

Chapter 36

Status of Forest Habitat of the Marbled Murrelet

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Abstract: Marbled Murrelets (*Brachyramphus marmoratus*) have been shown to be dependant upon old-growth forests for nesting habitat. These forests have declined over the last century as they are cut for human use. This paper reviews the current status of old-growth forests along the west coast, in both the United States and Canada.

Marbled Murrelets (*Brachyramphus marmoratus*) are dependant upon forests for nesting habitat, particularly old-growth forests, as seen in several studies of murrelets along the west coasts of Washington, Oregon, and California (Grenier and Nelson, this volume; Hamer, this volume; Raphael and others, this volume; Miller and Ralph, this volume). Over the last century, the acreage of old-growth forests has declined as they are cut for human use. The impact of the loss of this habitat is discussed elsewhere in this volume (Divoky and Horton, this volume). In this paper, I gathered together the most current information on the acreage of old-growth forests remaining along the west coast of North America from various sources to indicate the current status of the nesting grounds of the Marbled Murrelet.

Washington, Oregon, California

Presently, the best information on area and distribution of forests that might provide suitable murrelet habitat in these states is provided by two sources: the Final Supplemental Environmental Impact Statement (FSEIS, USDA and USDI 1994) that updates the report of the Forest Ecosystem Assessment Management Team (FEMAT) (Thomas and Raphael 1993), which covers Federal lands in the three states; and unpublished data of Fox (pers. comm.), which covers the coastal redwood zone in California. Both studies used remote imagery to classify forests.

FEMAT, as updated in the FSEIS, documented the following amounts of murrelet nesting habitat on Federal lands, within the range of the species:

<i>Physiographic Province</i>	<i>Hectares</i>
<i>Washington</i>	
Olympic Peninsula:	246,260
Western lowlands:	0
Western Cascades:	146,945
Eastern Cascades:	2,670
Washington total:	395,875

Of the Washington total, 97 percent is in Late Successional Reserves, Adaptive Management Areas (AMA's), and Riparian Reserves.

<i>Physiographic Province</i>	<i>Hectares</i>
<i>Oregon</i>	
Coast Range:	16,600
Klamath:	211,530
Western Cascades:	450
Willamette Valley:	240
Oregon total:	228,820

Of the Oregon total, 88 percent is in Late Successional Reserves, AMA's, and Riparian Reserves.

<i>Physiographic Province</i>	<i>Hectares</i>
<i>California</i>	
FEMAT amounts	
Klamath:	238,800
Cascades:	0
Coast Range: (included in Fox's estimates below)	
California Coast Range (Fox, pers. comm.)	
Redwood National Park:	7,930
State Parks (within the boundaries of Redwood NP):	10,100
Other Ownerships:	74,940
Total:	92,970
California total:	331,770

Of the habitat in the Klamath province, 89 percent is in Late Successional Reserves, AMA's, and Riparian Reserves. Fox's unpublished data (pers. comm.) include both public and private lands. He classified old-growth as areas with at least 10 percent cover of trees greater than 24 in. (60 cm) d.b.h. This comprised 10.6 percent of total forest cover within Fox's study area. Of the area recorded by Fox, 18,030 ha are located in Redwood NP and State Parks (Hofstra, pers. comm.).

<i>Three State Total</i>	
Federal Lands:	1,036,625
State Parks in California Coast Range:	10,120
Private Lands in California Coast Range:	74,920

If Alternative 9 is implemented as described in the Final Supplemental EIS (USDA and others 1994), about 89 percent of current murrelet habitat on federal lands will be protected within Late Successional Reserves, Riparian Reserves, and Congressionally Reserved Areas. Of the remaining habitat

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with the matrix and AMA's (116,100 hectares), all suitable habitat contiguous with occupied sites will be protected from timber cutting, at least until final recommendations of the Marbled Murrelet Recovery Plan are in place. The FSEIS shows the extent of protection within each physiographic province in these three states.

At least two caveats go with these estimates. First, estimates are largely based on interpretations of satellite imagery that have not been thoroughly ground-truthed. Second, the estimates refer to quantity of habitat, not quality. Depending on proximity to the coast, landscape context, and size, a given stand may or may not provide quality murrelet habitat ("quality" habitat, as defined here, meets basic nesting requirements, provides refuge from predators, and is relatively stable against catastrophic disturbances). At this time, it is not possible to estimate the proportion of remaining habitat that could be considered of high enough quality to allow long-term nesting success.

FEMAT documents only Marbled Murrelet habitat on Federal lands. Very little murrelet habitat remains on private lands in Washington and Oregon. Some habitat exists on State lands, particularly on the Tillamook and Elliot State Forests in Oregon, which comprise areas burned over by wildfires in the early part of the century (see Raphael and others [this volume] for estimates of habitat on state lands in Washington). Murrelets are using these areas to some degree, however it is not possible at present to quantify amounts of suitable murrelet habitat on Oregon State Forest lands. The greatest value of these lands for murrelet conservation may be in providing habitat over the next several decades, while the large areas of young forests within Late Successional Old-Growth reserves delineated in Alternative 9 of the U.S. Administration plan for Spotted Owl habitat are maturing.

Significant amounts of habitat remain on private lands along the California coast. Unlike FEMAT estimates, however, Fox's estimates for the California Coast Range include all land ownerships.

Historic Habitat

The area of potential murrelet habitat has been significantly reduced in Washington, Oregon, and California during the 20th century. The first comprehensive survey of forests in western Oregon and Washington was conducted in the mid-1930s (Andrews and Cowlin 1940). At that time, old-growth Douglas-fir (*Pseudotsuga menziesii*), Sitka spruce (*Picea sitchensis*), and western hemlock (*Tsuga heterophylla*) covered 459,700 hectares in the Oregon Coast Range, and 1,314,650 hectares on the Olympic Peninsula and the Puget Sound region of Washington (generally within 60 miles [about 100 km] of Puget Sound). Old-growth Douglas-fir had been heavily logged prior to that inventory, especially in western Washington. Andrews and Cowlin (1940) report that "Puget Sound...was formerly surrounded by magnificent forests of old-growth Douglas-fir and western red cedar (*Thuja plicata*). Ease of logging and transportation attracted lumbermen to lands bordering the sound as early as the

middle of the nineteenth century. Grays Harbor and Willapa Bay, on the coast of western Washington, offered almost equally attractive opportunities for forest exploitation. Practically all the old-growth Douglas-fir forests of western Washington were within 30 to 40 miles (50–65 km) of navigable waterways. Now western Washington, particularly in the vicinity of Puget Sound and Grays Harbor, is characterized by vast expanses of cut-over land largely barren of conifer growth".

Old-growth harvest continued at a high rate following the 1930s survey, especially on private lands, but increasingly on public lands as well. In 1958, a period of relatively low production, 2 billion board feet (International 1/4 in. rule) (4.7 million m³) were harvested from private lands in western Washington, two-thirds of which was old-growth (Wall 1972). By 1970, annual harvest from private lands had nearly doubled to 3.8 billion board feet (9.0 million m³), 80 percent of which was old-growth. At the same time, harvest from public lands in western Washington was accelerating, increasing from about 0.5 billion board feet (1.2 million m³) in 1949 to 2 billion board feet (4.7 million m³) in 1970. Most or all of this was probably old-growth, although I do not have data to give exact figures.

While the situation in Oregon was somewhat different than in Washington, the basic results were the same—the amount of old-growth has been reduced. Large wildfires burned in the Oregon Coast Range in the mid-1800s and early 1900s; consequently historic old-growth in that region was less extensive than in western Washington. Teensma and others (1991) estimate that 200-year and older stands comprised from 40 to 50 percent of Coast Range forests between 1850 and 1920, and declined to 20 percent in 1940, following large fires in the Tillamook area. If we include stands between 100 and 200 years old, some of which are likely to provide suitable murrelet habitat, stands that are potential murrelet habitat increases the proportion to between 50 percent (1940) and 70 percent (1920) of total forest area in the Oregon Coast Range. The 1930s survey documented 581,950 hectares of old-growth Douglas-fir, western hemlock and Sitka spruce in the Coast Range, and an additional 307,550 hectares of "large second growth"—90- to 160-year-old stands growing on old burns, with trees approaching the size of old-growth. At the time of the 1930s survey between 228,600 and 364,000 hectares had been cut over in the Oregon Coast Range, most or all from old-growth. These values indicate that, prior to logging, 1 to 1.5 million hectares of suitable murrelet habitat existed in the Oregon Coast Range. This may be compared to the current 178,500 hectares identified by FEMAT and the FSEIS on Federal lands in the Coast Range. Except for uncertain amounts of habitat on the two State forests mentioned above, virtually all remaining habitat in the Oregon Coast Range is on Federal lands.

In California, a large proportion of forests within nesting radius of the coast are privately owned. Once dominated by old-growth redwood, these forests have been heavily cut over.

Alaska

Approximately 50–60 percent of forests suitable for murrelet nesting occurs on two National Forests (Tongass and Chugach), with the balance on State lands and lands held by various Native Corporations (Iverson, pers. comm.). At this time I have data only for the National Forests.

Tongass National Forest

It is estimated that on the Tongass National Forest the original old-growth, classified as “productive” stands (i.e., stands with volumes estimated to be greater than 8,000 board feet per acre), was approximately 5,600,000 acres. These stands were composed primarily of western hemlock, Sitka spruce, and mountain hemlock (USDA Forest Service, Alaska Region, 1991). A subset of the productive stands has been classified as “highly productive”, with volumes greater than 30,000 board feet per acre. On the Tongass National Forest, the original acreage of this subset consisted of about 933,000 acres. These stands have larger diameter trees, and thus probably more and larger lateral branches. More of these attributes would provide proportionally more high-quality murrelet nesting sites (Hamer and Nelson, this volume b). However, very few data are available on murrelet abundances and nesting habitat characteristics in southeast Alaska. At this time there is no direct evidence that highly productive stands are used to greater degree than those classified as productive in southeast Alaska. The results of Kuletz and others (in press, this volume) in Prince William Sound, Alaska, and Burger (this volume) in British Columbia do, however, indicate that high-density old-growth has characteristics associated with high murrelet use.

Since large scale commercial timber harvest began in the mid-1950's, harvest has largely occurred within the highly productive component. Approximately 350,000 acres of old-growth forest have been harvested through 1990 (USDA Forest Service, Alaska Region, 1991). Additional harvest from 1990 through 1994 has totaled 41,800 acres (M. Wilson, pers. comm.). Thus, an estimated 93 percent of the productive old-growth forests on the Tongass National Forest remains. However, only an estimated 58 percent of the highly productive forest remains. Indications are that forests in southeast Alaska held by Native corporations have and will continue to be extensively logged (C. Iverson, pers. comm.).

Chugach National Forest

Although a high proportion of productive forest lands on the Chugach National Forest is probably suitable nesting habitat (classed as mature and overmature timber), this represents a total area of only 101,200 hectares (USFS undated).

British Columbia

Data for British Columbia is being compiled and is not yet available. According to Beebe (1990), “preliminary estimates are that only 17 of the 124 coastal temperate rainforests of more than 20,000 hectares remain unlogged. On Vancouver Island, just six of 89 coastal watersheds of more than 5000 hectares remain unlogged.” Though illustrative, these estimates are minimally useful as they give no information on watershed size or the extent of logging within logged watersheds. Beebe (1990) goes on to estimate that “perhaps 30 percent” of the original coastal forest remains in British Columbia.

