, while basins with rotation lengths between 80 and 135 years will emphasize a mix of early to mid successional stages. To develop the basin strategies, the basins were analyzed individually and as a group for the following factors.

- Forest age class structure
- Threatened species locations
- Soils and geology concerns
- Ownership patterns (Common School Lands and Board of Forestry Lands)
- Historic and current land use designations

Together, the management basins provide for a mix of successional stages on the Elliott that contributes to overall biodiversity on the forest. This strategy provides short and long-term contributions to the recovery and survival of the northern spotted owl and marbled murrelet through maintenance and development of nesting and dispersal habitat throughout the forest.

Stand Level

Habitat enhancement — A variety of habitat enhancement measures will be undertaken at the stand level. The list below describes activities to occur in both established and regenerated stands. Details on these activities are provided later in this section, under the heading “Mitigation and Minimization Measures.”

- Green tree and snag retention following clearcut harvest
- Thinning to maintain rapid tree diameter growth and encourage the establishment of understory vegetation
- Blowing tops out of retained green trees to increase stability and promote the development of top cavities preferred by the spotted owl for nesting
- Thinning small portions of stands to the low densities necessary to develop large tree limbs suitable for marbled murrelet nesting
- Snag creation in snag-poor stands
- Planting multiple tree species
- Downed wood retention and creation
- Underplanting stands with shade-tolerant tree species

Contributions to Northern Spotted Owl and Marbled Murrelet Habitat

Dispersal habitat — Dispersal habitat for the northern spotted owl is provided throughout the forest, using a variation of the 50/11/40 strategy. Dispersal habitat is maintained by management basins instead of quarter townships. The average management basin size is about the size of a quarter township (5,760 acres). The strategy constrains harvesting so that at least 50% of the stands in each management basin have trees averaging 11 inches DBH or larger, and the canopy closure is 40% or greater. All stands meeting the criteria will count toward meeting the acreage requirement.

Nesting-roosting-foraging habitat (NRF habitat) — The long-term effects of the mix of target harvest ages will vary by basin. As shown in the table on page IV-8, over time from 12-66% of each management basin will be maintained in NRF habitat for the spotted owl. For the basins with target harvest ages of 135 and older, this is the minimum amount of habitat that will be maintained in each basin. That is, no NRF habitat will be harvested until the NRF habitat in the basin reaches the level shown in the table. That level of habitat will then be maintained over time. For the basins with 80 year target harvest age, the percentages reflect the amount of NRF habitat that will develop over time in HCAs, other reserves, and riparian reserves. In the long-term, 39,781 acres (43% of the forest) will be maintained in NRF habitat. See page III-12 for a definition of NRF habitat.

Marbled murrelet nesting habitat — Future marbled murrelet habitat (stands in the 100 year age class or older) will be provided by a combination of long rotation basins, reserve areas, and riparian management zones. At the stand level, the development of habitat will be accelerated during the stand initiation and stem exclusion phases (Oliver and Larson 1990). Methodologies are presented in the mitigation and minimization subsection, under “Silvicultural Techniques to Maintain and Enhance Habitat.” All known murrelet-occupied sites will be protected. Murrelet-occupied sites identified in surveys from 1992-1994 have been designated as 31 Marbled Murrelet Management Areas (MMMA), totaling 5,320 acres. These areas will be managed under the Marbled Murrelet Management Plan for State Forest Lands (Department of Forestry 1994b). No operations involving detrimental habitat modification will be carried out in an identified MMMA, and actions within 0.25 miles that are likely to disrupt nest sites during the breeding season will be prohibited. Protection measures for murrelets are described under “Mitigation and Minimization Measures” later in this chapter, particularly in the section “Habitat Ranking Process for Marbled Murrelets.”

The map after page IV-8 shows the basins and the rotation ages for the conservation strategy.

Table IV-1. Management Basin Strategies

Basin	Total Basin Acres	HCA Acres	Other Reserves Acres	Riparian Reserves Acres	Total Reserve Acres	Target Harvest Age	Current Average Stand Age in HCAs	Current Acres in 80+ Age Classes	Current Percentage in 80+ Age Classes	Long Term Percentage in 80+ Age Classes
1	5153	267	626	311	1204	160	150	2795	54%	50%
2	6179	643	1191	317	2151	240	138	4128	67%	66%
3	5352	464	41	354	859	200	98	2654	50%	60%
4	5034	221	74	346	641	160	161	2074	41%	50%
5	7779	618	57	519	1194	200	109	4303	55%	60%
6	7352	387	31	506	924	240	93	4670	64%	66%
7	5870	346	143	393	882	200	116	3429	58%	60%
8	4176	983	144	223	1350	160	103	2061	49%	50%
9	6212	211	516	400	1127	80	90	2599	42%	18%
10	4929	267	255	322	844	80	110	793	16%	17%
11	5445	315	277	354	946	80	91	2459	45%	17%
12	4968	443	165	318	926	80	117	2746	55%	19%
13	5965	555	37	392	984	80	105	3342	56%	16%
14	5078	212	84	349	645	135	87	3019	59%	40%
15	4655	530	1330	204	2064	80	122	2773	60%	44%
16	4444	115	132	306	553	80	95	783	18%	12%
17	4263	384	107	275	766	240	114	2381	56%	66%
Total or Average	92,854 Total	6,961 Total	5,210 Total	5,889 Total	18,060 Total	151 Average	112 Average	47,009 Total	51% Average	43% Average

Table IV-2. Riparian Strategy

	Fish-bearing perennial streams	Non-fish-bearing perennial streams	Fish-bearing intermittent streams	Non-fish-bearing intermittent streams
Riparian Management Area (RMA) (measured slope distance from the edge of the active channel) ¹	100 feet	50 feet	75 feet	Shrub & forb retention
Harvest	No harvest except for specific habitat enhancement ²	No harvest except for specific habitat enhancement ²	No harvest except for specific habitat enhancement ²	No constraints
Adjacent RMA constraints ³	No constraints	No constraints	No constraints	No constraints
Roads	No road construction in RMA except crossings	No road construction in RMA except crossings	No road construction in RMA except crossings	No road construction in RMA except crossings
Yarding and line corridors	Yes	Yes	Yes	Yes
Yarding suspension over RMAs	Full	Full when possible, otherwise one-end suspension	Full	One-end suspension ⁴
Protection of wetlands adjacent to stream	Yes	Yes	Yes	Yes
Slope hazard areas			Site-specific strategy ⁵	Site-specific strategy ⁵
Rehabilitation	Stream structure and large wood placement ⁶		Stream structure and large wood placement ⁶	

1. Including all portions of the stream channel carrying water at normal high flows, not just the current wetted channel, and also all side channels and backwaters, which may not carry water during summer low flow.
2. Riparian habitat enhancement project such as an alder conversion or similar activity would require a written plan and consultation with ODFW.
3. Necessary green tree retention is often placed adjacent to RMAs, further increasing the effective width of the original RMA.
4. Partial suspension on stable areas, full suspension on unstable areas.
5. Slope hazard analysis is conducted prior to harvest by a registered professional — unstable areas require tailored protection.
6. Rehabilitation projects would require a written plan based upon results of the limited factors analysis from the stream survey work.

Scope of the Incidental Take Permit

Forest management may displace some resident owls and remove potential and suitable northern spotted owl and marbled murrelet habitat. The action involves seeking an incidental take permit from USFWS as provided in Section 10(a) of the federal Endangered Species Act (ESA).

Permit Period and Area

The Department of Forestry is seeking a 60 year incidental take permit for the northern spotted owl, and a 6 year permit for the marbled murrelet. This HCP provides measures intended to assure that the impacts of any take will to the maximum extent practicable be minimized and mitigated. Both permits will be reviewed annually for the first 5 years, using the annual monitoring plan as the basis for evaluation. (See “Monitoring” on page IV-45.) A comprehensive review after 5 years will assess the adequacy of the conservation strategy to meet established goals based upon monitoring, research, and adaptive management components of the strategy (see “Five-Year Comprehensive Review” on page IV-46).

A 60 year permit period is requested for the northern spotted owl because the amount of superior habitat on the Elliott (156+ forest) begins to peak in 2053. (See Figure IV-2 on page IV-19.) This superior habitat is a significant forest component providing for long term survival and recovery of the spotted owl.

Because of the limited information available on the biology of the marbled murrelet, a 6 year permit period is being requested at this time. This will enable the Department of Forestry to conduct a specific, comprehensive, five-year research program on the Elliott to test and refine the murrelet habitat management strategy (page IV-43). These research findings, as well as information from other sources, will be used in the five-year comprehensive review. This will enable the Department of Forestry and the U.S. Fish and Wildlife Service to agree to protection standards based on the best available scientific information at that time.

The permit area will be the Elliott State Forest. The forest’s location is described in Section I and the map section has maps of the forest.

Type of Take

The permit would cover potential incidental take of northern spotted owls and marbled murrelets in connection with otherwise lawful forest management operations in the permit area.

Spotted owls — Under the current definition of “harm,” the primary form of possible take for spotted owls under the plan is the potential injury or death of owls as a direct result of habitat modification from forest management activities. No intentional or direct killing of individuals is anticipated. Measures will be taken to avoid pursuing, hunting,

shooting, killing, wounding, trapping, or capture of threatened or endangered species. However, it is possible that incidental take of owls may occur when habitat is reduced below levels that would support spotted owls capable of reproducing.

Marbled murrelets — As currently defined in federal law, incidental take of marbled murrelets may occur if actual murrelet injury or death is directly traceable to harvest of murrelet habitat. Potential murrelet habitat on the Elliott consists of unsurveyed stands in the 100 year age class or older.

The following subsection has an estimate of the level of possible take that may result from habitat modification and removal. Whether such activities will actually impair essential behavioral patterns and result in death or injury will depend on the circumstances involved in each case. The permit should cover any activity that could result in a take.

Level of Incidental Take and Other Impacts

The following owl and murrelet analysis was done by the Oregon Department of Fish and Wildlife. This analysis examines the potential incidental take that could occur on the Elliott for spotted owls and marbled murrelets. The analysis begins on the page after the “Key Terms” box.

For spotted owls, the numbers reflect the maintenance level of currently known owls and owl sites. Little or no population recovery is actually expected over 60 years on the Elliott, as relatively little net habitat recruitment is expected to occur during the next 40-50 years. Also, habitat conditions around some owl sites could continue to decline. Over the longer term, however, the amount and quality of owl habitat under the conservation plan would improve. Figures in this section are continued beyond the 60 year term of the HCP to illustrate these important long term effects, even though the analysis of take and mitigation focus on the 60-year period covered by the permit request.

A similar situation will exist for owls at the regional level. Habitat levels on federal lands are similar to state lands in that little habitat recruitment is expected to occur during the next 40-50 years. During this time, the regional owl population is expected to continue to decline, as timber harvest in the matrix will continue to eliminate habitat and displace owls.

Calculations of owls to be supported were derived by counting the number of pairs, singles, and status unknown owls that are found where little or no harvest of stands 80 years and older would occur on state land within a 1.5 mile radius circle of the owls’ activity center. A number of owl sites are along the boundary of the Elliott and are heavily influenced by habitat conditions on private lands. These owl sites, although expected to be lost during the short-term, are included in the tally of spotted owls supported, as they are not expected to be affected by state land activities.

Using 1991-1993 data, a total of 69 spotted owls have been identified on or within 1.5 miles of the Elliott. This total includes: 29 pairs, 7 resident singles, and 4 status unknown sites. A status unknown site requires an additional year of surveying to determine its status. Additionally, non-territorial “floater” owls have been identified on the forest but are not included in this analysis.

Based on 1992-1994 survey data, marbled murrelets have been identified at 31 occupied sites. Murrelet habitat on the Elliott is defined as stands that are in the 100 year age class and older (see pages II-12-13 for a discussion of murrelet habitat). Murrelet habitat also has structural features such as large residual trees, large limbs, and nesting platforms. Since current inventory data does not account for large limbs and nesting platforms, stand age is used as a surrogate for habitat structure. Also, the occupied sites on the forest are all located in habitat that is in the 100 year age class or older. In 1993, there were 39,367 acres on the Elliott in the 100 year age class or older.

Key Terms

Habitat Conservation Plan — A plan developed by a private entity or state, that specifies conservation measures that will be implemented in support of a permit that would allow the incidental taking of a threatened or endangered species, under Section 10(a) of the ESA.

Incidental take — The taking of a federally listed wildlife species, if the taking is incidental to, and not the purpose of, carrying out otherwise lawful activities. While the Department of Forestry does not plan to knowingly harm, harass, hunt, or otherwise injure spotted owls and marbled murrelets, it does propose to remove some habitat. Habitat removal may cause disturbance extensive enough to disrupt normal behavioral patterns, even though the affected individuals may not actually die.

Incidental Take Permit — A permit issued by the U.S. Fish and Wildlife Service to either a private entity or a state, that allows incidental take of a threatened or endangered species; permit also requires permittee to carry out specified actions that minimize and mitigate the incidental take.

Resident single — An unpaired spotted owl that has an established home range; a resident single may be part of a pair but the mate was not detected during surveys.

Estimated Possible Take of Spotted Owls and Marbled Murrelets

Spotted Owls

Sixty Years

Number of spotted owls supported:

26 owls supported

Possible incidental take of spotted owls:

43 owls taken

Marbled Murrelets

Based on 1992-1994 marbled murrelet survey data, there are 31 sites where occupied behavior was observed. There are 5,300 acres associated with these stands. Currently, approximately 16,200 acres have been surveyed for murrelets and approximately 33% of the acres surveyed have been determined to be occupied and set aside in Marbled Murrelet Management Areas, to be managed under the Department of Forestry's Marbled Murrelet Management Plan for State Forest Lands (Oregon Department of Forestry 1994b).

The harvest of potential marbled murrelet habitat in the 100 year age class or older during the 6 year term of the permit is 2,380 acres. There is a total of 13,220 acres of stands in the 100 year age class or older in the short rotation basins. See pages IV-24-27 for more discussion of the conservation strategy's effects on marbled murrelet habitat.

Discussion

Nine long rotation basins (basins 1, 2, 3, 4, 5, 6, 7, 8, 17) will be managed to provide habitat levels for owls at 50% or more; 37% of these basins will be managed as murrelet habitat. Additionally, one basin (basin 14) will be managed to provide a 40% habitat level for owls (26% for murrelets). Rotation lengths will be consistent with the provision of these habitat levels. The remaining seven basins will be managed on an 80 year rotation except for habitat conservancy blocks, Marbled Murrelet Management Areas, other reserves, and riparian reserves in selected areas.

Reserve areas located across the forest will be managed for late successional habitat. The reserve areas include both the 21 HCAs, totaling 6,961 acres, and the additional riparian and special use reserves, totaling another 11,099 acres. These areas will serve to provide stable habitat areas through time for associated species. In addition, approximately 5,320

acres are within Marbled Murrelet Management Areas -- of these acres, about 1,010 are estimated to be within the reserves already described.

Spotted owls — As seven basins (basins 3, 4, 5, 6, 7, 8, 17) are already below the desired NRF habitat levels, no further harvest of stands in the 80 year age class and older will occur in those basins in the short-term. Basin 8 will have 94 acres harvested in decade 3. Two additional basins (1, 2) are slightly above the desired NRF habitat levels, and only a small amount of harvest will occur short-term in those basins.

Spotted owls are expected to occur intermittently within basins managed to provide 50% or lower NRF habitat levels, and would suffer from insufficient quantity and quality of habitat over time. Demographic performance may be inadequate to provide for contributions to recovery. With the exception of the Habitat Conservancy Areas and other reserves, existing NRF habitat in the seven shorter rotation basins will be harvested and rapidly become unsuitable for owls and murrelets. These basins will provide mainly dispersal habitat for owls. For the purpose of this estimate, owls are considered possibly taken when stands are entered and NRF habitat reduced below the amounts allowed under circle guidelines, even though the owls may move.

See the discussion under “Mitigation and Minimization Measures” later in this section, for a detailed discussion of how the nine long rotation basins will benefit spotted owls.

Marbled murrelets — Information is lacking on the number of marbled murrelets using the Elliott State Forest, and the locations and habitats required. For these reasons it is not feasible to quantify the number of birds possibly taken. In this HCP, possible incidental take of murrelets is measured by the acres of stands in the 100 year age class or older that are harvested. This criteria was chosen for the following reasons.

- The only occupied behavior observed on the Elliott is restricted to sites in the 100 year age class or older.
- Stands in the 100 year age class or older have a higher probability of including the structural habitat features used by marbled murrelets for nesting.

The risk of taking marbled murrelets is assumed to exist in unsurveyed stands in the 100 year age class or older. A series of decision steps, described on pages IV-35-36, will be used to minimize the risk of take of murrelets as a result of timber harvesting.

The Conservation Strategy’s Effects on Owl and Murrelet Habitat

The conservation strategy will contribute to both the short-term and long-term habitat requirements of the northern spotted owl and marbled murrelet. As the strategy is implemented, a forest landscape will develop that will maintain and enhance these habitat conditions through time. The key aspects of the strategy’s contributions to habitat requirements are listed below, and discussed in detail in the following pages. In keeping

with the planning needs for the forest, the conservation strategy analyzes forest development for 100 years. Note that ODF is currently requesting a permit for incidental take of spotted owls for 60 years, and of murrelets for 6 years.

- Management basins
- Reserve areas
- The forest’s development over time
- The strategy’s effects on spotted owl habitat
- The strategy’s effects on marbled murrelet habitat

Management Basins

The 17 management basins will be managed at different rotation lengths, in order to reverse past timber harvest patterns that fragmented the forest, and to increase the development of superior habitat for owls and murrelets over time. The 17 basins will be managed under the strategy shown in the following table.

Table IV-3. Strategy for the Management Basins	
Number of Basins / Rotation Length	Management Emphasis
3 basins will be managed on a 240 year rotation	Late successional forest
3 basins will be managed on a 200 year rotation	Late successional forest
3 basins will be managed on a 160 year rotation	Mid/late successional forest
1 basin will be managed on a 135 year rotation	Mid-successional forest
7 basins will be managed on an 80 year rotation	Early/mid-successional forest

In the long rotation basins, contiguous blocks of suitable or potentially suitable habitat will increase to 50-60% of the basin. Long-term, fragmentation will decrease across the forest, leading to more discrete habitat units and more interior forest conditions than currently exist. The average stand age will increase across the forest. As shown in Figure IV-2, superior habitat (stands 156+ years or older) will increase from the current 410 acres to approximately 5,600 acres at the end of the fourth decade, and continue to increase to a high of 26,678 acres after eight decades. Additional constraints used in managing the basins will limit harvest of this age class to a total of 170 acres in the first three decades.

Reserve Areas

The HCAs, riparian reserves, and other areas managed for non-timber production goals will act as refugia and provide linkages between managed stands, and will increase retention and dissemination of late successional forest species. The reserve areas also contribute to the short-term protection of important areas for fish and wildlife.

The Forest's Development Over Time

The Department of Forestry has forecast how the forest structure will change over the next 100 years, as the conservation strategy is implemented. This time period was chosen to illustrate the long term benefits of the forest plan for species preferring late seral conditions, even though the duration of the requested HCP is limited to 60 years (6 years for marbled murrelets). The analysis was done with the department's harvest scheduling model, SFDSFD (see the "Key Terms" box below).

The model uses the information listed below as a basis for its calculations.

- The forest's current age classes (see "Description of Current Forest Conditions" on page III-8).
- Target harvest ages for management basins, which control the rotation lengths for the basins (see Table IV-1 on page IV-8 and Table IV-3 on page IV-16; also see the "Key Terms" box below).

The forecast predicts how the age class distribution of the forest will change over the next 100 years as the conservation strategy is implemented. Figure IV-1 on page IV-18 shows the general trends for the three major age class groups. The changes in spotted owl and murrelet habitat over the next 100 years are discussed on the pages following Figure IV-1.

In addition to predicting changes in forest structure, the model predicts what level of timber harvest will be possible under the conservation strategy. The model calculates a first decade harvest cut (clearcut) of 475 acres per year and commercial thinning of 500 acres. The model estimates that the conifer clearcut volume for the first decade would be 24.7 MMBF (million board feet) annually. The conifer clearcut volume would increase to 36.9 MMBF annually for the tenth decade.

The first three maps following page IV-21 show the habitat development through time, based on implementing the conservation strategy. The first map shows the age class distribution as of 1994. The second and third maps show how the age classes will have changed in the years 2024 and 2054. These maps visually demonstrate how the forest would look, based on the discussion above. They illustrate the reduction of forest fragmentation through time. The fourth map shows how the forest would look in 30 years if the conservation plan was not implemented and harvest occurred under the interim plan. Figures IV-4 and IV-5, which follow the maps, also show the habitat development through time, in the form of graphs.

Key Terms

SFDSFD — State Forestry Department Simulated Forest Development. This computer model incorporates inventory data, yield tables, and planning decisions; it then projects forest development and harvest over time. The model was developed by the Department of Forestry.

Target harvest age — The age that regulates the rate at which stands are harvested. Target harvest age is a major influence on clearcut harvest levels.

Figure IV-1. Elliott State Forest Development Through Time
(formerly Figure III-2)

Figure IV-2. Late Successional Development
(new figure)

Effects on Spotted Owl Habitat

Suitable owl NRF habitat is defined as stands in the 80 year age class and older (described as 80+ forest below). There are currently 47,009 acres of 80+ forest on the Elliott. The trends described below are shown graphically in Figure IV-2 on page IV-19. The “Background Information” box on the next page explains concepts that are important for understanding the analysis.

Timber harvest — Figure IV-3 below shows the harvest of 80+ forest for six decades. An average of 470 acres of 80+ forest will be harvested per year in the first decade, with no more than 520 acres harvested in any one year. The total harvest of 80+ forest for six decades is 22,075 acres.

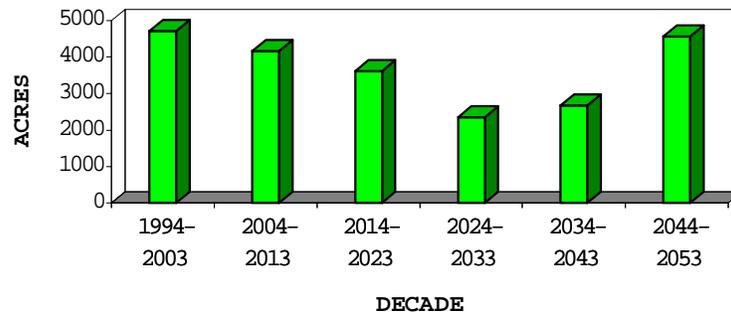


Figure IV-3. Harvest of 80 Year Plus Stands for Six Decades

In-growth — Figure IV-4 on page IV-22 shows the in-growth of spotted owl habitat in relation to harvest, by decade, beginning with the acres harvested from 1993 to 2003. For the first 40 years, the in-growth is less than the harvest, but as habitat in the reserves develops and the harvest shifts to other basins, the in-growth increases.

Net amount of habitat — The net amount of 80+ forest decreases from the current figure of 47,009 acres (50% of the forest) to a low point of 36,180 acres (39%). The low point occurs in the year 2033, which is 40 years from the starting year. The acres in this age class then increase to 43,463 acres (46%) by the year 2073, which is 80 years from the starting point, then generally level off.

156+ stands — Figure IV-5 on page IV-23 shows what portion of 80+ stands will be 156+ stands over the next 100 years. The 156+ stands are considered to be superior habitat for spotted owls. The increasing amounts of 156+ stands over the next century will contribute to the stability of the spotted owl population and increase the opportunities for the owls to reproduce and disperse.

Background Information

While spotted owl and marbled murrelet habitat are defined differently (80+ stands for owls, 100+ stands for murrelets), the following general concepts apply to both. These concepts are important in evaluating the conservation strategy's effects on owl and murrelet habitat.

In-growth — The amount of forest stands that grows into habitat from decade to decade.

Net amount of habitat — Timber harvest will remove some habitat each decade. At the same time, some in-growth will occur. After timber harvest and in-growth are both calculated, the actual amount of available habitat is called the net amount of habitat. The net amount is described in acres.

Superior habitat — Stands that are 156 years or older are considered to be superior habitat for spotted owls and marbled murrelets. These stands have larger trees and more structural features that are important to owls and murrelets.

Fragmentation — The distribution of habitat is also important. When habitat is fragmented, or scattered in small pieces across the landscape, it is less valuable to owls and murrelets. Habitat that is blocked-up in larger patches, or more continuous, is more valuable to these two species.

Figure IV-4. Northern Spotted Owl Habitat Removal and In-growth

Figure IV-5. Spotted Owl Habitat

Effects on Marbled Murrelet Habitat

Marbled murrelet habitat is defined as stands in the 100 year age class and older (described as 100+ forest below). Surveys on the Elliott have found no occupied sites in stands less than 100 years old. Stand structural characteristics associated with marbled murrelets include such features as large residual trees, large limbs, and nesting platforms (USDI Fish and Wildlife Service 1994b). Stand information currently available from the forest does not include this type of information. Therefore, stand age is used as a surrogate for habitat structure. In 1993, there were 39,367 acres of stands in the 100 year age class or older on the Elliott.

The trends, by decade, in habitat loss and development are described below and shown graphically in Figure IV-7 on page IV-27. This figure and the following discussion analyze the effects on murrelet habitat if the conservation plan were to continue in effect over the long term. Note that the permit period for murrelets is only 6 years, with intensive review of the protection strategy and possible amendment of the HCP planned for that point in time. During the 6 years covered by the permit for take of murrelets, 2380 acres of unsurveyed potential murrelet habitat are planned for harvest, using a habitat ranking procedure (Appendix K) to minimize the risk of harvesting occupied habitat.

Timber harvest — Figure IV-6 below shows the harvest of 100+ forest for six decades. An average of 440 acres of 100+ forest will be harvested per year in the first decade. A total of 2,640 acres will be harvested in the first 6 years, including 260 acres of surveyed, unoccupied stands. The total harvest of 100+ forest for six decades would be 14,513 acres. This graph is included to illustrate the long range effects of the conservation plan. ODF is not at this time requesting a permit to harvest unsurveyed potential murrelet habitat beyond 6 years.

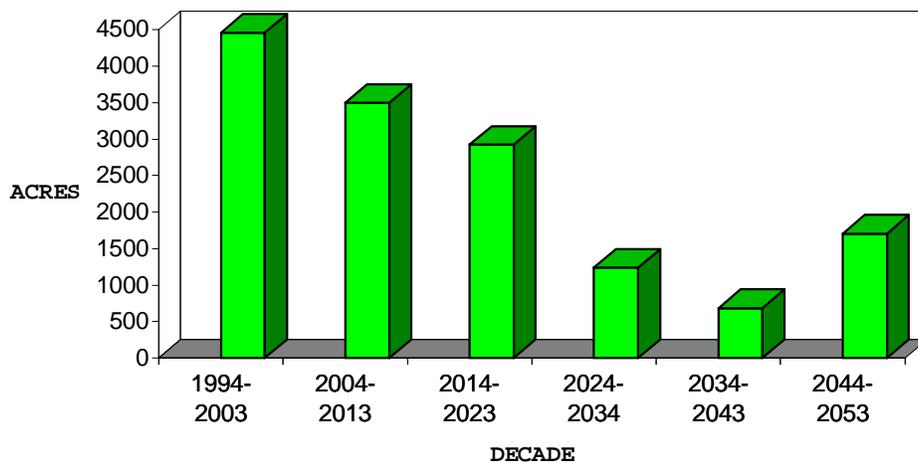


Figure IV-6. Harvest of 100 Year Plus Stands for Six Decades

In-growth — Figure IV-7 on page IV-27 and the following graph show the in-growth of marbled murrelet habitat in relation to harvest. Development of potentially suitable (100+) habitat will begin immediately following implementation of the conservation strategy. During the next 60 years, harvest would exceed in-growth. After 60 years, which is after the year 2053, in-growth would generally equal or exceed harvest.

Net amount of habitat — The net amount of 100+ forest would decrease from the 1993 figure of 39,367 acres (42% of the forest) to a low point of 32,978 acres (35%). The low point would occur in the year 2063, 70 years from the starting year. The acres in this age class would then increase back to 39,087 acres (42%) by the year 2093, 100 years from the starting point, then level off. Currently, 13,220 acres of the 100+ stands are in the short rotation basins (basins 9-16), as shown in Table IV-4 below. During the 6 year permit period for marbled murrelets, all harvest of 100+ stands will occur in these short rotation basins, using decision steps to minimize the risk to murrelets, as described below in the Mitigation and Minimization subsection.

156+ stands — In addition to recreating 100+ habitat, the conservation strategy would increase the percentage of that habitat that is 156 years or older. Figure IV-8 on page IV-28 shows what portion of 100+ stands would be 156+ stands over the next 100 years. These older stands are assumed to provide late successional characteristics important to murrelets, such as large limbs and nesting platforms. The increasing amounts of 156+ stands over the next century would provide increased murrelet nesting opportunities, a stable nesting environment, and stand size and structure sufficient to reduce risks from predation.

Young stands — A number of silvicultural techniques will be employed to enhance younger and regenerated habitat to accelerate the development of structural conditions known to be associated with marbled murrelet habitat. The objective will be to recreate those conditions earlier than would naturally occur in 100+ forests. Monitoring measures will be implemented to track the success of these techniques.

Table IV-4. Acres of 100+ Stands in Short Rotation Basins

Basin Number	Acres of 100+ Stands	Acres Less Than 100+ Years	Total Acres
9	1607	4608	6215
10	376	4556	4932
11	1595	3853	5448
12	2460	2512	4972
13	2477	3487	5963
14	2268	2811	5079
15	2167	2490	4657
16	270	4176	4446
Total Acres	13,220	28,492	41,713

Figure IV-7. Marbled Murrelet Habitat Removal and In-growth

Figure IV-8. Murrelet Habitat

Minimization and Mitigation Measures

An incidental take permit for northern spotted owls and marbled murrelets is requested to implement the conservation strategy, as stated on page IV-10. The following subsection outlines the procedures that will be used to minimize and mitigate the level of possible take requested. As already described, many features of the Conservation Plan, such as the long rotation management basins, riparian protection, and Habitat Conservation Areas, were designed to protect and enhance habitat for sensitive, threatened and endangered wildlife species. Specific procedures are listed below, and then discussed in more detail in this subsection. The table on page IV-51 shows which activities are classified as mitigation measures, and which as minimization measures.

1. Habitat Management

- A. Management basins
- B. Reserve areas
- C. Habitat Conservancy Areas (HCAs)
- D. Riparian reserves
- E. Other reserves
- F. Habitat management specific to spotted owls
- G. Marbled murrelet habitat ranking process

2. Habitat Enhancement

- A. Reforestation
- B. Thinning and partial cutting
- C. Green tree retention
- D. Snag creation and retention
- E. Downed wood retention and creation
- F. Group selection of mature trees
- G. Timber sale planning

3. Continuing Surveys and Studies

- A. Spotted owl research
- B. Marbled murrelet research
- C. Monitoring
- D. Adaptive management

4. Summary of Owl and Murrelet Minimization and Mitigation Package

1. Habitat Management

The minimization and mitigation measures are based on a strategic view of how the forest will be managed over time to maintain and enhance essential habitat features for the northern spotted owl and marbled murrelet. This strategic view provides a context in which to address regional, forest, and stand habitat objectives. The strategic framework involves two main activities, listed below.

- Development of management basins of different harvest rotation lengths
- Establishment of a network of HCAs, riparian reserves, and other reserve areas across the forest

A. Management Basins

Management basins were developed to protect elements of biodiversity associated with different seral stages and stand conditions, and to provide the specific habitat requirements of the spotted owl and marbled murrelet. The rotation lengths for individual basins were selected to maximize the opportunities to provide owl and murrelet habitat, given the current stand conditions. In the context of the forest-wide landscape, the assignment of rotation lengths to basins was planned to reduce forest fragmentation over time. In the context of the regional landscape, the assignment of rotation lengths to basins was planned to ensure long-term habitat connectivity to surrounding federal and private lands.

Management basins with rotation lengths of 80 and 135 years will produce a broad array of habitat conditions, with an emphasis on the objectives listed below.

- Maintaining dispersal habitat for northern spotted owls
- Maintaining biodiversity for early to mid-seral species

The early to mid-length rotation basins will have a total of 41,696 acres.

Management basins with rotation lengths of 160, 200, and 240 years will emphasize the objectives listed below.

- Creation of late successional forest conditions recognized as important for spotted owl NRF habitat
- Development of potential nest sites for marbled murrelets
- Protection of biodiversity for mid to late seral species

The Elliott will have 17,794 acres with a rotation length of 240 years; 19,001 acres with a rotation length of 200 years; and 14,363 acres with a rotation length of 160 years. Currently, only a small amount of the Elliott is late successional forest. When the strategy is fully implemented, a total of 51,158 acres, or 55% of the Elliott, will be in late successional forest as a result of the long rotations. The Elliott will also have 8,089 acres of reserves within short rotation basins. The total for all late successional forest on the Elliott will be 59,247 acres, or 64% of the forest, when the strategy is fully implemented.

Long rotation basins provide an important basis for mitigation for marbled murrelets and spotted owls. Little or no harvest is planned in basins 1-8 and 17 for the first three

decades. The restriction of harvest in the long rotation basins will allow murrelet nesting habitat to increase over the next 30 years from 25,174 acres to 28,373 acres. The result will be a greater consolidation of nesting habitat than currently exists on the Elliott and blocks of potential nesting habitat will increase. Also, superior habitat (stands 156+ years old) will begin to develop in these basins after 30 years, and will dramatically increase with time.

B. Reserve Areas

The reserve areas include 18,060 acres in HCAs, riparian reserves, and other areas designated for a variety of non-timber production goals. Additional acres will be managed as Marbled Murrelet Management Areas. The reserve areas will develop into late successional forest, with an emphasis on the objectives listed below.

- Provide corridors of late successional forest between similar habitat units
- Act as refugia or dissemination points for elements of biodiversity into less developed forest habitat
- Create superior late successional habitat areas

In the long term, these reserve areas will provide high quality nesting habitat for both spotted owls and marbled murrelets, to aid recovery of the species. Owls will benefit from the connectivity with late successional stands both within and outside the Elliott State Forest. Late successional forest corridors allow spotted owls to forage successfully, protected from predation. The three types of reserves are discussed in more detail under C, D, and E below.

C. Habitat Conservancy Areas (HCAs)

Habitat conservancy areas are established on the Elliott in all 17 management basins, as described earlier in this chapter and shown in Table IV-1. The HCAs will supplement managed forests and provide refugia for species inherent in late successional forests. The species using the HCAs can then disseminate to other areas (Franklin and Forman 1987).

The current average age of stands inside the HCAs is 112 years old. Limited management activities will be allowed within the HCAs, primarily with the intent of hastening development of late successional characteristics. The HCAs have been designed specifically to protect sensitive wildlife habitat areas, such as T&E species sites or fisheries areas, or areas that can become high value areas. The objective for the HCAs is to provide late successional forest in discrete portions across the Elliott.

The criteria used to select the HCAs are listed below.

1. Size and shape of candidate areas.
2. Spotted owl occupancy or marbled murrelet occupied behavior.
3. Presence of interior forest conditions.
4. Risk of loss due to fire, wind, or other natural hazards.
5. Absence or low level of disturbance such as campgrounds, roads, etc.
6. Thin or poor quality soils.

7. Proximity to other reserve areas.

The HCAs are distributed across the forest, with some HCA acreage located in each management basin. They are permanent and in fixed locations. The acreage in the HCAs varies by basin, ranging from 3-25% of the basin. Total HCA acreage within the forest is 6,961 acres. The boundaries for the HCAs are located along recognizable features such as roads, adjacent unit boundaries, streams, or ridges.

No clearcut harvesting will be allowed in HCAs. Only limited forest management activities will be allowed, to meet other forest management needs, or by necessity because of management in adjacent stands. Activities in HCAs will be restricted to vehicle traffic on forest roads, wildfire suppression and control, reforestation, precommercial thinning, slash burning, application of herbicides, hand release, road construction, sales of special forest products, road maintenance, forage seeding, pruning, harvest unit guylines or tailholds, stream rehabilitation work, stream survey work, and animal survey work. Forest management activities in the HCAs will be done with the specific objective of improving the late successional character of the stands. Within HCAs, stands that do not contain spotted owl or marbled murrelet habitat may be thinned or treated with other silvicultural activities to create late successional stands. It is generally recognized that enhancement of late successional forests benefits most when management is conducted early in stand development (Tappeiner et al. 1992). Thus, thinning treatments will be restricted to stands 0-80 years old, with an emphasis on stands less than 40 years old.

D. Riparian Reserves

Late successional forests will be retained along fish-bearing and perennial non-fish-bearing streams, as part of the forest's riparian strategy (Table IV-2). The riparian reserves will be between 50 and 100 feet wide along each side of the streams. These reserves will provide streamside protection, contribute to aquatic-dependent species protection, and act as linkages of older forest structures between and within management basins and HCAs. Approximately 5,889 acres are in no harvest riparian reserves.

E. Other Reserves

Late successional habitat is managed within the Elliott State Forest in areas where the primary objective is not timber harvest. Examples are scenic and protective conservancy, noncommercial forest, and some additional classifications. The Elliott has a total of 5,667 acres in these non-timber land use classifications; 457 of these acres are in HCAs.

All reserves combined total 18,060 acres, or 19% of the Elliott State Forest. The map on the following page shows where the reserve areas are located on the Elliott State Forest.

F. Habitat Management Specific to Spotted Owls

A 70 acre core area will be retained for the next five years around all northern spotted owl activity centers identified by field surveys conducted up until the submission of this plan. The core areas will provide an opportunity for the owls to relocate to more suitable areas on the forest or surrounding forest lands. As part of the measures to minimize take, ODF will provide these owl nests with protection from loud or disruptive activities, such as timber harvest and road construction, within 0.25 miles of the nest from March 1 to September 30 to protect nesting adults and their young.

Over time, 12-66% of each management basin will be maintained as suitable spotted owl habitat (Table IV-1). Suitable habitat is defined as stands in the 80 year age class and older. Eventually, 39,781 acres, or 43% of the forest, will be maintained in nesting, roosting, and foraging habitat. Fragmentation of habitat blocks will be reduced.

Areas that have a high present value for spotted owls, or that can become high quality NRF habitat, are protected as habitat conservancy areas, previously described in the discussion on page IV-4 under the heading “Landscape Level.” These HCAs are situated in each management basin, and range from 3-25% of each basin. The HCAs will provide permanent late successional forest structure across the entire forest. In the long term, owl pairs successfully reproducing within these protected areas will produce young that can disperse to high quality habitat found on federal lands to the north, east, and to some extent to the south, of the Elliott.

Dispersal in animals can be defined as the relatively permanent movement of individuals from one location to another. Usually dispersal is the movement of juveniles from their natal area to a site where they eventually settle and breed (Thomas et al. 1990a). Dispersal habitat is important to the recovery of spotted owls, because breeding pairs will decline and suitable NRF habitat remain unoccupied unless juveniles or displaced adults have adequate habitat to allow movement between blocks of NRF habitat.

For this conservation strategy, a variation of the 50-11-40 rule (defined below) will be used to provide dispersal habitat for spotted owls. The variation is that 50-11-40 will be maintained by management basin rather than by quarter townships.

Dispersal habitat for spotted owls is defined as forest vegetation over 50% of a quarter township (or management basin in this alternative) with at least 40% canopy closure and an average stand diameter of 11 inches or more. This is known as the 50-11-40 rule. These conditions are generally met by stands in the 40 year age class and older. Currently there are 57,300 acres of this habitat, which is expected to increase to 70,000 acres by the year 2033, and then maintain that amount in the years after 2033. Figure IV-9 on the next page shows this trend graphically.

Currently all of the basins meet 50-11-40. All basins will maintain 50-11-40 throughout the 60 years. No harvesting will be allowed that reduces any basin below 50-11-40.

Figure IV-9. Northern Spotted Owl Dispersal Habitat

G. Marbled Murrelet Habitat Ranking Process

A series of decision steps, outlined below, will be used to minimize the risk of take for marbled murrelets as a result of timber harvest. These decision steps use a marbled murrelet habitat rating key, fully described in Appendix K, to allocate timber harvest into the lowest quality habitat, with the smallest risk of murrelet occupancy. This assessment of risk will be based upon the habitat characteristics of the site.

During the 6 year permit period for murrelets, the murrelet habitat rating key will be validated on the forest and modified as necessary. The validation procedures are described in Appendix K. Results of ODF-sponsored and other relevant research will contribute information toward assessment of the key. The process for modifying the murrelet habitat rating key is described in Step 3 of the habitat ranking process on page IV-37.

After 5 years, a comprehensive review of murrelet management will be jointly undertaken by the Department of Forestry and the U.S. Fish and Wildlife Service. This 5 year review will incorporate the results of scientific research done on the forest.

During the 6 year permit period, timber will be sold on a total of approximately 2,380 acres of stands in the 100 year age class or older that have not been surveyed for murrelets. This harvest will be selected from the 13,200 acres of 100+ stands in the short rotation basins. Based upon past survey work on the forest, approximately 33% of this potential habitat may be occupied by murrelets. The following habitat ranking process will be used to protect high quality murrelet habitat and prioritize stands for harvest that have the least likelihood of murrelet occupancy.

Step 1: Strategic Decisions

- Sites with occupied behavior determined through 1994 will be protected.
- Harvest of potentially suitable habitat will be restricted to the shorter rotation management basins (rotation ages 80 and 135 years).
- Sales of unsurveyed potential habitat sold through the year 2001 will use the decision steps outlined below and will be allowed to proceed until the contracts are completed.
- Any sites determined to be occupied after 1994 will be evaluated for protection by the Department of Forestry in consultation with the Oregon Department of Fish and Wildlife and the U.S. Fish and Wildlife Service.

Step 2: Implementation -- Timber Harvesting Decisions

- Habitat ranking surveys
- Further assessment of site quality

Habitat ranking surveys — All sites will be field surveyed and rated as either high, medium, or low quality murrelet habitat, based on the habitat rating key in Appendix K. The following stand characteristics will be surveyed.

— Multi-storied canopies

- Remnant trees
- Deformed trees or large limbs
- Number of potential nesting platforms
- Live crown ratio
- Gaps in the stand

Approximately 60 acre segments established on the basis of topography (slope aspect, ridge lines, drainage bottoms) will be used as the basic unit for determination of habitat quality. Each segment of the site will be rated as either high, medium, or low quality habitat for the stand characteristics listed above. Initial habitat criteria are found in Appendix K, Marbled Murrelet Habitat Rating Key. Based upon future research activities, the Oregon Department of Forestry, U.S. Fish and Wildlife Service, and the Oregon Department of Fish and Wildlife may revise or add to these criteria in the future.

Sites that are rated as having either high or medium quality habitat will be further evaluated as described below. Sites rated as having low quality habitat will be assumed to have low potential for murrelet occupancy, and will be placed in a pool that can be released for timber harvest.

Further assessment of site quality — In any given management basin, timber harvest will be deferred in sites that are rated as having either high or medium quality habitat, until all sites previously released are harvested. The Service recognizes that ODF’s ability to harvest all low quality habitat first in the 13,200 acre pool is limited by operational constraints such as limitations on clearcut size, green-up requirements, water quality concerns, etc. The intent, however, is that low quality habitat will be harvested prior to harvesting medium quality habitat, to the extent practicable. Likewise, within operational constraints, high quality habitat will not be harvested until low and medium quality habitat is gone. To minimize the risk of take, harvest of medium and high quality sites will be prioritized by the following rules.

- Harvest all medium quality habitat before harvesting high quality habitat.
- The smallest, most isolated patches of habitat that have little or no protection of potential nest sites will be harvested first. This habitat is assumed to provide little long-term benefit for marbled murrelets because of the high risk from predation.
- The highest quality, largest blocks of potentially suitable habitat will be deferred until last.
- Timber harvest will be planned to minimize fragmentation, as shown in the maps following page IV-21, in order to keep potentially suitable habitat in larger blocks.
- Minimization of forest fragmentation will be done by:
 - Harvest of small patches
 - Group harvest where possible, while complying with Forest Practices Act rules
 - No clearcut harvest in HCAs
 - No new clearcut harvest sales in long rotation basins for the first 6 years.

Step 3: Linking Research, Adaptive Management, and Re-evaluation

Possible impacts to marbled murrelets will be reduced even further by the procedures in Step 3, which link research to adaptive management and re-evaluation of the plan. These procedures are listed below.

- Research will focus on the relationship between habitat characteristics on the Elliott State Forest and murrelet occupancy. Stand characteristics to be studied include live crown ratio, canopy closure, stand variability, relative density, potential flight paths from the ocean, and nest platforms.
- Adaptive management on the Elliott will incorporate this evolving information base, from ODF research as well as other sources. Accurate data on murrelet habitat quality will enable ODF and other landowners to designate the best habitat for protection, and to enhance existing stands to make them more suitable for murrelet nesting.
- Forest management activities will be formally evaluated to further minimize and mitigate potential incidental take of marbled murrelets proposed in this Habitat Conservation Plan. If new information determines that current efforts are inadequate, then modifications to the plan can be effectively implemented as soon as the information becomes available. Modifications to the plan may also be appropriate if research indicates the efforts are overly restrictive, relative to the identified benefits to murrelets.
- It is intended that the murrelet habitat rating key will be validated and modified as necessary. The validation procedures are described in Appendix K. In the event of disagreement between USFWS and ODF regarding the results of validation tests or questions of murrelet habitat or biology, the situation will be reviewed by a group of independent experts agreeable to the two agencies. This group will prepare recommendations regarding validity of the rating key and, if necessary, changes to improve the key.
- ODF prepares timber sale plans for each July 1 through June 30 fiscal year. Fiscal years are designated based on the second year of the fiscal year period (i.e., the 1996 Timber Sale Plan covers the period July 1, 1995 to June 30, 1996). Changes to the murrelet habitat rating key will be coordinated with the timber sale planning process as follows:
 - ◇ Harvest units in the 1995 and 1996 sale plans (until June 30, 1996) will be surveyed to protocol with no murrelet occupancy. The habitat ranking key will not be used to rate habitat until January, 1996.
 - ◇ Harvest units for the 1997 Timber Sale Plan will be selected and will proceed based on the murrelet habitat rating key in effect on January 1, 1996. If changes are made to the key prior to January 1, 1996, the revised key will be used to select harvest units for the 1997 Timber Sale Plan.
 - ◇ Harvest units for future timber sale plans will be selected and will proceed based on the murrelet habitat rating key in effect on the January 1 prior to the beginning of the sale plan year.

In summary, changes made to the murrelet habitat rating key apply only to harvest units selected for timber sale plans prepared after the changes are made. Changes will not apply to sold sales or to already approved sale plans.

2. Habitat Enhancement

Introduction

Habitat enhancement will be conducted at the stand level to accelerate the development of spotted owl NRF habitat and murrelet nesting habitat. Silvicultural techniques will be used to achieve the desired stand conditions, which include multi-layered canopies, mixed species composition dominated by large trees, numerous large snags, large trees with abnormal limbs or cavities for murrelet nesting platforms, and large logs and other woody debris on the ground to provide habitat for the spotted owl's prey base. The silvicultural techniques that will be used are described in detail below and on the following pages.

A. Reforestation

Successful reforestation of final harvest and rehabilitation areas is the first step in producing future dispersal and NRF habitat for spotted owls, and future nesting habitat for marbled murrelets. Good reforestation includes site preparation, planting, interplanting, animal damage protection, and vegetation management. Reforestation is successful when a healthy young stand of conifers is established, and the conifers are able to grow above the shrub layer.

Reforestation is an important element in any conservation strategy, because it ensures the continued growth and harvest of forest stands. The Department of Forestry is committed to regenerating forests that are diverse in age and structure; that use tree species well-adapted to the site; that use genetically improved planting stock to conserve genetic resources for commercial tree species; and that maintain forest health by planting trees that are resistant to disease in areas infected with *Phellinus weirii* (an infectious root disease).

Reforestation on the Elliott is expensive and difficult because the profuse growth of brush can suppress seedlings. Coos District foresters have developed successful prescriptions for reforestation and maintenance of plantations. Forest plan targets are for 90% of any areas to be stocked (usually with conifers, except for hardwood sites), and for tree per acre densities to be in the 250-435 tree per acre range.

B. Thinning

Precommercial thinning — Precommercial thinning is planned for an average of 1,000 acres per year for the first ten years of the plan, in stands less than 20 years old, when the stand has significant acreage where tree densities exceed 275 trees per acre. As mentioned in the discussion under the heading “Landscape Level” on page IV-4, management early in stand development is most effective in creating late successional characteristics that will produce high quality nesting habitat for both spotted owls and murrelets. Precommercial thinning helps to achieve the goals for a stand in less time. It creates space for the trees to grow faster than they would if the stand was left in a natural condition. Precommercial thinning also enables the forester to select trees based on dominance and species, to create the desired stand diversity. Precommercial thinning’s effect on a stand’s mean annual volume increment varies, depending on the prescription used for tree spacing and rotation length.

Commercial thinning and partial cutting — As trees grow, they require increasing amounts of water, light, and nutrients, resulting in competition between the trees for limited resources. This competition can leave trees and stands in poor health and form. A crowded stand also shades out understory brush and trees, leaving little or no understory vegetation for wildlife use.

Commercial thinning is the sale and removal of a portion of the trees from a stand in order to achieve a variety of objectives. Thinning objectives include maintaining the growth and health of retained trees; providing for the establishment of other plant species including shade-tolerant conifers; creating more natural conditions in plantations; and shortening the length of time necessary for a stand to attain late successional conditions.

Partial cutting contributes to the development of owl and murrelet habitat in several ways: (1) maintains rapid tree diameter growth; (2) encourages the establishment of understory vegetation to help provide a food base for spotted owl prey; and (3) develops large tree limbs suitable for marbled murrelet nesting platforms. Commercial thinning is planned for a minimum of 500 acres per year on the Elliott for the first ten years of the plan.

C. Green Tree Retention

The practice of green tree retention is to leave trees standing within or adjacent to sale units, in order to provide habitat for a variety of species and to aid in the development of multi-story canopy stands that can be used by northern spotted owls and other cavity-nesting birds. Green tree retention can also be used to enhance stream habitat protection and development. Green tree retention is provided for in all sales, as specified in the Forest Practices Act.

In timber sales, three or more trees per acre harvested are planned to be left standing. This level of retention provides for complex, uneven-aged systems because of the reserved trees. A wide diversity of retention can be prescribed between sales and within sales for overall stand structure and landscape diversity. Higher levels of retention would be specified on

areas that may be more sensitive to disturbance and where high levels of retention do not create operational problems for timber harvest.

To provide for accelerated production of murrelet habitat, selected trees will emphasize damaged or deformed trees that have a higher likelihood of providing nesting platforms. To be most effective, these trees will be left in clumps. Existing clumps of diverse tree species would be favored for retention during thinning and regeneration harvesting activities. When the new plantation reaches 50-60 years old, it will provide buffering habitat for the residual trees left from the harvest. The buffering habitat will reduce edge effect and thus improve the quality of the potential nesting habitat. When edge is reduced, the opportunity for predation of the nest or young birds is also reduced.

D. Snag Creation and Retention

Snags provide habitat for a variety of woodpeckers and cavity-nesting bird species and are associated with optimal spotted owl habitat. Remnant snags within the stand are not required to be felled, but felling is permitted if required to comply with safety regulations or otherwise avoid risk to workers. Most of these snags are left from the 1868 fire and have limited use for bird species. Snags will be created within most sale units from retained green trees over 20 inches DBH, by removing tops through blasting or sawing after harvesting operations are finished.

In timber sales, one-half to three snags per acre would be created or retained. Snags will be spread across the unit to the extent feasible while avoiding operational problems.

E. Downed Wood Retention and Creation

This practice refers to leaving logs on the ground that might otherwise have commercial value and be removed during harvest. Down logs are left in order to provide habitat structural components for wildlife species and to help maintain organic matter that contributes to long-term soil productivity. The minimum size of retained logs is 12 inches diameter on the large end and 16 feet in length. Significant volumes of smaller logs and pieces will remain on the unit to add to organic matter retention.

In timber sales, three to six down logs per acre are left scattered in the unit.

F. Group Selection of Mature Trees

Group selection harvesting is the partial cutting of a stand by the removal of small clumps of trees. The harvested areas range from 0.5-2.0 acres, and create an uneven-aged stand structure. Tree species that are not shade-tolerant regenerate better under this system than in thinned stands. The group selection harvest adds diversity to stand structures and would help promote such desired stand conditions as multi-layered canopies and mixed species composition. Group selection can also be used to remove tree clumps infected with laminated root rot, which may result in larger harvest patches. Group selection would be used in conjunction with thinning operations, and periodically during extended rotations. The testing of the group selection method has just been initiated on Oregon State University's MacDonald Forest by John Tappeiner, et al. If this method is used on the

Elliott, it should be done initially on a small trial basis until we gather enough data and experience to decide that it is appropriate to apply the practice operationally.

In the later stages of long rotations, group selection may be used to further develop stand structure. Group selection areas might be seeded for forage when feasible, and underplanted with primarily shade-tolerant species. In some cases, Douglas-fir planting would be successful in portions of larger group selection units.

G. Timber Sale Planning

Under the conservation strategy, the guidelines below will be followed in annual timber sale planning to help minimize harvesting's potential impacts on habitat for T&E species.

- After the Elliott State Forest Management Plan is adopted, an action plan will be developed to identify potential areas for harvest. An important component of this plan will be implementation of the procedures to minimize marbled murrelet habitat loss, as described under “Marbled Murrelet Habitat Ranking Process” on page IV-36.
- The action plan will identify opportunities to maintain or enhance habitat for other fish and wildlife species.
- Harvest units will be located to minimize fragmentation of larger blocks of mature forest. As an example, units will be located on the edge of fragmented blocks, rather than in the middle of suitable habitat.
- Harvest scheduling will defer stands that meet the following criteria as long as suitable substitute areas are available.
 - Stands with spotted owl occupancy.
 - Stands in the 100 year age class or older that meet medium to high quality habitat standards for marbled murrelet nesting habitat.
 - Stands closest to high quality marbled murrelet potential nesting habitat, northern spotted owl activity centers, and HCAs.

3. Continuing Surveys and Studies

A. Spotted Owl Research

Surveys for northern spotted owls have been done on state forest lands since 1990. The surveys have identified substantial numbers of northern spotted owls in second growth “managed” forests.

The Oregon Department of Forestry is sponsoring research to understand better the managed forest conditions that support healthy spotted owl populations. The goal is to develop and implement silvicultural prescriptions that will provide for sustainable populations of owls and a continuous supply of timber.

Phase 1 — Phase 1 involves a demographic study of owls in northwest Oregon (Jewell area) and the Elliott State Forest to evaluate if populations (or groups) are sustaining. This work was initiated in 1993 and is being conducted by the Oregon Coop Wildlife Research Unit (OCWRU), in addition to timber sale-related surveys. It is expected that a four-year time period will be needed to complete the demographic work. A prey base analysis is being conducted concurrently with the demographic work.

Using radio telemetry to monitor owls, researchers will identify the nesting, roosting, and foraging habitats used by owls that have demonstrated acceptable reproductive performance. The researchers will then determine the physical characteristics of the forest stands and landscapes used by the radio-tagged owls.

From this work, researchers can define the types of habitats that are necessary to support healthy populations of spotted owls on the Elliott State Forest. The research will also involve a “retrospective” look at how past management practices have influenced forest conditions. The ORGANON forest growth simulator will be used to model forest development.

Phase 2 — Based on the landscape descriptions and stand attributes defined in Phase 1, silvicultural prescriptions will be developed and implemented. It will be necessary to monitor owl populations, habitat development, and levels of timber production over time. An adaptive management approach will be used, adjusting prescriptions and strategies in response to new information.

Time period — A four-year time period will be needed to complete the demographic study. One year is currently planned for the radio telemetry work. A two to five-year time period is expected for the development and implementation of silvicultural strategies. Monitoring will continue over time.

Cooperative approach — All data will be compatible with existing research work by OCWRU, the Bureau of Land Management, the U.S. Forest Service, and the National Council of the Paper Industry for Air and Stream Improvement (NCASI). The prospectus and study plans for this project were developed with the cooperation of the above

organizations and the Oregon Department of Fish and Wildlife. The Forest Service did not participate in the development of this project. Much of the data collected on state lands will function as a subset of information for other research efforts by NCASI, BLM, USFS, etc. There are no other direct cost-sharing participants at this time.

Results — This study, in conjunction with other related research, should provide valuable information for long range planning for state forest lands, especially in planning that aims to provide habitat for threatened and endangered species while maintaining revenues from timber management.

B. Marbled Murrelet Research

The current level of biological research dealing with marbled murrelets is inadequate to address important forest management decisions affecting the species. Additional information is essential to allow state and private landowners to assist with murrelet conservation efforts. For this reason, the Department of Forestry proposes a five-year research program to address outstanding research questions as part of its measures to minimize and mitigate the risk of take of marbled murrelets.

The overall objective of the proposed program is to enable the Department of Forestry and other forest land managers to contribute to the conservation and recovery of the species through a better understanding of how to meet murrelet habitat requirements. Research results will be integrated into the five year review described under “Monitoring” on page IV-45, and will form part of the adaptive management strategy undertaken during implementation of the habitat conservation plan.

The Oregon Department of Forestry has compiled extensive murrelet survey information throughout the state. This work provides a foundation of information that can be used for more directed research on the Elliott State Forest. Research conducted under this habitat conservation plan will be in lieu of current survey work. The Department believes that recommitment of survey money to research will benefit the conservation of marbled murrelets to a greater degree than continued survey work. Through additional research, information will be developed to enable the Department and forest landowners to provide more and significantly better quality habitat for murrelets into the future.

Research will be tailored to provide answers to key questions that apply to management of the Elliott State Forest and more generally central Oregon coastal forests. The research plan will be developed in conjunction with other research organizations and specialists, to maximize the benefits to the species, ensure validity of results, and contribute to other ongoing research projects. The Department of Forestry will obtain the concurrence of the Service on the research program and on any changes to the habitat ranking key prior to implementation. The following are examples of questions pertaining to the Elliott.

1. Do certain stand characteristics reliably correlate with murrelet occupancy of stands? Stand characteristics of interest include live crown ratio, canopy closure, stand variability, relative density, potential flight paths from the ocean, and nest platforms.

2. What is the relationship between habitat characteristics and successful nesting, including predation rates? Habitat features include stand size, or some measure of fragmentation of the forest.
3. Does aerial photo analysis provide sufficient data to prioritize murrelet habitat quality, as tested by field habitat surveys and murrelet surveys?
4. Which habitat characteristics are key for murrelet reproductive success?
5. What silvicultural and management activities provide the best quality habitat for marbled murrelets?

Marbled murrelets in Oregon nest exclusively in large trees in forests with old growth characteristics, and they depend on this habitat for survival. It has been questioned whether existing older forests are sufficient to allow continued survival of the species, and whether stands currently being used contain characteristics needed for successful fledging of young. For example, some biologists are concerned that predatory birds common to fragmented forest habitats are taking substantial numbers of young murrelets. The goal of the Elliott State Forest Habitat Conservation Plan is to minimize the risk of take of murrelets and to enhance and preserve high quality habitat. Answers to the research questions above will allow the Department to identify, conserve, and enhance high quality murrelet nesting habitat and contribute to the survival and recovery of the species.

The Department of Forestry will cooperate with the U.S. Fish and Wildlife Service, the Oregon Department of Fish and Wildlife, Oregon State University, and other research organizations and specialists to develop a comprehensive and coordinated research design.

Over the next five years, the Department of Forestry intends to spend \$500,000 on murrelet research, comparable to the amount spent on surveys of the Elliott to date. Funding will be significantly leveraged if other parties that have an interest in similar or related questions about this species can contribute time, expertise, and finances. The Department will actively work with potential cooperators to maximize research benefits in terms of money available for research, and consistency of research methodology. A further review of appropriate and necessary fund levels will be made after development of the research design and discussions with other potential cooperators.

The research plan will be developed during the first part of 1995 or within six months of issuance of the permit, in conjunction with research organizations. Data collection about habitat requirements was initiated in mid-1994. Research planned for 1995 will address questions about nest site characteristics and stand characteristics, protection standards, predation, and identification of factors dictating forest use from a landscape perspective (flight corridors, topographic influences, etc.). The research will be designed to test hypotheses related to reproductive success. Our plan is to use contractual arrangements and cooperative agreements to accomplish this work.

C. Monitoring

Monitoring, in the context of the Elliott State Forest, is a process of measuring key characteristics of forest resources to determine the effects of carrying out management strategies. Monitoring helps us answer the question: “Are the management strategies we have implemented achieving our management goals for resource development and protection?” Monitoring strategies are described on the following pages.

Monitoring will be focused on key characteristics of key resources, or on data that is collected for other purposes. Unless otherwise noted, resource monitoring will be done by Coos District personnel, and results will be summarized annually.

Northern Spotted Owl

- Population surveys as part of the demographic study described under the heading “Spotted Owl Research” on page IV-42.
- Amounts and percentages of northern spotted owl dispersal habitat by management basin.
- Amounts and percentages of northern spotted owl nesting, roosting, and foraging habitat (age class 80+ conifer stands) by management basin.
- Amounts and types of northern spotted owl habitat enhancement activities by management basin.

Marbled Murrelet

- Amounts and quality of murrelet habitat (age class 100+ conifer stands) harvested.
- Amounts and percentages of marbled murrelet potential habitat (age class 100+ conifer stands) by management basin.
- Amounts and types of marbled murrelet habitat enhancement activities by management basin.
- Survey to define habitat characteristics — sample kinds and conditions to provide information for future management as per the murrelet research described on pages IV-43-44.

Annual Monitoring Report

Each year the Department of Forestry will prepare an annual monitoring report and submit it to U.S. Fish and Wildlife Service for review.

The report will:

- Specify actual known instances of owl death, injury or displacement over the preceding year, including the number of spotted owl sites impacted, the number of spotted owls displaced, and any inadvertent death or injury to individual owls that may have occurred.
- Specify acreage and location of owl habitat altered.
- Specify the acres and location of potential murrelet habitat harvested, and the quality ranking of those acres.

- Determine the acreage change in owl and murrelet habitat.
- Estimate the levels of possible murrelet and owl death, injury or displacement for the upcoming year.
- Estimate the current number of owl sites and murrelet-occupied sites, and the amount of habitat; and note any changes from the previous year.
- Include information listed under “C. Monitoring,” above, for the northern spotted owl and marbled murrelet.
- Report post-harvest estimates of snags and residual trees in timber harvest plans.
- Identify any corrective measures or other changes that may be necessary to improve the efficacy of the plan.

Annual research reports will be included.

Five-Year Comprehensive Review

To further ensure the efficacy of the conservation plan, the Department of Forestry proposes that a comprehensive review of the habitat conservation plan and incidental take permit conditions be conducted at the end of the first five years. The basis of the review will be: 1) for owls, to decide if changes are needed as a result of new information on the species, conservation needs and goals, and recovery plan information; and 2) for murrelets, to use new information from research to provide a new protection plan. This would entail a formal amendment to the habitat conservation plan and incidental take permit. In addition, the review will include the following items.

- All information included in the annual monitoring report.
- A comparison of actual and estimated levels of owl and murrelet death, injury or displacement.
- A comparison of actual and estimated distribution of owl and murrelet habitat.
- A re-evaluation of the biological basis for the conservation strategy, based on the data collected through the research program.
- An assessment of the continued need for the HCAs, and of the long-term viability of owl and murrelet populations on the Elliott State Forest.
- An estimate of possible owl death, injury or displacement for the remainder of the permit for spotted owls.
- Develop a new monitoring plan for duration of owl permit.

D. Adaptive Management

Adaptive management involves collecting new data, analyzing it, and adjusting management if necessary. Specifically, it involves taking input from monitoring activities and research, and incorporating this into ongoing planning and implementation efforts.

Adaptive management is based on the best available science, and involves a regular assessment of current management practices. This occurs through ongoing activities, research findings, and the yearly sale planning and budget cycles. For the Elliott, it will involve a partnership approach between district personnel, Salem headquarters staff, U.S. Fish and Wildlife Service, and the Oregon Department of Fish and Wildlife.

Any changes in the Elliott State Forest Management Plan that affect the listed species will require an amendment of the habitat conservation plan.

Information sources for adaptive management — Some information sources that will be used in the adaptive management approach are listed below.

- The “Retrospective Study” for owls described earlier in this chapter under “Spotted Owl Research.”
- The list of information to be collected for future plans in Appendix L of the Elliott State Forest Draft Management Plan.
- The monitoring information described earlier in this section.
- Ongoing research on the habitat needs of fish and wildlife species.
- Ongoing research into silvicultural practices.
- Genetic research carried out at the Schroeder Seed Orchard and/or the Forest.
- Information from marbled murrelet habitat surveys and ongoing marbled murrelet research findings.

Summary of Owl and Murrelet Minimization and Mitigation Package

- Long Rotation Basins. Long rotation basins (up to 240 years) will serve to reduce fragmentation and edge effects and will provide large, stable blocks of superior habitat for both owls and murrelets. Average target harvest age across all management basins will increase to 151 years, from an average stand age of 66 years today. This will have positive effects for all species that prefer late successional forest conditions.
- Reserve Areas. Total acreage in HCAs, other reserves, and riparian buffers is about 18,060 acres, or about 19% of the forest. These areas will provide high quality nesting habitat for murrelets and owls.

Habitat Conservancy Areas. HCAs (6,961 acres total) are located in all 17 management basins. HCAs have a high value for murrelets, owls, and fish, or can become high value areas. They are set aside to provide refugia for late successional species, to protect the biodiversity inherent in late successional forests. The current average age of stands inside HCAs is 112 years old. Limited management activities will be allowed within HCAs, to meet other forest management needs, or by necessity because of management in adjacent stands. Forest management activities, for example, thinning of 0-80 year old stands, will contribute to development of late successional characteristics. HCAs will be maintained during the 60 year permit period for owls, and will mitigate possible take for both owls and murrelets.

Other Reserves. Under the Conservation Plan, 5,210 acres are classified as scenic conservancy, protective conservancy, and noncommercial forest. These areas will also provide high quality, permanent habitat for owls and murrelets.

Riparian Protection. Wide riparian corridors, above Oregon Forest Practices Act requirements, will provide 5,889 acres of habitat or 7.3% of the “matrix” lands (productive commercial forest). Riparian buffers along streams within or adjacent to HCAs, other reserves, and long rotation basins will include superior habitat for murrelets and owls.

- Protection of Known Owl Activity Centers. A 70 acre core area will be retained for the first five years around owl activity centers identified prior to the submission of this plan, to allow time for the owls to relocate to more suitable areas.
- Owl Nesting, Roosting, and Foraging Habitat. Over time, 12-66% of each management basin will be maintained as NRF habitat for spotted owls (80+ year old stands). Eventually, 39,781 acres, or 43% of the forest, will be NRF habitat. This will reduce fragmentation and support nesting pairs on the forest.
- Owl Dispersal Habitat. All management basins now contain at least 50% dispersal habitat (40% canopy closure and average stand diameter of 11 inches or more), and will

be managed to provide 50% or more dispersal habitat throughout the next 60 years. Currently there are 57,300 acres of this habitat, which will increase to 70,000 acres by 2033. This will allow dispersal of young owls or displaced adults across the forest to adjacent federal late successional areas, to help maintain a healthy regional owl population.

- **Murrelet Habitat Ranking Procedure (Appendix K).** As described on pages IV-36-39, potential harvest sites will be field surveyed and rated as either high, medium, or low quality murrelet habitat, using the habitat rating key in Appendix K. Low quality sites will be assumed to have low potential for murrelet occupancy and will be released for harvest. Medium quality habitat will be harvested before high quality, and medium and high quality sites will be further assessed to harvest small, isolated patches first. Highest quality, largest blocks of potentially suitable habitat, and stands closest to such habitat, will be deferred until last. Timber harvest will be planned to minimize fragmentation. This process will ensure that habitat harvested will be relatively low quality, and therefore the risk of take will probably be low as well. It is expected that most harvested areas will not be occupied by murrelets. On-going research (see below) will guide habitat ranking and forest management to designate the best sites for protection, and to enhance stands to make them more suitable for murrelet nesting. The Department of Forestry will obtain the concurrence of the Service on the research program and on any changes to the habitat ranking key prior to implementation.
- **Marbled Murrelet Management Areas.** Murrelet-occupied sites identified in surveys from 1992-1994 have been designated as 31 Marbled Murrelet Management Areas (MMMA), totaling 5,320 acres. These areas will be managed under the Marbled Murrelet Management Plan for State Forest Lands (Department of Forestry 1994b) for the duration of the murrelet portion of the permit. No operations involving detrimental habitat modification will be carried out in an identified MMMA. Actions within 0.25 miles of an identified occupied stand which are likely to disrupt reproductive activities of marbled murrelets will be prohibited during the breeding season.
- **Habitat Enhancement for Both Owls and Murrelets.** Silvicultural techniques will be used to achieve stand conditions which include multi-layered canopies, mixed species composition dominated by large trees, numerous large snags, large trees with abnormal limbs or cavities for nests, and large logs and other woody debris to provide habitat for the spotted owl's prey. An adaptive management approach will be used, adjusting prescriptions and strategies in response to new information from ODF research (below) and other sources.
- **Spotted Owl Research.** ODF is conducting a five-year demographic study of owls in northwest Oregon and on the Elliott State Forest to evaluate reproductive performance. Radio telemetry will identify NRF habitats used by owls that have successfully raised young. Researchers will then determine the physical characteristics of the forest stands and landscapes used by these pairs. During Phase 2 of the research, silvicultural prescriptions will be developed and implemented to create and enhance NRF habitat.
- **Marbled Murrelet Research.** ODF is proposing a five-year research program to answer key questions that apply to management of the Elliott State Forest and central Oregon

coastal forests. The research plan will be developed in conjunction with other research organizations and specialists to maximize the benefits to the species, ensure validity, and contribute to other ongoing research projects. Data collection about habitat requirements was initiated in mid-1994. Research planned for 1995 will test hypotheses related to reproductive success, including nest site characteristics, predation, flight corridors, etc. ODF is committing \$500,000 in support of this research.

Table IV-5. Measures to Minimize and Mitigate Possible Incidental Take

Minimization Measures

- Protect many spotted owl and murrelet activity centers through creation of permanent reserves (HCAs).
- Protect known spotted owl activity centers outside reserves, as identified by field surveys conducted up to the submission of this plan, with 70 acre cores and 1/4 mile protection from disturbance during the breeding season for the first five years of plan implementation.
- Protect known marbled murrelet-occupied sites outside reserves in Marbled Murrelet Management Areas.
- Within 0.25 miles of an identified marbled murrelet occupied stand, prohibit actions likely to disrupt reproductive activities during the breeding season.
- Protect highest quality murrelet habitat by means of a habitat ranking key and a decision hierarchy that considers landscape context and biological requirements. Key will be validated before use, for sales after January 1996.
- Reduce habitat fragmentation through the location of individual timber sales.

Mitigation Measures

- Increase amount of superior habitat through development of long rotation basins. Reduce forest fragmentation through basin management.
- Create late successional forest conditions and connections between suitable habitat by establishing distributed reserve network consisting of HCAs, riparian buffers, and other reserve sites.
- Maintain regional connectivity among private and federal forests through reserves and 50% or more dispersal habitat in each management basin.
- Create and accelerate development of suitable habitat characteristics for both owls and murrelets through silvicultural techniques, using adaptive management guided by ongoing monitoring and research.
- Conduct demographic research on northern spotted owls on the Elliott State Forest and northwest Oregon.
- Commit \$500,000 toward marbled murrelet research in conjunction with other research organizations to test hypotheses related to reproductive success in central Oregon coastal forests.

Implementation

This subsection describes who is responsible for implementing the conservation strategy, and how implementation will be carried out. The State and USFWS will sign an Implementation Agreement to legally bind the parties to their respective obligations under the HCP.

Responsibilities

The Coos District Manager has the overall responsibility for implementing the Forest Management Plan and the Habitat Conservation Plan. Implementation of the plans consists of carrying out the items listed below, determining when changes in strategies are needed, and amending the plan as needed.

- **Elliott State Forest Management Plan:**
Section V, “Management Strategies” — management strategies.
Section IX, “Monitoring and Adaptive Management” — monitoring management activities.
- **Elliott State Forest Habitat Conservation Plan:**
Section IV, “The Conservation Plan” — conservation strategy.
- **Implementation Agreement:**
The implementation agreement that accompanies the Habitat Conservation Plan.

Plan Scope

For the Elliott State Forest, the Forest Management Plan supersedes the Long Range Timber Management Plan for Southern Oregon Region State Forests (August 1987) and the Interim Stewardship Approach adopted in 1992. Until it is revised, the 1987 plan will continue to apply to Southern Oregon Region lands outside the Elliott State Forest.

Plan Duration

This habitat conservation plan (HCP) will be in effect until it is replaced by a new HCP, or until it is terminated in accordance with the provisions of the Implementing Agreement. It is intended that this HCP be flexible enough to endure significant changes in legal requirements and knowledge base. It is expected that this HCP will be in effect for 60 years, although the permit for incidental take of marbled murrelets allowing harvest of unsurveyed potential murrelet habitat is not in effect beyond 6 years.

Implementation Levels

Many of the management strategies require investments of capital. Some examples of these strategies are: reforestation, stand improvements (precommercial thinning, fertilization), habitat enhancement activities, recreation-related investments, and some monitoring activities.

The State Lands program is financially self-supporting (no general fund dollars), from sales of timber and special forest products; user fees; and gas, oil, and mineral leases. Funding for the implementation of the HCP and mitigation measures is assured, as described in Section H of the Implementation Agreement, since after it is signed by the Service and the State of Oregon, the HCP becomes a legally required activity.

Priorities for investment are generally as follows:

1. Legally required activities.
2. Activities with high economic return.
3. Activities with lower, but still acceptable economic return.
4. Activities with little or no economic return that the state carries out as a good steward of the land.

It is our belief that the categorical rankings will change from time to time as legal requirements change and resource prices fluctuate. Activities will be prioritized in the biennial and fiscal year budgeting processes initiated at the district level, and will be reviewed by the State Land Board, the Board of Forestry, and the Legislature as part of the approval process for the Department of Forestry's biennial budget.

Implementation through Other Plans

Implementation of the Elliott State Forest Management Plan will involve levels of planning that are more specific than the forest management plan. Other planning levels include basin plans, annual operations plans for timber sales and other silvicultural operations, biennial budgets, and fiscal year budgets. These more detailed levels of planning are described in Section I of the Elliott State Forest Management Plan, under the heading "Forest Management Planning for State Forests." The selected alternative and the resource strategies common to all alternatives will be used to develop the more detailed plans. A geographic information system (GIS) will be a valuable tool in implementation of the plan. Monitoring, research, and adaptive management will also be valuable tools; they are described in Section IX of the Elliott State Forest Management Plan.

Unforeseen Circumstances

Procedures used to address unforeseen circumstances are specified in the Implementation Agreement.