# Endangered Species Act - Section 7 Consultation

# Biological Opinion

## Newport Municipal Airport Obstruction Removal
## Lincoln County, Oregon

**U.S. Fish and Wildlife Service Reference:**
**2022-F-0005**
**Project Code 2022-0032242**
**TS 22-380**

**Federal Action Agency:**
**Federal Aviation Administration**

**Consultation Conducted By:**

**U.S. Fish and Wildlife Service**
**Oregon Fish and Wildlife Office**
**Newport Field Office**

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# Contents

# INTRODUCTION

This document represents the U. S. Fish and Wildlife Service's (Service) Biological Opinion based on our review of the proposed Newport Municipal Airport Obstruction Removal project in Lincoln County, Oregon, and its effects on the marbled murrelet (*Brachyramphus marmoratus*), the northern spotted owl (*Strix occidentalis caurina*), and the coastal distinct population segment (DPS) of the Pacific marten (*Martes caurina;* hereafter "coastal marten"), in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et *seq.*). On January 7, 2022, we received your request for informal consultation and concurrence with your "not likely to adversely affect" finding by email. On February 7, 2022, we communicated via email our conclusion that based on the information in the Biological Assessment (BA) provided to us, we could not concur with your finding and indicated that formal consultation would likely be needed (see Consultation History, below). Based on additional information gathering and conversations between our staff, on February 24, 2022, the Service determined that a formal consultation would be required for the proposed project, as communicated in an email of that same date. We therefore consider formal consultation to have been initiated February 24, 2022.

This Biological Opinion is based on information provided in your Biological Assessment (BA) for the proposed project dated January 2022 (attached here as Appendix A), discussions with action agency staff and consultants, species experts, field visits and other information. A complete record of this consultation is on file at this office.

## Consultation History

Staff from the Service attended several public agency coordination meetings provided by the Federal Aviation Administration (FAA) and its consultant, Environmental Science Associates (ESA). These meetings presented an overview and progress updates for the proposed project and invited early agency input on conservation measures to avoid or minimize any potential negative impacts on any listed species that could be in the action area. These meetings were held on October 11, 2018; November 21, 2019, and September 29, 2021. The information provided at each of these meetings indicated that there were no known occurrences of marbled murrelet, northern spotted owl, or coastal marten within the action area of the project, therefore the FAA had made a preliminary "no effect" determination for each of these listed species. Based on this information, the Service was not anticipating the need for either informal or formal consultation on the project.

On November 30, 2021, the Service (Michele Zwartjes) received an email from ESA (Sarah Hartung) communicating that the preliminary effect determinations for the marbled murrelet and northern spotted owl had been changed from "no effect" to "may affect, not likely to adversely affect." This change was based on ESA learning that observations of marbled murrelets exhibiting behavior indicative of occupancy (breeding) had been made during surveys conducted in spring and summer 2021 on property within the project area owned by Weyerhauser (Parcel ID 12-11-05-00-00802-00). Consistent with Service protocol, as a result of this observation adjacent contiguous habitat within the study area is also considered occupied, which expanded the area of marbled murrelet occupancy to include lands owned by Steel String, Inc. (Parcel IDs 12-11-05-00-00803-00, 12-11-05-CB-00200-00, and 12-11-05-CB-00700-00). Because marbled murrelets and northern spotted owls may utilize forested habitats with similar structural

characteristics, presumed occupancy by the marbled murrelet similarly indicates potential occupancy by the northern spotted owl within the project area. On December 10, 2021, the Service acknowledged receipt of the communication.

Holiday schedules prevented further communications on the subject until subsequent to the Service's receipt of the FAA's request for informal consultation and concurrence with a determination of "may affect, not likely to adversely affect" for the marbled murrelet, northern spotted owl, and coastal marten, accompanied by the BA for the project, on January 7, 2022. Receipt of the BA and request for informal consultation was followed by further email exchanges and information gathering, documented in the record. Based on these exchanges, on February 7, 2022, the Service communicated via email that we could not concur with the "not likely to adversely affect" finding and that formal consultation would likely be needed; we additionally requested a site visit to visually assess the habitat in question.

On February 10, 2022, Michele Zwartjes of the Service and Sarah Hartung of ESA visited the Weyerhauser and Steel String parcels identified as occupied or contiguous/potential habitat and more specifically visited each area where obstruction trees are slated for removal on those properties. Based upon this visit, we determined that some of the large trees identified for removal display characteristics consistent with potential marbled murrelet nest trees (i.e., horizontal, large diameter branches high in the canopy and with sufficient cover to serve as nest platforms). We also determined that other trees with similar characteristics would remain in the area following the removal of individual obstruction trees, thus potential nest trees would remain after completion of the project.

On February 24, 2022, the Service communicated via email that formal consultation would be required, based upon our determination that the project may affect, and is likely to adversely affect, the marbled murrelet. At that time, we also requested a second site visit for the purposes of having an expert in spotted owl habitat assess the areas presumed to be occupied by the marbled murrelet. The Service had earlier understood that northern spotted owls had not been detected during surveys of the project area, but subsequently learned that northern spotted owl surveys conducted on the Weyerhauser property in 2021 had been terminated after that single season. Service protocol requires that two consecutive years of surveys be completed to assume the absence of northern spotted owls (Service 2012). The termination of surveys after a single year therefore cannot be relied upon to presume that northern spotted owls are not present.

On March 4, 2022, Michele Zwartjes and Kevin Maurice of the Service again visited both the Weyerhauser and Steel String properties. Visual assessment made during this site visit confirmed that the forested areas on these properties have characteristics of possible roosting and/or foraging habitat for the northern spotted owl, but there was no obvious nesting habitat present (i.e., decadent trees with cavities). Furthermore, this visit raised questions as to whether the relatively small size of the contiguous forested habitats available surrounded by younger second-growth and residential development would provide a sufficiently large area of habitat suitable to support resident spotted owls.

In an email to the FAA on March 14, 2022, the Service committed to completing a Biological Opinion on the proposed project no later than the end of April 2022.

### Service Determination and Concurrence

In the Opinion that follows, the Service concludes that the proposed action is likely to adversely affect the marbled murrelet, but that the adverse effects will not definitively rise to the level of incidental take of individuals of the species and will not jeopardize the species.

The Service concurs with the agency's determination in the BA (Appendix A, p. 14) that the subject action may affect, but is not likely to adversely affect, the northern spotted owl and coastal marten. The basis for these concurrence determinations is presented in Appendix B; these species are not discussed further in this Opinion.

There is no designated critical habitat for the marbled murrelet or northern spotted owl, and no proposed critical habitat for coastal marten, affected by the proposed project, therefore critical habitat is not further addressed within this Opinion.

# BIOLOGICAL OPINION

## DESCRIPTION OF THE PROPOSED ACTION

### Project Overview

A full description of the project is included in the BA, which is incorporated into this BO as Appendix A. Here we provide a brief summary of the project.

The Newport Municipal Airport (Airport) is proposing to remove tall vegetation (trees and shrubs/saplings) that pose obstructions to the FAA-regulated airspaces north and south of the Airport. Removing these obstructions will allow for a clear approach surface. The approach surface is critical in allowing aircraft to execute landings in a manner that is safe. The project would provide a clear 50:1 approach surface for Runway 16 for the first 10,000 feet (40:1 for an additional 40,000 feet), 34:1 approach surface for Runway 34, and 20:1 approach surface for Runway 20, in compliance with Federal Air Regulations Part 77. In total, approximately 63 acres of tall vegetation will be removed from the project area, which includes areas to the north and south of the Airport. In some cases contiguous vegetated areas will be cleared, but whenever possible single trees that act as obstructions will be removed individually from the surrounding forest matrix. The project is scheduled to take place beginning in 2022 and will continue through 2024.

Obstructing vegetation was identified for removal by Light Detection and Ranging (LiDAR) to identify tall trees penetrating the FAA-regulated airspace. As noted above, a total of approximately 63 acres has been identified for removal, affecting 32 separate tax lots north and south of the Airport. The Airport is located within the Newport City Limits in the South Beach Urban Renewal District, Lincoln County, Oregon. The Airport itself and properties where obstructions are proposed for removal are zoned as either Industrial, Public Structures, or High-Density Multi-Family. See Figures 1, 2, and 7 of the BA (Appendix A) for visual representations of the project area and the extent of trees proposed for removal.

Most of the vegetation identified for removal (60 acres) occurs within areas that are not considered suitable habitat for marbled murrelets, northern spotted owls, or coastal marten, as they are either developed, cleared, or highly fragmented areas of primarily young second-growth forest. In addition these areas are not considered potential suitable habitat due to lack of complex forest structure, lack of dense understory or multiple canopy layers, habitat fragmentation, and close proximity to human activity.

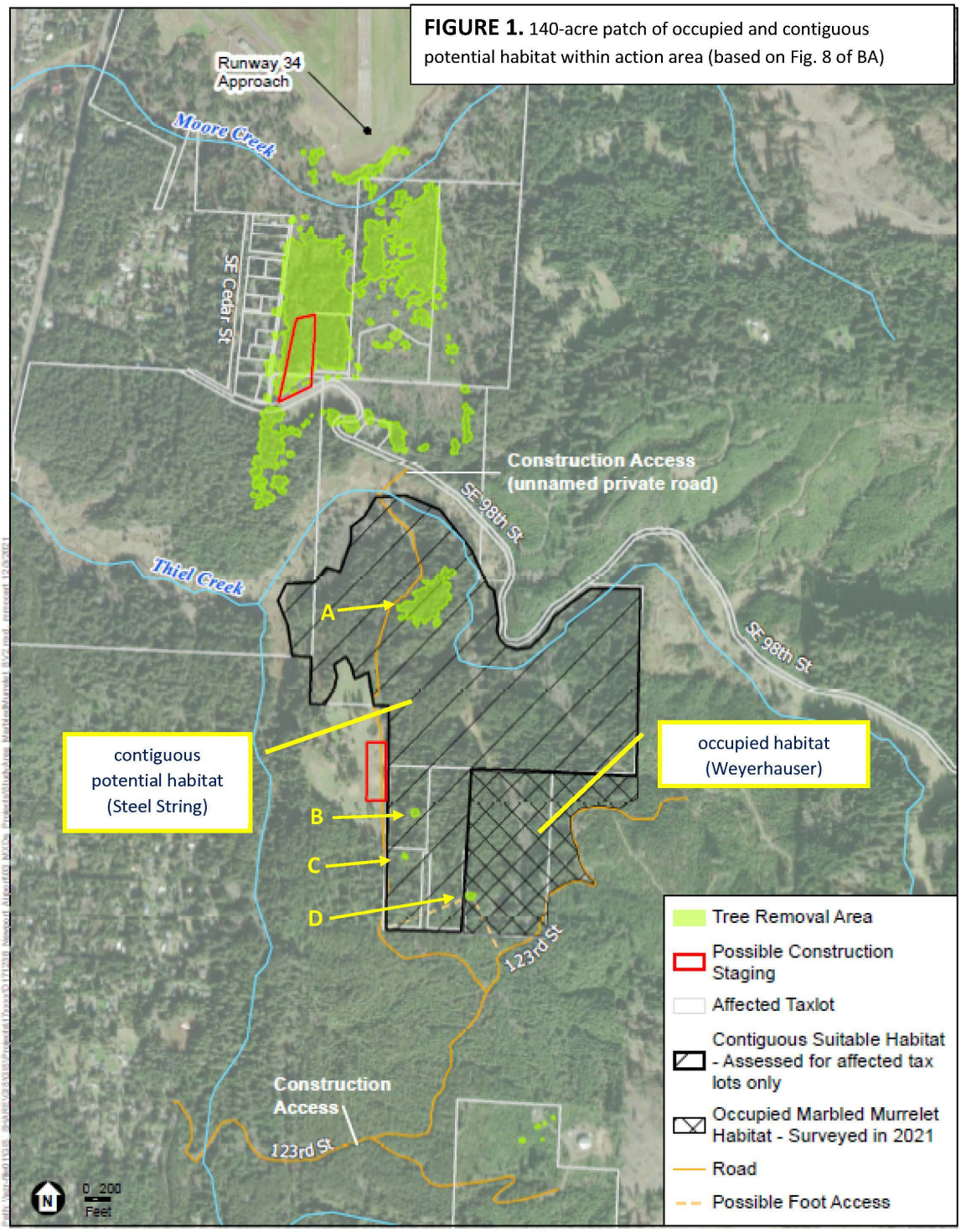
However, in summer 2021 surveys revealed marbled murrelets displaying behavior associated with breeding (flying at canopy height) that is considered indicative of occupancy in Parcel ID 12-11-05-00-00802-00, owned by Weyerhauser (Tag 22, Figure 5 of the BA, Appendix A; see also Figures 7 and 8). Adjacent contiguous forest that is similar in structure to known occupied habitat is also presumed to be occupied, thus adjacent forested habitat on property owned by Steel String, Inc. (Tags 17, 23, and 24 [Parcel IDs 12-11-05-00-00803-00; 12-11-05-CB-00200-00; and 12-11-05-CB-00700-00], Figure 5 of the BA, Appendix A) is also considered occupied/potential habitat. Collectively this area of occupied and potential habitat south of the Airport within the approach to Runway 34 represents a patch of forest approximately 140 acres in size and is separated from surrounding forest patches by residential areas, industrial timberlands, or meadows and clearings. We considered this 140-acre patch to provide occupied marbled murrelet habitat. Within this 140-acre patch, a total of approximately 3 acres of tall vegetation is slated for removal; most of this is in one contiguous patch of forest (approximately 2.55 acres) of potential habitat on Silver String property (Figure 1, Tree Removal Area A). In addition, there are a few individual trees separately identified for removal that occur both within the parcel where marbled murrelet occupied behaviors were observed on Weyerhauser lands (Figure 1, Tree Removal Area D) and in potential habitat on Silver String lands (Figure 1, Tree Removal Areas B and C). The 2.55-acre patch of forest that is slated for removal (Area A) appears to represent marginal habitat, as it exhibits little structural complexity, there were no observable suitable nest structures, the trees were too small to provide suitable nesting platforms, and the forest lacked multiple canopy layers (BA, Appendix A, p. 7; Zwartjes pers. obs.).

**Conservation Measures**

As described in the BA (Appendix A, pp. 3-4), the proposed project has been designed to implement the following conservation measures in an attempt to avoid or minimize potential impacts to any listed species that could be present:

- No tree removal is proposed in the 140-acre patch of occupied/contiguous habitat (as shown in Figures 7 and 8 from the BA, Appendix A) during the combined marbled murrelet, northern spotted owl, and coastal marten breeding/denning season (February 1 to September 15).
- Tree removal in occupied/contiguous habitat would be limited to daylight hours (i.e., not at dawn or dusk, when northern spotted owls, marbled murrelets, or coastal marten, if present, would most likely be active).
- Work areas are confined to the minimum area needed to complete the action; individual trees will be removed when possible, as opposed to wholesale clearing of vegetation.
- Staging will occur in existing disturbed areas already cleared of vegetation.

**FIGURE 1.** 140-acre patch of occupied and contiguous potential habitat within action area (based on Fig. 8 of BA)




SOURCE: ESRI, 2020; Weyerhaeuser, 2021; Precision Approach Engineering, 2019

Newport Airport Obstruction Removal Phase 2

**Tree removal areas within contiguous potential habitat**

A – 2.55 acres of forest to be cleared and replanted with shrubs

C – one to few individual trees to be removed

D – one to few individual trees to be removed

**Tree removal area within occupied habitat**

D – one to few individuals trees to be removed

- No new facilities, roads, or impervious surfaces are proposed as part of the project. Obstructions will be accessed from existing disturbed areas including paved and unpaved access roads and private roads as well as old logging roads and paths (see Figure 8 of the BA, Appendix A).
- Areas permanently disturbed (tree removal areas) will be restored following removal with native groundcover and shrubs.

**Action Area**

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment.

The action area in this case includes the project footprint (including construction access and staging areas) and areas within an approximately 825-foot (25-meter) radius of the project footprint that may be affected by construction noise (see Figure 2 of the BA, Appendix A). This distance is based on the disturbance distance for marbled murrelets or northern spotted owls from construction equipment generating "very high" sound levels, as described in the BA (pages 12-13, Appendix A).

## ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATIONS

**Jeopardy**

In accordance with regulation (see 84 FR 44976), the jeopardy determination in this Biological Opinion relies on the following four components:

1. The *Status of the Species*, which evaluates the species' current range-wide condition relative to its reproduction, numbers, and distribution; the factors responsible for that condition; its survival and recovery needs; and explains if the species' current range-wide population is likely to persist while retaining the potential for recovery or is not viable;

2. The *Environmental Baseline*, which evaluates the current condition of the species in the action area relative to its reproduction, numbers, and distribution absent the consequences of the proposed action; the factors responsible for that condition; and the relationship of the action area to the survival and recovery of the species;

3. The *Effects of the Action*, which evaluates all future consequences to the species that are reasonably certain to be caused by the proposed action, including the consequences of other activities that are caused by the proposed action, and how those impacts are likely to influence the survival and recovery role of the action area for the species; and

4. *Cumulative Effects*, which evaluates the consequences of future, non-Federal activities reasonably certain to occur in the action area on the species, and how those impacts are likely to influence the survival and recovery role of the action area for the species.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the consequences of the proposed Federal action in the context of the species' current rangewide status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild. The key to making this finding is clearly establishing the role of the action area in the conservation of the species as a whole, and how the effects of the proposed action, taken together with cumulative effects, are likely to alter that role and the continued existence (*i.e.*, survival) of the species.

## STATUS OF THE SPECIES

### Marbled Murrelet

The marbled murrelet was listed as a threatened species under the federal Endangered Species Act in Washington, Oregon, and California in 1992 (57 FR 45328; October 1, 1992). Subsequent reviews have reaffirmed the threatened status of the marbled murrelet, which is recognized as a Distinct Population Segment (DPS) in accordance with Service policy (e.g., see the 2019 5-year review for the species; USFWS 2019). The recovery plan for the marbled murrelet (.USFWS 1997) divides the range of the DPS into six conservation zones; the action area falls within Conservation Zone 3 (Oregon Coast Range Zone), which extends from the Columbia River south to North Bend, Coos County, Oregon. Conservation Zone 3 includes waters within 1.2 miles of the Pacific Ocean shoreline and extends inland a distance of up to 35 miles.

For a detailed description of the status of the marbled murrelet, we refer the reader to Appendix D of this document. Of particular relevance to this Biological Opinion is the characterization of suitable potential nest trees required by the marbled murrelet. In the terrestrial environment, the presence of platforms (large branches or deformities) used for nesting is the most important characteristic of nesting habitat. Habitat use during the breeding season is positively associated with the presence and abundance of mature and old-growth forests, large core areas of old-growth, low amounts of edge habitat, reduced habitat fragmentation, proximity to the marine environment, and forests that are increasing in stand age and height. A suitable nest tree is a coniferous tree, generally within 20 miles of the coast (up to 50 miles for older forest stands) with all of the following characteristics or trees functioning together to provide the following characteristics (based on averages derived from the marbled murrelet recovery plan, USFWS 1997):

- A diameter at breast height (DBH) of at least 19.1inches and a height greater than 107 feet (average DBH 65 inches);
- A nest platform at least 32.5 feet above the ground (average height of nest branch 138 feet) (a nest platform is a relatively flat surface 4 inches wide at a minimum, with nesting substrate (e.g., moss, epiphytes, duff) (average depth 1.2 inches), and an access route through the canopy that a murrelet could use to approach from below the nest and land on or near that platform; and
- A tree branch or foliage, either on the tree with potential structure or on an adjacent tree, which provides protective cover over the platform (average 78% cover within 28 to 39 inches of the platform)

Any tree that does not meet all of these criteria is unlikely to support nesting marbled murrelets.

## ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

### Current Condition of the Marbled Murrelet in the Action Area

There is relatively little suitable habitat for nesting marbled murrelets within the majority of the action area, which is highly fragmented and surrounded by residential areas and industrial timberlands. Most of the forest in this area is second-growth and lacks trees of sufficient size and structural complexity to provide suitable nest platforms for marbled murrelets (see description above for specific criteria that characterize potential nest trees). However, surveys conducted in 2021 on the Weyerhauser parcel (ID 12-11-05-00-00802-00) documented several instances of marbled murrelets flying above the canopy of this property between May and July 2021 (considered evidence only of birds traveling through the area), with one detection of a marbled murrelet flying at canopy height on July 1, 2021, which is considered behavior indicative of occupancy (breeding) (BA p. 1, Appendix A; Evans Mack et al. 2003, p. 22; S. Hartung, in litt. 2022). The Weyerhauser property comprises the southeast corner of the 140-acre occupied/contiguous patch of forest identified within the action area (Figure 1).

A site visit to the Weyerhauser property in February 2022 confirmed the presence of multiple tall, large trees, primarily Sitka spruce (*Picea sitchensis*), capable of providing suitable nest platforms with sufficient vegetative cover to constitute potential nest trees for marbled murrelets (Zwartjes, pers. obs.; see, e.g., Exhibit 6 of the BA, Appendix A). Nest trees and specific nest sites may be reused by marbled murrelets in subsequent years; rates of reuse of trees range from 11 to 18%, and specific nest sites range from an average of 6% up to 25 or 30% (Lorenz et al. 2019 and references therein, pp. 163-164). There are several such large coniferous trees distributed across the Weyerhauser property that provide potentially suitable nesting sites for marbled murrelets. One or possibly a few of these trees have been identified for removal as part of the proposed action (Figure 1, Tree Removal Area D)[1], but there are multiple trees with suitable nest platforms and habitat conditions that will remain on the landscape in this occupied parcel.

[1] The exact number of trees that will be removed is unknown at this time; LiDAR imaging identified an obstruction of a certain height in this area, but whether this is a single tree or may be two or three trees growing in close proximity to one another is unknown at this time and individual trees slated for removal have not yet been marked.

The contiguous forest that is presumed occupied or potential habitat adjacent to the Weyerhauser property is owned by Steel String. This contiguous patch of forest appears to provide only marginal habitat for marbled murrelets. None of the trees within the 2.55-acre area that is slated for removal (Figure 1, Area A) within this contiguous patch of forest appear to provide suitable nesting conditions for marbled murrelets (see Exhibit 5 of the BA, Appendix A). Larger coniferous trees that do provide potentially suitable nest platforms occur west of this patch, however, across the road and down the drainage from the 2.55-acre patch identified for removal. These trees will remain on the landscape and will not be affected by the proposed action. Most of this area is relatively fragmented by roads and there are clearings for buildings and residences within the Steel String property that increase accessibility to the forest interior for potential nest predators, resulting in reduced habitat quality for marbled murrelets. For example, the few individual large trees identified for removal on the Steel String parcels (Figure 1, Areas B and C), although they provide limbs large enough to serve as potential nest platforms, were very close to roads or cleared areas and had little in the way of protective horizontal or vertical vegetation that would obscure a nest, resulting in suboptimal potential nest sites that would be highly vulnerable to predators and thus would have very low probability of successful nesting.

In sum, although there were multiple observations of marbled murrelets flying over the Weyerhauser property within the action area, there was only a single observation of a marbled murrelet displaying occupied behavior (flying at canopy height) during surveys conducted in 2021. This was the first known observation of marbled murrelets in this area, and the number of marbled murrelets that may possibly nest here is unknown. The Weyerhauser property and some areas of the Steel String property appear to provide some trees with suitable nest sites for marbled murrelets. The proximity of the area to the ocean is highly favorable for marbled murrelets, as it reduces the energetic expenditure required of the birds for flights between foraging and nesting areas. However, with the exception of the Weyerhauser parcel, the majority of the forest within the action area appears to be of marginal quality for marbled murrelets and unlikely to support successful nesting. The forest in this area is primarily younger second-growth and highly fragmented such that any nest site that is not far from a forest edge is likely vulnerable to failure from predation.

In addition, as the action area is directly in the flight path of aircraft taking off and landing, the area is subject to disturbance from the engine noise of aircraft on a daily basis. The Airport supports an average of 55 aircraft operations a day, and services a variety of aircraft including both private and military airplanes, jets, helicopters, and various military aircraft (AirNav.com 2022). In particular, the area identified as occupied/contiguous habitat for marbled murrelets is below the flightpath for Runway 34 to the south of the Airport, and aircraft pass over this area at relatively low altitudes as they approach or depart the Airport, thus noise levels can be high.

**Conservation Role of the Action Area**

As noted above, the action area falls within marbled murrelet Conservation Zone 3 as identified in the marbled murrelet recovery plan (USFWS 1997). In 2014, the marbled murrelet population for Conservation Zone 3 was estimated at 8,840 birds (Crescent Coastal Research 2015, p. 2). Although there is evidence of a slight positive population trend for marbled murrelets in Conservation Zone 3 for the years 2000 through 2016, there is uncertainty around this trend as the confidence intervals overlap zero (USFWS 2019, p. 16). The most recent analysis of marbled

murrelet nesting habitat in Oregon shows small net increases in higher probability nesting habitat over the period 1993 to 2017 (Lorenz et al. 2021, p. 34). As of 2017, in Oregon there were an estimated 5,402,9076 acres of lower probability nesting habitat, 688,906 acres of moderate probability nesting habitat, and 517,686 acres of higher probability nesting habitat for marbled murrelets across all landownerships (Lorenz et al. 2021, p. 28).

The recovery plan calls for efforts in Conservation Zone 3 to focus on the maintenance of suitable and occupied nesting habitat in the Elliott State Forest, Tillamook State Forest, Siuslaw National Forest, and the Bureau of Land Management-administered forests as an essential component for the stabilization and recovery of the marbled murrelet, with particular emphasis on populations in the western portion of the Tillamook State Forest. In addition, restoring some of the north-south distribution of marbled murrelet populations and habitat within Conservation Zone 3 is identified as a priority (USFWS 1997, p. 127). The action area under consideration here has the potential to contribute to maintaining or restoring the north-south distribution of marbled murrelet populations within Conservation Zone 3 by providing nesting habitat.

## EFFECTS OF THE ACTION

Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR 402.02).

### Impacts to marbled murrelets

Here we analyze the ways in which the proposed project **may affect** marbled murrelets in the action area, as a consequence of the following:

- Disturbance impacts from increased noise and activity associated with vegetation removal;
- Increased vulnerability of nests to nest predators as a result of edge effects; and
- Reduced availability of nesting habitat due to removal of potential nest trees.

#### *Disturbance Impacts from Increased Noise and Activity Associated with Vegetation Removal*

The project would involve the use of heavy equipment and activities related to tree removal (e.g., use of chainsaws). Construction equipment generating "very high" sound levels would cause increased noise disturbance in the immediate area and up to 850 feet (250 meters) from the source of the activity, which would be considered an adverse effect to marbled murrelets if individuals were exposed to these noise levels (BA p. 13, Appendix A). However, tree removal activities within occupied/contiguous habitat will be restricted to September 15 through January 30, thereby entirely avoiding potential disturbance impacts from noise or tree removal activities during the marbled murrelet nesting season (mid-April to mid-September), which is the only time that marbled murrelets would be expected to be present within the action area. The vulnerability of marbled murrelets is generally considered to be greatest early in the critical

breeding season for the species, between early April and early August.

The nearest activity that is proposed to occur in the vicinity of occupied or potential marbled murrelet habitat is more than 1,000 feet (305 meters) away from the habitat boundary (Figure 7 of BA, Appendix A). Furthermore, any marbled murrelets present in this area would already be exposed to a high level of background noise as a consequence of nesting directly below the approach to Runway 34. Collectively, avoidance of tree removal activities during the entirety of the marbled murrelet nesting season (and especially during the critical nesting season), the low probability of marbled murrelets being present during activities outside of the nesting season, the distance of more than 1,000 feet (305 meters) from any construction activities during the nesting season, and the high ambient levels of background noise experienced in the occupied/potential habitat area all contribute to our conclusion that adverse effects of noise-related disturbance will be discountable or insignificant and therefore unlikely to alter the essential behaviors or life functions of marbled murrelets.

***Increased vulnerability of nests to nest predators as a result of edge effects***

Forest fragmentation has been implicated as a primary contributing factor to nest failure in the marbled murrelet, in large part because nest predation increases with proximity of the nest to forest edges. Corvids (crows, ravens, and jays) are frequently identified as primary nest predators that may have greater access to marbled murrelet nests as a result of forest fragmentation and clearing. Higher probability nesting habitat for marbled murrelets includes "core habitat" that represents unfragmented patches of nesting habitat in forest interior, which provides higher quality habitat than forest edges and small, scattered patches (Lorenz et al. 2021, pp. 1-2). Following a review of the literature, Lorenz et al. (2021, p. 2) conclude that a distance of 197 feet (60 meters) is most appropriate to delineate "core" versus "edge" habitat for marbled murrelets, as nests within 164 to 197 feet (50 to 60 meters) of an edge are most susceptible to depredation and nest failure (Lorenz et al. 2021 and references therein, p. 13). Core habitat is considered the highest quality nesting habitat for marbled murrelets and is defined as habitats with a minimum patch size of 5.56 acres (2.25 hectares) farther than 197 feet (60 meters) from the edge of nonhabitat (Lorenz et al. 2021, p. 15).

Within the 140-acre patch of occupied/potential habitat for marbled murrelets, there are four areas slated for tree removal that could potentially further add to forest fragmentation and edge effects (Figure 1). Three of these areas (B, C, and D in Figure 1) are areas in which a single or only a few individual trees are identified for removal. Trees in areas B and C are already on the forest edge and represent suboptimal potential nest sites due to their current vulnerability to nest predators. Removal of these trees thus would not result in any increase in forest openness or edge effects. Only the individual tree(s) identified for removal on the Weyerhauser property[2] are within the forest interior. Visual inspection of Area D where one or possibly several trees have been identified for removal suggests that the relatively small opening that would be created as a result is unlikely to be any different than would be experienced through natural processes such as windthrow and would not create a significant opening in the canopy. Finally, the 2.55-acre patch

[2] As noted earlier, the exact number of trees that will be removed is unknown at this time; LiDAR imaging identified an obstruction of a certain height in this area, but whether this is a single tree or may be two or three trees growing in close proximity to one another is not yet known.

slated for removal (Area A on Figure 1) will result in the removal of a contiguous stand of trees within marginal habitat that is already situated on a forest edge, as it occurs along the access road to the structures on the Steel String property and in close proximity to surrounding meadows. Following clearing, the new boundary (edge) will be greater than 197 feet (60 meters) distant from any known potentially suitable nest trees, thus the clearing of this patch will not result in a reduction of any core, higher probability nesting habitat that may exist within the identified 140-acre block of occupied and contiguous potential habitat within the action area.

We thus considered the following factors: the few individual trees to be removed in Areas B and C (Figure 1) already occur within the forest edge; the opening that will result from removing one to a few individual trees in the forest interior (Area D; Figure 1) will be so small as to be relatively indistinguishable from natural openings in the canopy; the 2.55 acres of forest to be cleared (Area A; Figure 1) within the area of potential habitat is of marginal quality and already occurs along the forest edge in a highly fragmented landscape; and the clearing of this patch will not result in a new forest edge within a distance that is likely to provide increased predator access to potentially suitable nest trees. Based on all of these considerations, we conclude there is little likelihood that edge effects resulting from the proposed action will be noticeably different from the current condition, thus we have determined that the potential adverse effects of increased nest predation as a result of edge effects or fragmentation as a consequence of the project will be insignificant to the marbled murrelet.

***Reduced availability of nesting habitat due to removal of potential nest trees***

Within the action area, there has been a single detection of a marbled murrelet exhibiting flight behavior indicative of occupancy (as defined in Evans Mack et al. 2003, p. 22) within the Weyerhauser parcel. We therefore consider this parcel to be occupied, and site visits confirmed the presence of multiple trees on this property that could serve as potentially suitable nest trees for marbled murrelets. Consistent with Service protocol, forested habitat that is similar in structure and adjacent to occupied habitat is also presumed to be occupied and is described here as potential habitat. As a result, the adjacent forested areas on Steel String property are considered potential habitat. Individual trees that could potentially serve as suitable nest trees for marbled murrelets have been identified as obstructions to the FAA-regulated airspace and are slated for removal on both the Weyerhauser and Steel String properties. Whether the specific trees that will be removed have been used for nesting by marbled murrelets in the past is unknown. Also unknown is whether marbled murrelets definitively nest within this specific area (e.g., Lorenz et al. [2021, p. 10] note that occupied behaviors rarely provide an exact nest location) and if so, how many marbled murrelets may possibly use this area for nesting.

Marbled murrelets are unlikely to be present within the 140-acre patch of occupied/contiguous habitat when tree removal activities occur, as all tree removal activities in this area will take place entirely outside of the marbled murrelet nesting season (February 1 through September 15). Thus we do not anticipate any direct effects to marbled murrelets as a result of the project. However, there will be an indirect **adverse effect** to marbled murrelets because the number of potentially suitable trees available for future nesting will be reduced through habitat modification as a result of the project. If a marbled murrelet were to return to a nest stand that now has fewer potentially suitable trees, or to a specific previously used nest tree, there may be some small increased cost to that individual in terms of time or effort required to locate and choose an

alternative suitable tree for nesting. Whether the trees that will be removed are definitively suitable nest trees for marbled murrelets or may have served as nest trees for marbled murrelets in the past is unknown.

As discussed above, large trees identified for removal on Steel String property (Figure 1, Areas B and C) occur on the forest edge and represent poor quality nest sites that would be highly unlikely to support successful nesting (due to vulnerability to predation), and no trees large enough to serve as potentially suitable nest trees were observed in the 2.55-acre patch planned for clearing (Figure 1, Area A). Of the areas within the 140-acre patch of occupied/contiguous habitat where tree removal is planned, we consider only the single or few trees identified on the Weyerhauser property to represent potentially high-quality nest trees (Figure 1, Area D). In this one area, we assume that the removal of a few trees that could possibly serve as nest trees will reduce the suitability of the habitat for nesting to some small degree, but given that one or very few trees will be removed and that multiple other trees that will remain within the same stand provide good potential nesting sites, we conclude the removal will not appreciably reduce the overall amount and distribution of suitable habitat in that area or the current use of the area by murrelets. The remaining availability of multiple suitable nest trees within this area will allow this area to continue to potentially contribute to maintaining north-south connectivity of marbled murrelet populations along the Oregon Coast. Furthermore, the amount of suitable habitat to be removed is a vanishingly small fraction of the amount of suitable habitat currently known to occur within Conservation Zone 3 (even if removals were conservatively assumed to be in higher probability nesting habitat, the removal in question would amount to a few trees out of more than half a million acres of higher probability nesting habitat on the Oregon coast); the planned removal, therefore, is not likely to measurably impair the role of this Conservation Zone in the long-term recovery and survival of the species.

Although we have resolved there will be an adverse effect to marbled murrelets due to the removal of potential nest trees as a consequence of the project, we do not foresee any mortality or injury to individuals of the species as we do not anticipate individuals being present outside of the nesting season when activities will occur within the occupied/potential habitat area. We also do not anticipate that the habitat modification caused by the action is reasonably certain to kill or injure the species by significantly impairing essential behavior patterns, for the reasons explained above. In short, only a few potentially suitable trees will be removed in a stand that contains multiple potential nest trees, such that any disruption or impairment of behaviors related to searching for a suitable nest site will be minimal. In addition, as it is not definitively known whether the specific trees that will be removed are either suitable potential nest trees or trees that have been used for nesting in the past, it is speculative to conclude that impairment of essential behaviors is reasonably certain to occur as a consequence of the proposed action.

In sum, we anticipate that adverse effects to the marbled murrelet will occur as a result of reducing available nesting habitat by removing potential nest trees. However, the best available information is currently insufficient to determine whether the magnitude of these effects is reasonably certain to significantly disrupt or impair the behavior of the marbled murrelet, injure the marbled murrelet, or cause mortality.

## CUMULATIVE EFFECTS

Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). Future federal actions that are unrelated to the proposed action are not considered in this section because they will require separate consultation pursuant to section 7 of the Act.

Timber harvest has previously occurred on private lands in the area in and around the action area and is likely to continue in the reasonably foreseeable future. Due to previous harvest, most of the associated forest is not high-quality habitat, but probably provides some degree of suitability for the marbled murrelet due to proximity to the coastline and as indicated by the observations of marbled murrelets flying over the action area. This reasonably foreseeable future timber harvest is likely to result in further long-term reductions in the amount and distribution of habitat in the local area beyond that which is anticipated to occur as a result of the project. The extent to which this will occur or to which it will impact the overall conservation value of the area for the marbled murrelet is not known. We are unaware of any specific non-federal actions in the action area that are reasonably certain to occur.

## CONCLUSION

After reviewing the status of the marbled murrelet, the environmental baseline for the action area, and the effects of the proposed action, including all measures proposed to avoid and minimize adverse effects, and the cumulative effects, it is the Service's Biological Opinion that the Newport Municipal Airport Obstruction Removal project is not likely to jeopardize the continued existence of the marbled murrelet.

This no jeopardy finding for the marbled murrelet is supported by the following:

1. Adverse effects of noise-related disturbance will be insignificant or discountable, as it is highly unlikely that individuals of the species will be present when tree removal activities take place within the portion of the action area that is occupied or potential habitat;
2. No significant increase in vulnerability to nest predation is anticipated as a result of forest fragmentation or the creation of new forest edge from tree removal activities, as most of the trees slated for removal already occur within edge habitat, the only opening created within the forest interior will be as small as naturally occurring openings in the canopy, and the new forest edge from the one cleared area will not place any potentially suitable nest trees within the distance known to experience elevated levels of predation;
3. Individuals of the species are highly unlikely to be directly or immediately harmed or injured by the project's tree removal activities as those activities will take place in occupied or potential habitat outside of the nesting season;
4. The amount of potentially suitable nesting habitat that will be removed is exceedingly small, on the order of a few individual trees, and multiple potentially suitable nest trees will remain in the same patch of forest, such that the use of the area by nesting marbled murrelets is not expected to be substantially altered as a result of tree removal;
5. We do not anticipate any effects of the action whatsoever, however negligible they may be, to extend beyond effects to the population in the immediate action area; and

6. Because we do not anticipate a significant alteration of essential nesting behaviors to the population in the action area, we do not anticipate any significant impacts to the contribution of this area to the stated goal of Conservation Zone 3 to provide north-south connectivity for marbled murrelet populations.
7. As a result of the negligible potential impacts on future nesting attempts by marbled murrelets and the insignificant reduction in suitable nesting habitat available as a result of the project, we do not anticipate an appreciable reduction in the likelihood of survival or recovery for the marbled murrelet population at the scale of the action area, the Conservation Zone, or for the species rangewide.

No critical habitat has been designated for this species; therefore, none will be affected.

## INCIDENTAL TAKE STATEMENT

While we determined that the project would result in adverse effects to the marbled murrelet as the result of a reduction in available suitable habitat (removal of potential nest trees), the combination of conservation measures incorporated into the project and the uncertain nature of the use of the action area by marbled murrelets – and more specifically, potential use of the specific individual trees slated for removal – makes it somewhat speculative as to whether these effects will actually result in harm, harassment, or injury to individuals of this species.

Based on these considerations, and as detailed above in the Effects of the Action section, incidental take of listed species is not reasonably certain to occur, therefore no incidental take statement is provided herein. Since no incidental take is anticipated, no take exemption has been provided. If incidental take is detected during implementation of the proposed action, reinitiation of formal consultation should be requested immediately.

## AMOUNT OR EXTENT OF TAKE

The Service does not anticipate that the proposed action will incidentally take any listed species. Although the Effects of the Action section above includes a finding that implementation of the proposed action has the potential to cause biological effects to the species that conform to the regulatory definition of take, the mere potential for take is not a legitimate basis for a take exemption. The Service must provide a reasoned basis for a likelihood of take in order to anticipate and exempt it. Since no take is anticipated or exempted, no reasonable and prudent measures and terms and conditions are provided in this Biological Opinion.

## NOTIFICATIONS

The Service is to be notified within three working days upon locating a dead, injured or sick endangered or threatened species specimen. Initial notification must be made to the nearest U.S. Fish and Wildlife Service Law Enforcement Office. Notification must include the date, time, precise location of the injured animal or carcass, and any other pertinent information. Care should be taken in handling sick or injured specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a

dead animal, the finder has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. Contact the U.S. Fish and Wildlife Service Law Enforcement Office at (503) 682-6131, or the Service's Oregon Fish and Wildlife Office at (503) 231-6179.

## CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service is not offering any conservation recommendations in association with the subject project at this time.

## REINITIATION NOTICE

This concludes formal consultation on the Newport Municipal Airport Obstruction Removal project. As provided in 50 CFR 402.16, reinitiation of consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (1) If the amount or extent of taking specified in the incidental take statement is exceeded; (2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the Biological Opinion; or (4) If a new species is listed or critical habitat designated that may be affected by the identified action. If you have any questions about this consultation, please contact Michele Zwartjes of the Newport (Oregon Coast) Field Office at (503) 541-8667, x237.

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# Appendix A. Biological Assessment, Newport Municipal Airport Obstruction Removal, January 2022.

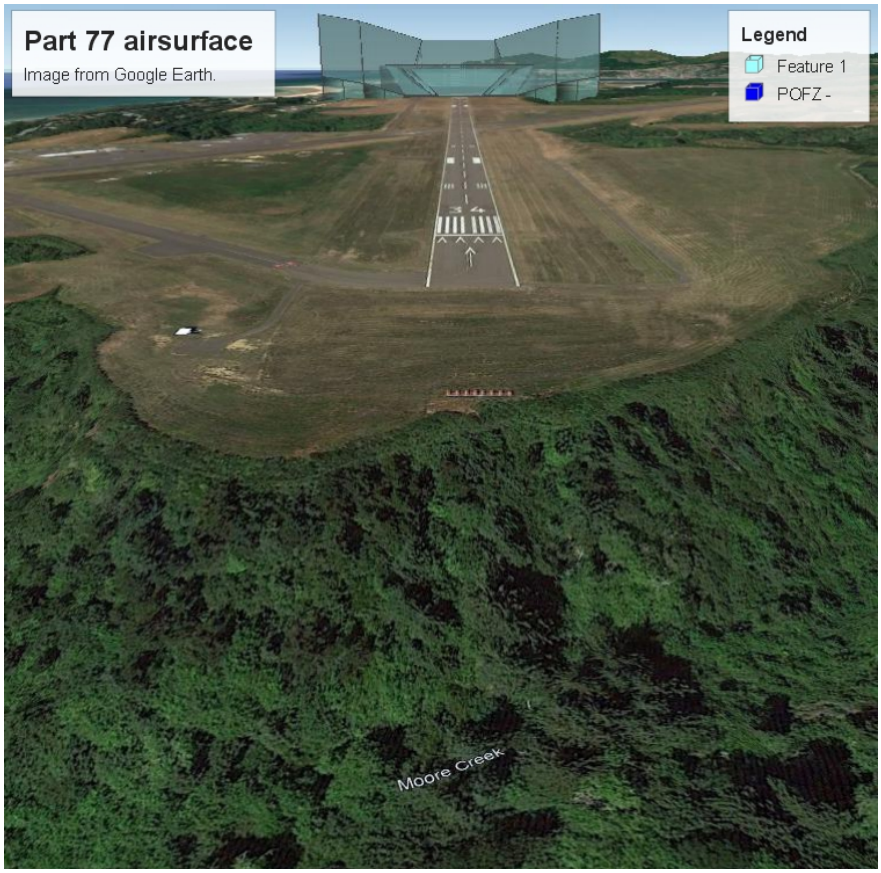
Final

# NEWPORT MUNICIPAL AIRPORT OBSTRUCTION REMOVAL

## Biological Assessment

**Prepared for** **January 2022**

**City of Newport and Federal Aviation Administration**



Final

# NEWPORT MUNICIPAL AIRPORT OBSTRUCTION REMOVAL

## Biological Assessment

**Prepared for**

**City of Newport and Federal Aviation Administration**

**January 2022**

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# NEWPORT AIRPORT OBSTRUCTION REMOVAL
Biological Assessment

## Introduction

### Background

This Biological Assessment (BA) evaluates the effects of an obstruction (vegetation) removal project at the Newport Municipal Airport (Airport) on the marbled murrelet (*Brachyramphus marmoratus*), northern spotted owl (*Strix occidentalis caurina*), the coastal distinct population segment of the Pacific marten (*Martes caurina*), and designated critical habitat. All are listed as threatened under the federal Endangered Species Act of 1973, as amended. The nearest critical habitat for the marbled murrelet is 0.5 mile from a water tower at the southern boundary of where identified obstructions (trees) would be removed. The nearest critical habitat for northern spotted owl and Pacific marten (proposed critical habitat) is over two miles east/southeast of the southern obstruction removal area in the Siuslaw National Forest. This BA also provides justification for a no effect determination for the western snowy plover (*Charadrius nivosus nivosus*). The Airport is a designated general aviation facility, owned and operated by the City of Newport (City).

The City proposes to clear approximately 63 acres of vegetation (tall trees and shrubs) that are obstructions to the approach ends of the airport runways. Obstructions would occur on Airport and adjacent properties. Removing these trees and vegetation will allow for a clear 20:1 approach surface to be maintained. The approach surface is critical in allowing aircraft to execute lands in a manner that is safe to the aircraft, nearby environmental resources, residences, and the general public. Approximately three acres need to be removed from occupied marbled murrelet habitat and potential suitable northern spotted owl and Pacific marten habitat south of the Airport within the approach to Runway 34.

**Occupied vs Contiguous Habitat**

Occupied marble murrelet habitat is defined as habitat that has been surveyed to protocol and breeding behavior has been observed. The current protocol was developed by the Pacific Seabird Group (Evans Mack et al. 2003) and relies on a series of standardized audio-visual surveys. A revised survey protocol is under development (ODFW 2021).

Contiguous habitat is habitat adjacent to occupied habitat that is similar in structure. This habitat has not been surveyed but is considered to be occupied by breeding murrelets.

The proposed project requires funding and approval from the Federal Aviation Administration (FAA), the lead agency for Section 7 Endangered Species Act consultation. Refer to separate documentation for No Effect determination related to Oregon coho salmon under the jurisdiction of the National Marine Fisheries Service (NMFS) (ESA 2021).

This BA was developed using 2021 protocol survey data provided by Weyerhaeuser, existing data from the Oregon Biodiversity Information Center (ORBIC), species list and information from the U.S. Fish and Wildlife Service (USFWS), literature reviews, and field reconnaissance conducted in the study area in 2019.

## Consultation History

USFWS staff attended three public agency meetings regarding the project, although the availability of protocol survey data from Weyerhaeuser were not known when the meetings occurred. Meeting dates are as follows: October 11, 2018; November 21, 2019; and September 29, 2021.

# Project Description

## Project Summary

The City proposes to remove obstructions from Federal Air Regulations (FAR) Part 77 airspace approach surfaces at the Airport to improve the safety of aircraft operations. The Airport is located at 135 SE 84th Street, Newport, in the South Beach Urban Renewal District, Lincoln County, Oregon. The Airport itself and the properties where obstructions are proposed to be removed are entirely within the Newport city limits (with the exception of a few parcels), and are zoned as either Industrial, Public Structures, or High Density Multi-Family. Refer to **Figures 1, 2 and 7 (Appendix A)** for a depiction of the study area setting in relation to the City of Newport and the extent of trees proposed for removal.

The City proposes to remove obstructions (primarily tall trees) within three separate FAR Part 77 approach surfaces:

- Visual approach of Runway 20 (north of the Airport).
- Non-precision instrument approach and threshold siting surfaces of Runway 34 (south of the Airport).
- Precision instrument approach and threshold siting surfaces of Runway 16 (north of the Airport).

Light Detection and Ranging (LiDAR) was flown in 2018 for the study area and processed in February 2019 to identify tall trees penetrating the 3D FAA regulated airspace. The original number of trees slated for removal were scaled-back markedly in 2020 and 2021 after coordination with landowners and the FAA. The original footprint of clearing all possible obstructions totaled approximately 240 acres, whereas the current proposed footprint of tree removal is approximately 63 acres affecting 32 separate tax lots north and south of the Airport **(Figures 1-6)**. The proposed project would be constructed between 2022 and 2024.

## Project Components

The project consists of removing tall vegetation (trees and shrubs/saplings) from the FAA regulated airspaces north and south of the Airport. The crowns of trees proposed for removal are outlined in red on **Figure 2** and shown in green on **Figure 7**. No new facilities, roads, or impervious surfaces are proposed as part of the project. The contractor selected for the project would access obstructions from existing disturbed areas including paved and unpaved airport access roads, private roads as well as old logging roads and paths (**Figure 8**). Staging would occur in existing disturbed areas that are already cleared of vegetation. Tree removal would occur during daylight hours (i.e., not at dawn or dusk). The total footprint of proposed tree removal per area is summarized in Table 1 below.

**TABLE 1.**
**SUMMARY OF TREE REMOVAL IMPACTS**

| Area | Footprint of obstruction removal (ac) |
|---|---|
| Occupied marbled murrelet habitat (Parcel ID 12-11-05-00-00802-00) | <0.1 |
| Contiguous suitable habitat (Parcel IDs 12-11-05-00-00803-00; 12-11-05-CB-00200-00; and 12-11-05-CB-00700-00) | 3.0 |
| Remainder of the project (considered unsuitable forested habitat) | 60.0 |
| **Total** | **63.1** |

## Avoidance, Minimization, and Conservation Measures

The following list summarizes the measures incorporated into the project to avoid and minimize impacts on the environment and Endangered Species Act-listed species and habitat during construction.

1. No tree removal is proposed in occupied/contiguous habitat (as shown on **Figures 7 and 8**) during the combined marbled murrelet, northern spotted owl, and Pacific marten breeding/denning season (February 1 to September 15).

2. Tree removal in occupied/contiguous habitat would occur during daylight hours (i.e., not at dawn or dusk).

3. Minimization measures incorporated into the design of the project include reducing the footprint of obstructions that could be removed from the FAA regulated airspaces from approximately 240 acres to 63 acres.

4. Work areas will be confined to the minimum area needed to complete the action.

5. Construction vehicles and equipment will be stored, fueled, and maintained in designated staging areas, making use of existing disturbed areas that area already cleared of vegetation.

6. Areas permanently disturbed (tree removal areas) will be restored following removal with native groundcover and shrubs.

7. No new facilities, roads, or impervious surfaces are proposed as part of the project. The contractor selected for the project would access obstructions from existing disturbed areas including paved and unpaved airport access roads, private roads as well as old logging roads and paths (**Figure 8**).

## Study Area and Action Area

The proposed project would occur on various publicly and privately owned parcels north and south of the airfield. The study area consists of the footprint of obstructions proposed for removal as well as access roads and staging areas. Refer to the attached preliminary site plans for a list of affected tax lots, property owners, and approximate extent of obstructions proposed for removal (**Appendix A**).

The action area encompasses all areas affected directly or indirectly by the proposed project. The action area for this project includes the project footprint (including construction access and staging areas) and areas within an approximately 825-foot radius of the project footprint that may be affected by construction noise, as described below.

# Proposed Tree Removal Areas Existing Conditions

The proposed study area north and south of the Airport consists of hilly terrain in the foothills and headlands of the Central Oregon Coast Range. The temperate forests of the area have been altered through fire, logging and development of roads. In areas that have been significantly disturbed, second-growth forest and shrub layers have very dense vegetation. Four streams flow westerly through the study area and into the Pacific Ocean (from north to south): Henderson Creek, Grant Creek, Moore Creek, and Thiel Creek (**Figure 7**). With the exception of Moore Creek, these drainages are typified by steep slopes and narrow valley bottoms. Elevations in the area range from 20 feet to 275 feet above mean sea level.

Tree removal north of the Airport would occur on shrubland, forested terraces and hillslopes, and riparian habitat **(Exhibits 1 and 2**). The forests in this area consist of mid-seral / mid-structural, thinned stands of western hemlock (*Tsuga heterophylla*) and Sitka spruce (*Picea sitchensis*). The understory is dense and consists of salal (*Gaultheria shallon*), evergreen huckleberry (*Vaccinium ovatum*) and sword fern (*Polystichum munitum*). In areas where wetlands have been delineated, the vegetation is dominated by Douglas spirea (*Spiraea douglasii*), twinberry honeysuckle (*Lonicera involucratra*), red alder (*Alnus rubra*), and slough sedge (*Carex obnupta*) (ESA 2019).

These wooded areas north of the Airport have not been surveyed for listed species, but are not considered potential suitable habitat for marbled murrelet, northern spotted owl, or Pacific marten due to lack of complex forest structure, habitat fragmentation, and close proximity to human activity.

Exhibit 1. Typical mid-seral forested conditions north of Henderson Creek on City property, May 2019.

Exhibit 2. Typical riparian habitat along Henderson Creek includes young red alder and dense undergrowth, May 2019.

Tree removal south of the Airport would occur along Moore Creek (**Exhibit 3**) just south of the end of Runway 34; the wooded areas between SE 98th Street and Moore Creek (**Exhibit 4**); and areas south of SE 98th Street **(Exhibits 5–7**). The riparian habitat along Moore Creek consists of young trees and palustrine emergent wetlands dominated by slough sedge **(Exhibit 3)**.

Exhibit 3. Palustrine emergent wetland along Moore Creek on City property, May 2019.

The habitat south of Moore Creek but north of SE 98th Street, consists of young Douglas fir (*Pseudotsuga menziesii*) trees with some alders and willows (*Salix* spp.) as well as Scotch broom (*Cytisus scoparius*) (**Exhibit 4**). Trees range in height from 20 to 50 feet, with most of the trees between 35 and 45 feet high (Quantum Spatial, Inc. 2019). Adjacent wooded areas on City property are young mixed deciduous/coniferous trees that are generally 40 to 50 feet high. A couple of the trees in this area are 90 feet high, but are isolated. These trees would not provide suitable marbled murrelet nesting habitat and

Exhibit 4. Young Douglas-fir trees on City property, south of Moore Creek and north of SE 98th Street, May 2019.

lacks the older forest complexity, snags and downed wood that is preferred by the marbled murrelet, northern spotted owl, and Pacific marten.

The trees proposed for removal on occupied and contiguous marbled murrelet habitat on private land to the south consist of conifers that exceed 100 feet in height (Quantum Spatial, Inc. 2019) and are generally larger than 15 inches in diameter at breast height (dbh) with some exceeding 25 inches dbh (**Exhibits 5 and 6**). The forest in this area south of Thiel Creek is characterized by mid-successional to late-successional with varying densities of undergrowth. The approximate 2.5-acre patch of trees proposed for removal on Steel String property (Parcel ID 12-11-05-00-00803-00, **Figure 5**) ranges in height from 113 to 189 feet (Quantum Spatial, Inc. 2019). The forest on this parcel has some late-successional characteristics, but has a sparse shrub and subcanopy layer with few snags and pieces of large downed wood that may be suitable for Pacific marten **(Exhibit 5)**. The 2.5-acre patch is anticipated to be only marginally suitable for marbled murrelet and northern spotted owl due to lack of multiple canopy layers.

Exhibit 5. Typical conifer forest contiguous with occupied marbled murrelet habitat south of SE 98th Street on Steel String property (Parcel ID 12-11-05-00-00803-00). Note sparse shrub layer, May 2019.

The forest on Weyerhaeuser land in occupied murrelet habitat (Parcel ID 12-11-05-00-00802-00) is typified by large Sitka spruce trees with a dense shrub layer **(Exhibit 6)**.

Exhibit 6. Typical large Sitka spruce on Weyerhaeuser property (Parcel ID 12-11-05-00-00802-00), May 2019.

The trees proposed for removal on Emery Investments Inc. (Parcel ID 12-11-00-00-03400-00) property adjacent to the Seal Rock water tower **(Figure 5)** are isolated and do not provide suitable habitat for the listed species **(Exhibit 7)**.

Exhibit 7. Isolated tall trees proposed for removal adjacent to the Seal Rock water tower (Parcel ID 12-11-00-00-03400-00), May 2019.

# Status / Presence of Listed Species and Designated Critical Habitat in the Action Area

A list of threatened and endangered species that may occur in the proposed study area was obtained from the USFWS on November 11, 2021 (**Appendix B**). Listed species and associated critical habitat addressed in this BA are presented in **Table 2**.

**TABLE 2.**
**LISTED SPECIES, CRITICAL HABITAT, AND PRESENCE WITHIN THE ACTION AREA**

| Species and Federal Listing | Critical Habitat Status | Breeding Season | Occupied habitat within Study area? |
|---|---|---|---|
| Marbled murrelet<br><br>Listed as **Threatened** in 1992 (57 Federal Register [FR] 45328). | Critical habitat areas were originally **Designated** in 1996, revised in 2011, and finalized in 2016 (81 FR 51348).<br><br>The study area is not within designated critical habitat. The nearest designated critical habitat is located approximately 0.5 mile east of the southern part of the study area (Figure 7). | Mid-April to Mid-September | Yes, on Weyerhaeuser land, tax map 12-11-05-00-00802-00 |
| Northern spotted owl<br><br>Listed as **Threatened** in 1990 (55 FR 26114). | Critical habitat areas were **Designated** in 1992, revised in 2008, and again in 2012 (77 FR 71876).<br><br>The study area is not within designated critical habitat. The nearest proposed critical habitat is located approximately 2 miles east of the southern part of the study area (Figure 7). | February 1 through August 31 | No, but potential suitable habitat presumed present south of Thiel Creek based on murrelet survey (Weyerhaeuser 2021). |
| Pacific marten<br><br>Listed as **Threatened** in 2020 (85 FR 63806). | Critical habitat areas were **Proposed** October 25, 2021 (86 FR 58831).<br><br>The study area is not within designated critical habitat. The nearest proposed critical habitat is the same area designated as critical habitat for the northern spotted owl, located approximately 2 miles east of the southern part of the study area (Figure 7). | Mid-April to Mid-September | No, but potential suitable habitat presumed present south of Thiel Creek based on murrelet survey (Weyerhaeuser 2021). |

## Species Not Analyzed in this BA: Western Snowy Plover (No Effect)

The western snowy plover is a small, federal threatened shorebird that resides in marine shoreline habitat, specifically coastal dunes, the upper intertidal zone, as well as beaches at creek and river mouths and salt pans at lagoons and estuaries (77 FR 36728). None of these habitats occur within the action area nor would they be affected by the project. The nearest critical habitat is located outside of Lincoln City, several miles to the north of the study area. Due to the absence of suitable habitat in the study area, the project would have no effect on the western snowy plover.

## Marbled Murrelet

The marbled murrelet is a small seabird that breeds in coastal forests in British Columbia, Washington, Oregon, and California. Breeding pairs generally lay one egg during the nesting season and may not breed every year. No nest structure is built, but the egg is laid on a horizontal branch with moss or lichen. General habitat attributes are characteristic throughout its range, including the presence of nesting

platforms, adequate canopy cover over the nest, landscape condition, and distance to the marine environment. Nest sites typically occur in mature and old-growth coniferous forests but are also found in younger forests containing suitable nesting platforms. Wildfires and timber harvest are major threats contributing to the on-going loss of marbled murrelet nesting habitat (USFWS 2019).

Stand age is a key indicator of marbled murrelet habitat. There is a positive correlation between stand age and the presence of potential nesting platforms; the older a coniferous tree becomes, the more likely it is to have suitable nesting platforms for marbled murrelets.

An essential structural component of suitable marbled murrelet habitat is the presence of potential nesting platforms (USFWS 2012). In general, old-growth, mature, or younger coniferous forests with appropriate structures can provide these platforms. The USFWS defines a suitable nesting platform as a relatively flat surface at least 10 centimeters (4 inches) in diameter and located a minimum of 10 meters (33 feet) high in the live crown of a coniferous tree. Another important attribute of nesting habitat is vertical and horizontal cover around potential nest platforms to protect chicks and adults from predation while allowing adults access to nest platforms (USFWS 2012).

Marbled murrelets have occupied small patches of habitat within larger areas of unsuitable habitat, and some occupied sites have included large, residual trees in low densities; over 20 percent of occupied sites in Oregon were less than 80 years old (USFWS 2012).

Presence in the Action Area: Occupied marbled murrelet breeding behavior (flight at canopy height) was observed on Weyerhaeuser land south of SE 98th Street on parcel ID 12-11-05-00-00802-00 during 2021 protocol surveys (Weyerhaeuser 2021) (**Figures 7 and 8**). Based on guidance from the USFWS, adjacent or contiguous habitat that is similar in structure is also considered occupied habitat. Consequently, adjacent forested habitat on Steel String property (parcel IDs 12-11-05-00-00803-00; 12-11-05-CB-00200-00, and 12-11-05-CB-00700-00) is considered contiguous habitat.

## Northern Spotted Owl

Northern spotted owls primarily utilize late successional mature and old-growth forests with large diameter coniferous trees, snags, downed wood, and a closed canopy with multiple canopy layers for nesting and roosting (Davis et al. 2016). Foraging habitat for northern spotted owls is similar but may not contain suitable nesting structures to support successful breeding pairs (Sovern et al. 2015). The range of this species is from southwestern British Columbia through western Washington, western Oregon, and the Klamath Mountains and Coast Ranges of northwestern California south to San Francisco Bay (55 FR 26114).

The northern spotted owl is a nocturnal owl species and resident of structurally complex forests. It prefers late successional mature and old-growth forest or forests with old-growth characteristics. Preferred nesting and roosting habitats include a multi-story forest containing a diversity of tree species, moderate to dense canopy cover (>60 percent) dominated by large trees with a high incidence of cavities or broken tops, sufficient open space below the canopy for flight, and an accumulation of woody debris on the ground (USFWS 2011).

Northern spotted owls usually nest in tree and snag cavities or in broken tops of large trees. They less frequently nest in mistletoe clumps and abandoned raptor and raven nests (Zeiner et al. 1990). Northern spotted owl are territorial, although home ranges of adjacent pairs can overlap. The size of the home range varies with geography and availability of prey species.

Northern spotted owl will feed on a variety of prey items, including small mammals, birds, amphibians, reptiles, and insects (Zeiner et al. 1990; USFWS 2011). Foraging habitat for northern spotted owl is similar to nesting and roosting habitat but may not contain suitable nesting structures to support successful breeding pairs (Sovern et al. 2015).

The northern spotted owl is a long-lived species, with a long reproductive life span. It is monogamous, but pairs do not necessarily breed every year. Breeding generally begins at two to five years of age. Following courtship, breeding may start as early as mid-February, and the female typically lays one to four eggs by late-March or April. The male delivers food to the female and the young while the female is brooding. Juvenile owls fledge in late-May or June; however, they still depend on food provided by their parents until about September (Zeiner et al. 1990; USFWS 2011).

Presence in the Action Area: There are no documented occurrences of northern spotted owl in or near the action area (ORBIC 2019). Weyerhaeuser surveyed for northern spotted owls according to protocol in the spring and summer of 2021 on parcel ID 12-11-05-00-00802-00 (the same parcel where marbled murrelets were detected), but no northern spotted owls were seen or heard (Hane, personal communication, 2021).

## Pacific Marten

The Pacific marten is a medium-sized, solitary carnivore related to weasels, minks, otters, and fishers (85 FR 63806). Pacific martens are territorial and dominant males will maintain home ranges that encompass one or more female's home ranges. Male home ranges are larger than female home ranges and can cover 0.8 to 10.5 mi.$^2$ (512 to 6,720 acres) (WDFW 2021). Pacific martens are primarily carnivorous and prey on small mammals, birds, insects, but also consume berries and other fruits depending on availability. Pacific martens generally select older forest stands that are structurally complex (e.g., late-successional, old growth, large-conifer, mature, late-seral). These forests generally have multiple canopy layers, snags and other decay elements, dense understory, and have a biologically complex structure and composition. Small patches of forest are in less suitable for the Pacific marten because their primary predator, the bobcat, is more abundant fragmented forests than large unbroken tracks (86 FR 58831).

Den sites most often consist of large diameter trees (live or dead) with cavities, but may also include hollow logs, crevices under rocks, log piles, and squirrel nests (86 FR 58831). Pacific martens breed in the summer, bearing one to five young (WDFW 2021). Young are independent by late summer. According to a Northern California study, the denning season for coastal martens extends from mid-April to mid-September (Delheimer, et al. 2021).

Presence in the Action Area: There are no documented occurrences of Pacific marten in or near the action area (ORBIC 2019). The nearest population of Pacific marten is anticipated to occur in the Siuslaw

National Forest over two miles east of the southern project boundary. The Siuslaw National Forest is proposed critical habitat for the Pacific marten and is considered the northernmost distribution of coastal martens in Oregon (86 FR 58831).

# Analysis of Effects of the Action

## Direct Effects

No direct effects are anticipated to occur to either marbled murrelets, northern spotted owls, or Pacific martens because trees are proposed to be removed from occupied/contiguous habitat after September 14 and before February 1 when no breeding birds or denning Pacific martens would be present. Marbled murrelets generally nest from mid-April to mid-September (September 15), northern spotted owl generally breed from February 1 through August 31, and the denning season for Pacific marten generally extends from mid-April to mid-September (September 15).

The action area includes the area surrounding the project that would be subject to increased noise from construction equipment and activities during project work. The area of potential noise disturbance was determined for the project using noise analysis from USFWS (2020) entitled, "*Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California.*" Inputs for the noise analysis were based on the following:

- Ambient daytime noise levels adjacent to occupied/contiguous marbled murrelet habitat and potential suitable northern spotted owl habitat is considered to be "low" or 61–70 decibels (dB), which includes sounds from residences located along SE Cedar Street.

- The loudest piece of equipment anticipated for the project (and the associated average maximum sound level at 50 feet) is likely to be a logging truck (97 dB) categorized as a "very high" action-generated sound level. Obstruction removal would occur during daylight hours.

Using Table 1 from USFWS (2020) (reproduced below), the disturbance distance for construction equipment generating "very high" sound levels is 250 meters or 825 feet—i.e., logging truck activity within 825 feet of nesting activity is expected to result in "take" of marbled murrelets or northern spotted owls. However, the nearest logging truck activity that may occur in the vicinity of occupied/contiguous marbled murrelet habitat and potential northern spotted owl and Pacific marten habitat during the breeding season would be over 1,000 feet away along SE 98$^{th}$ Street or near the Seal Rock water tower **(Figure 7**). No logging or tree removal is proposed to occur near potential nesting/denning habitat during the combined marbled murrelet, northern spotted owl and Pacific marten breeding/denning season (February 1 – September 15).

**Table 1. Estimated disturbance distance (in feet) due to elevated action-generated sound levels affecting the northern spotted owl and marbled murrelet, by sound level.**

| Existing (Ambient) Pre-Project Sound Level (dB) [1, 2] | Anticipated Action-Generated Sound Level (dB) [2, 3] | | | |
|---|---|---|---|---|
| | Moderate (71-80) | High (81-90) | Very High (91-100) | Extreme (101-110) |
| "Natural Ambient" [4] (< = 50) | 50 (165)[5,6] | 150 (500) | 400 (1,320) | 400 (1,320) |
| Very Low (51-60) | 0 | 100 (330) | 250 (825) | 400 (1,320) |
| Low (61-70) | 0 | 50 (165) | 250 (825) | 400 (1,320) |
| Moderate (71-80) | 0 | 50 (165) | 100 (330) | 400 (1,320) |
| High (81-90) | 0 | 50 (165) | 50 (165) | 150 (500) |

Source: USFWS (2020). Disturbance distances are presented in meters and (feet).

## Indirect Effects

Habitat modification or tree removal is proposed to affect approximately three acres of occupied and contiguous marbled murrelet habitat (see Table 1), which is also considered potential suitable northern spotted owl and Pacific marten habitat. Tree removal in occupied/contiguous habitat would affect two percent of the surrounding suitable forest (approximately 140 acres) and is not expected to adversely impair the ability of marbled murrelets, northern spotted owl or Pacific marten to reproduce in the area. Several mature trees with large limbs and sufficient canopy cover will remain in the Thiel Creek riparian zone and in areas outside of the FAA regulated airspace that could provide suitable habitat for these species that depend on late successional forests.

Noise generated from the project would likely be from chainsaws, backhoes, dozers, or logging trucks. These noise sources would occur more than 1,000 feet away from occupied/contiguous marbled murrelet and potential northern spotted owl and Pacific marten habitat and are anticipated to have minimal impacts. Refer to the section on construction noise analysis for more details.

The wooded areas north of the Airport where obstruction removal is proposed do no provide suitable habitat for the marbled murrelet, the northern spotted owl or Pacific marten. These areas lack late successional mature and old-growth forest structural characteristics and are close to human disturbances and large openings that reduce the suitability of the forest because of the ability of competitors/predators (i.e., barred owls, red-tailed hawks, bobcats etc.) to readily access potential nests.

## Effects from Interrelated and Interdependent Actions

An interdependent activity is an activity that has no independent utility apart from the proposed project. An interrelated activity is an activity that is part of a larger action and depends on the larger action for its justification.

The proposed project consists of removing tall trees from regulated airspace to maintain safe conditions for landing aircraft and is not part of a larger action or series of actions that depend on the obstruction removal. Effects from activities associated with the various elements of the project, including construction staging and access, are considered in the direct and indirect effects analyses for this BA.

## Cumulative Effects

Cumulative effects are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.02).

The City of Newport's Capital Improvement Plan (CIP) for fiscal years 2021-2022 to 2026-2027 was reviewed to determine potential future projects within the action area, which is effectively limited to the City-owned Airport property for the purposes of this consultation. The CIP does not identify any projects planned for the Airport, either federal or non-federal.

# Finding of Effect

The following effect determinations for listed species and critical habitat are made for the Newport Airport Obstruction Removal Project:

**Marbled Murrelet, Northern Spotted Owl, and Pacific Marten**: **May Affect, Not Likely to Adversely Affect (NLAA).**

**Critical Habitat**: **No Effect.**

The following justifications are provided for these determinations for all three species:

- Tree removal is not proposed in designated or proposed critical habitat for the marbled murrelet, northern spotted owl or Pacific marten.
- Tree removal in occupied/contiguous habitat (as shown on **Figures 7 and 8**) would occur outside of the combined marbled murrelet, northern spotted owl and Pacific marten breeding/denning season (February 1 to September 15) to avoid the potential for take.
- Tree removal in occupied/contiguous habitat would occur during daylight hours (i.e., not at dawn or dusk).
- Obstruction removal that may occur prior to September 15 in areas north of Thiel Creek off of SE 98th Street or near the Seal Rock water tower (both > 1,000 feet from occupied/contiguous habitat) are anticipated to have minimal noise impacts due to the distance from potential marbled murrelet and northern spotted owl nesting and Pacific marten denning areas.
- Tree removal would be limited in scope and scale affecting just under three acres (2.74 acres), or two percent of the occupied and contiguous habitat patch (totaling approximately 140 acres) outlined on **Figures 7 and 8**.

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# Appendix A
## **Figures**

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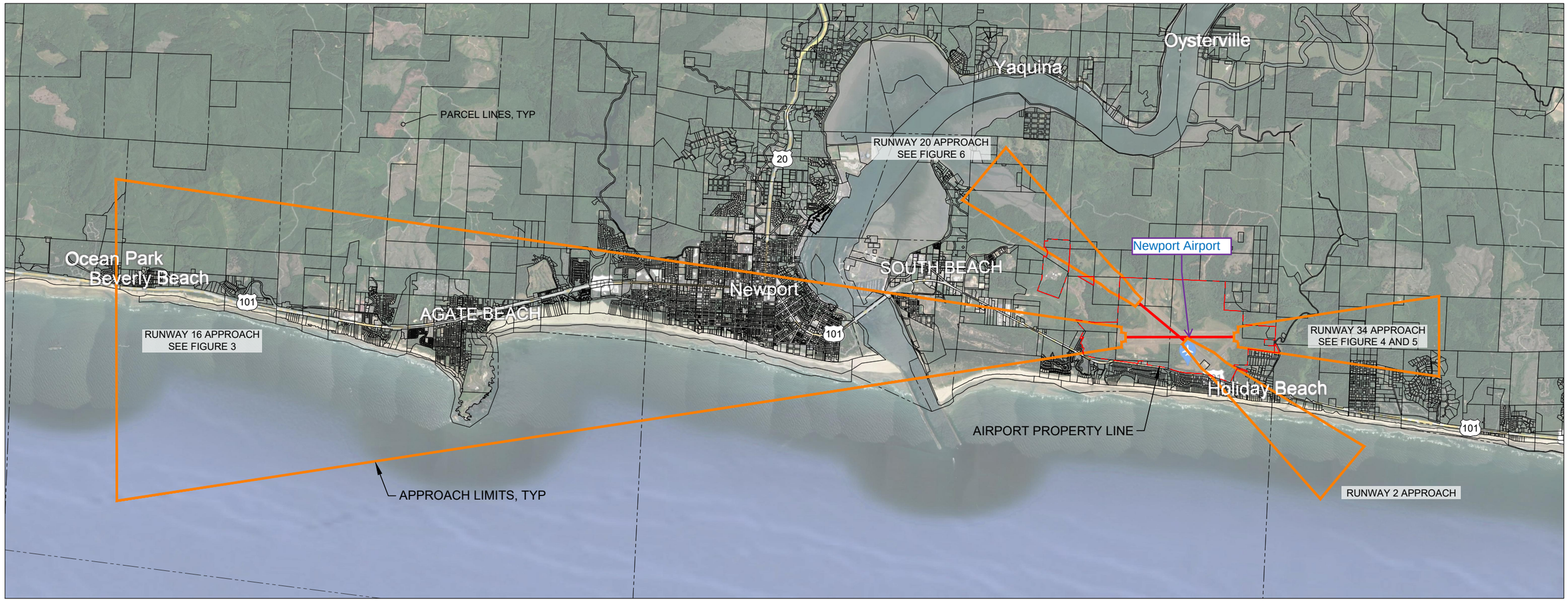
NORTH

0 2500 5000

SCALE IN FEET




PRELIMINARY
NOT FOR CONSTRUCTION
12/02/2021

PRECISION APPROACH ENGINEERING
5125 Southwest Hout Street
Corvallis, OR 97333
541•754•0043

NEWPORT MUNICIPAL AIRPORT
APPROACH OBSTRUCTION REMOVAL

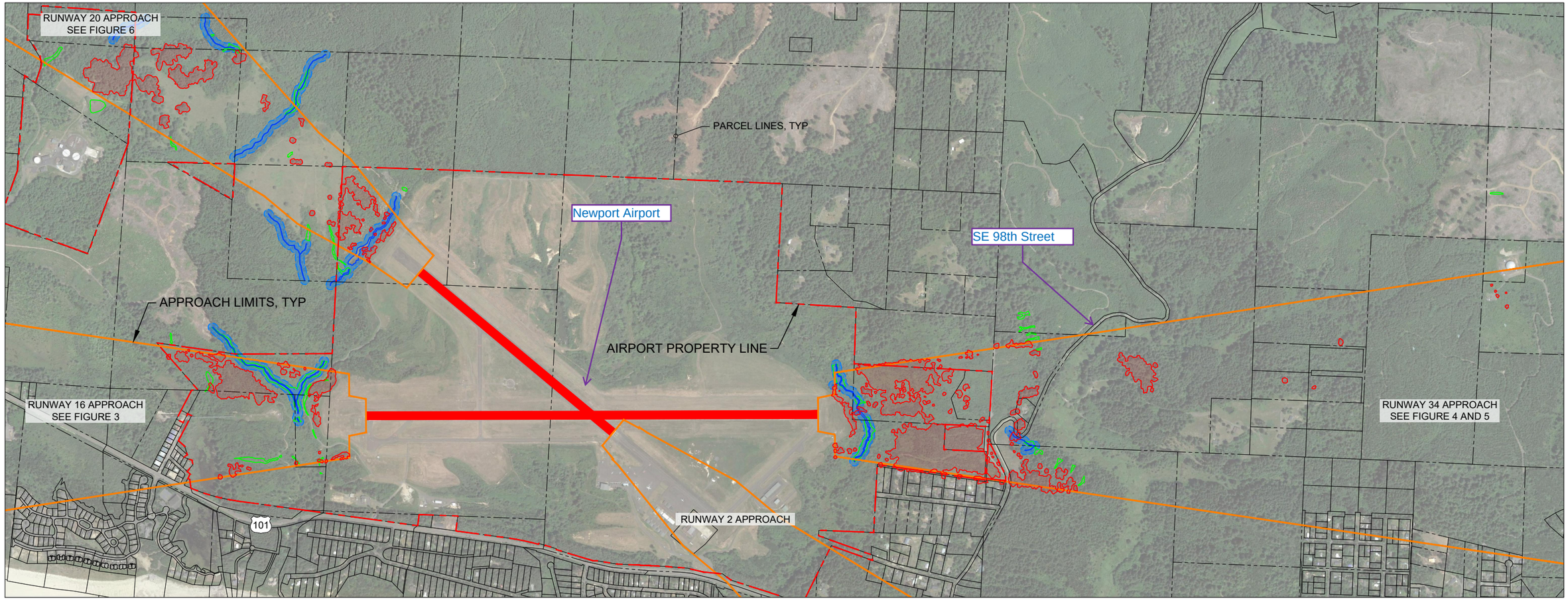
# NEWPORT MUNICIPAL AIRPORT APPROACH AREAS

**Figure 1** DEC 2021

NORTH

0 600 1200

SCALE IN FEET



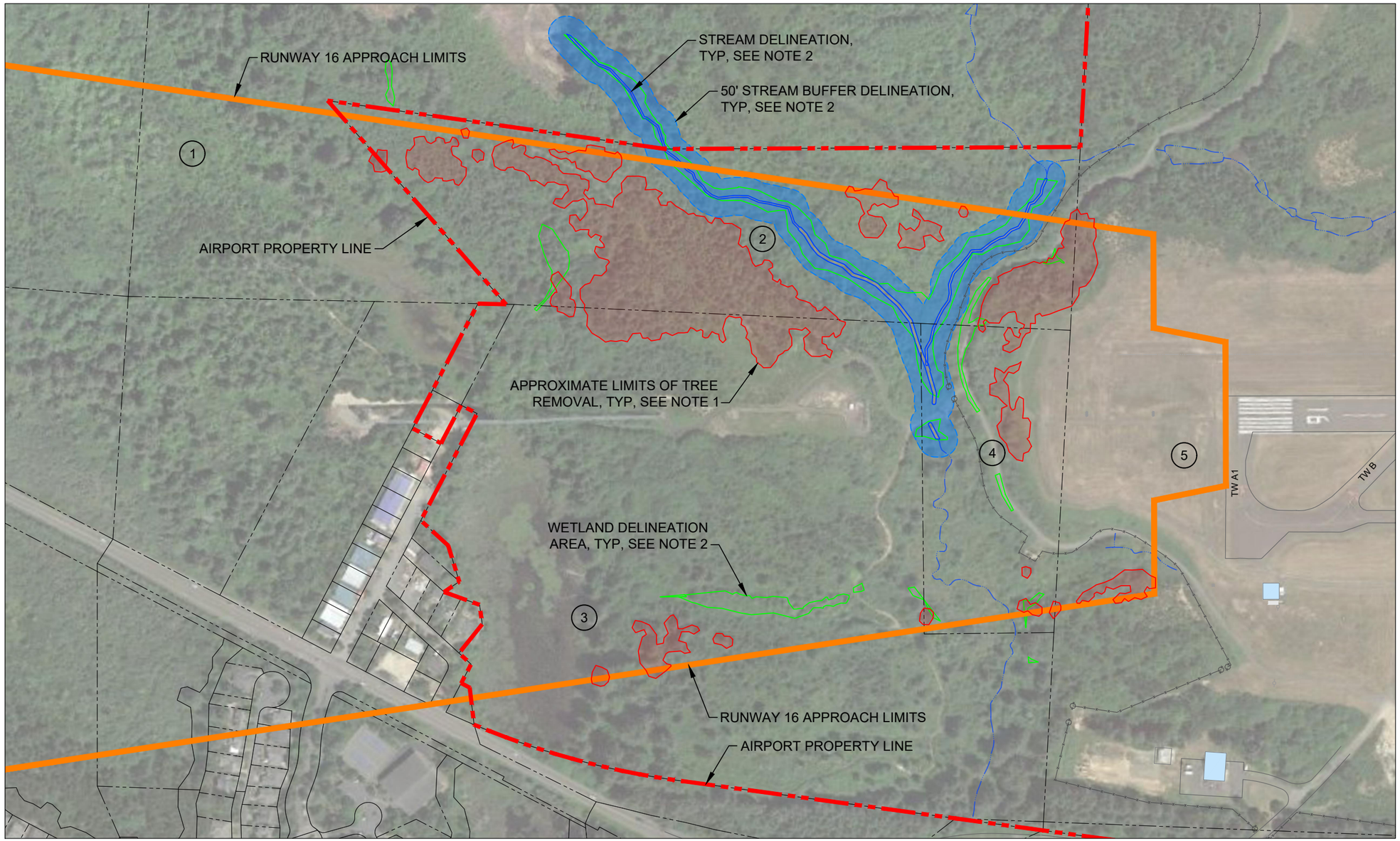

PRELIMINARY
NOT FOR CONSTRUCTION
12/02/2021

PRECISION APPROACH ENGINEERING
5125 Southwest Hout Street
Corvallis, OR 97333
541•754•0043

NEWPORT MUNICIPAL AIRPORT
APPROACH OBSTRUCTION REMOVAL

# OBSTRUCTION REMOVAL PLAN

**Figure 2** DEC 2021




NORTH

0 150 300

SCALE IN FEET

| TAG | PARCEL ID | OWNER | TREE REMOVAL |
|---|---|---|---|
| 1 | 11-11-29-00-00300-00 | LANDWAVES INC | 0.04 AC |
| 2 | 11-11-29-00-00400-00 | CITY OF NEWPORT | 5.81 AC |
| 3 | 11-11-29-00-01402-00 | CITY OF NEWPORT | 1.70 AC |
| 4 | 11-11-29-00-01401-00 | CITY OF NEWPORT | 0.50 AC |
| 5 | 11-11-29-00-01100-00 | CITY OF NEWPORT | 0.45 AC |

NOTES:

1. LIMITS OF TREE REMOVAL SHOWN OUTSIDE OF STUDY AREA REPRESENT CANOPIES OF TREES TO BE REMOVED.
2. STREAM, BUFFERS AND WETLAND AREAS PROVIDED BY ESA, DATED OCT 19, 2021.

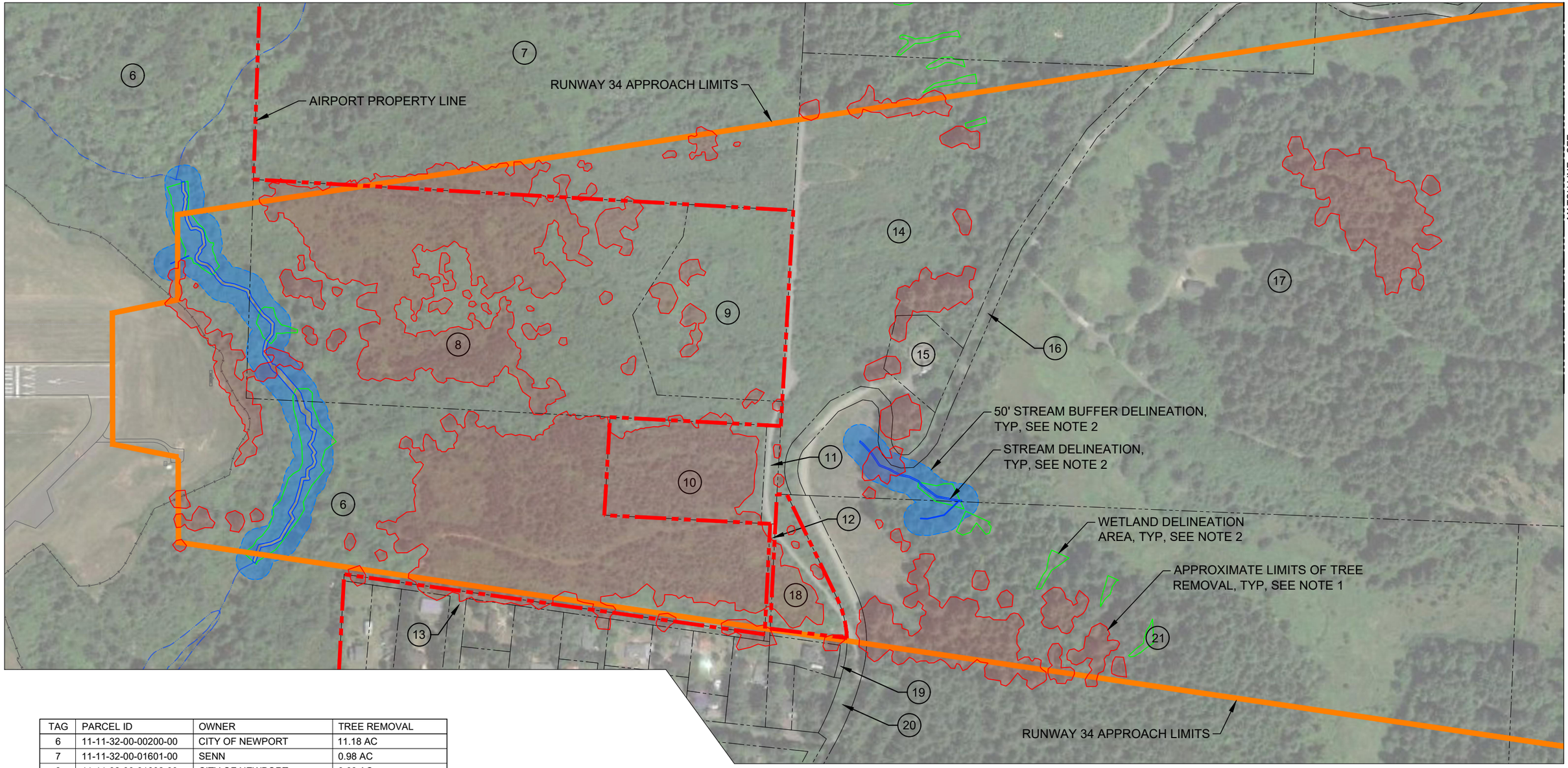
PRELIMINARY
NOT FOR CONSTRUCTION
12/02/2021

PRECISION APPROACH ENGINEERING
5125 Southwest Hout Street
Corvallis, OR 97333
541•754•0043

NEWPORT MUNICIPAL AIRPORT
APPROACH OBSTRUCTION REMOVAL

# RUNWAY 16 APPROACH

**Figure 3** DEC 2021




| TAG | PARCEL ID | OWNER | TREE REMOVAL |
|---|---|---|---|
| 6 | 11-11-32-00-00200-00 | CITY OF NEWPORT | 11.18 AC |
| 7 | 11-11-32-00-01601-00 | SENN | 0.98 AC |
| 8 | 11-11-32-00-01602-00 | CITY OF NEWPORT | 8.68 AC |
| 9 | 11-11-32-00-01604-00 | CITY OF NEWPORT | 0.38 AC |
| 10 | 11-11-32-00-00201-00 | STATE OF OREGON | 2.80 AC |
| 11 | 11-11-32-00-01603-00 | FERRIS | 0.03 AC |
| 12 | 11-11-32-00-01600-00 | LINCOLN COUNTY | 0.09 AC |
| 13 | 11-11-32-CC-0ROAD-00 | ROW | 0.50 AC |
| 14 | 12-11-05-00-00800-00 | STEEL STRING INC | 1.50 AC |
| 15 | 12-11-05-00-00600-00 | STEEL STRING INC | 0.11 AC |
| 16 | 12-11-05-00-0ROAD-00 | ROW | 0.10 AC |
| 17 | 12-11-05-00-00803-00 | STEEL STRING INC | 2.55 AC |
| 18 | 12-11-06-00-00100-00 | CITY OF NEWPORT | 0.53 AC |
| 19 | 12-11-06-00-00200-00 | WATTS | 0.06 AC |
| 20 | 12-11-06-00-0ROAD-01 | ROW | 0.08 AC |
| 21 | 12-11-06-00-00600-00 | STEEL STRING INC | 3.03 AC |

NOTES:

1. LIMITS OF TREE REMOVAL SHOWN OUTSIDE OF STUDY AREA REPRESENT CANOPIES OF TREES TO BE REMOVED.
2. STREAM, BUFFERS AND WETLAND AREAS PROVIDED BY ESA, DATED OCT 19, 2021.

PRELIMINARY
NOT FOR CONSTRUCTION
12/02/2021

NORTH

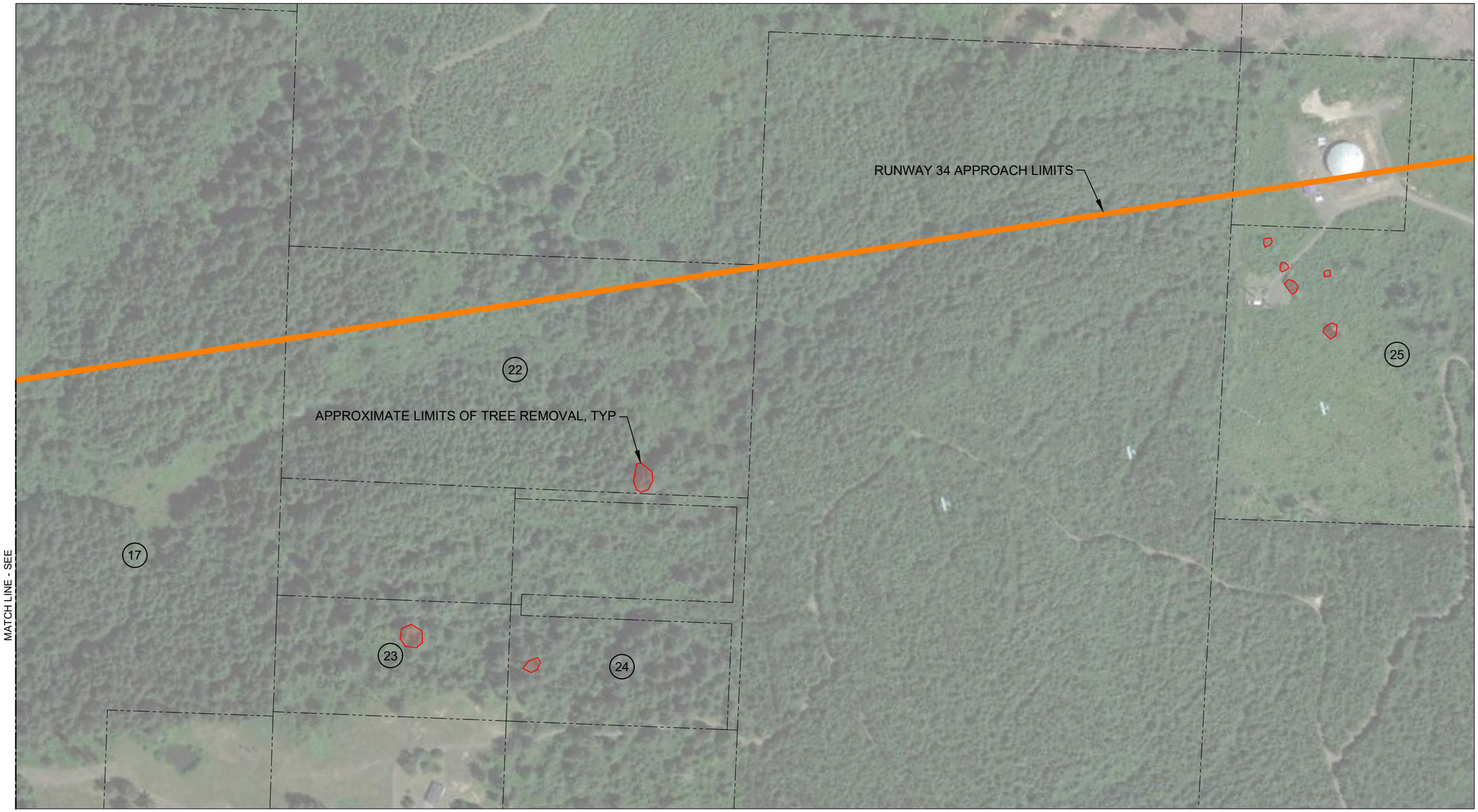
0 150 300
SCALE IN FEET

NEWPORT MUNICIPAL AIRPORT
APPROACH OBSTRUCTION REMOVAL

# RUNWAY 34 APPROACH (North)

PRECISION APPROACH ENGINEERING
5125 Southwest Hout Street
Corvallis, OR 97333
541•754•0043

**Figure 4** DEC 2021




| TAG | PARCEL ID | OWNER | TREE REMOVAL |
|---|---|---|---|
| 17 | 12-11-05-00-00803-00 | STEEL STRING INC | 2.55 AC |
| 22 | 12-11-05-00-00802-00 | WEYERHAEUSER CO | 0.08 AC |
| 23 | 12-11-05-CB-00200-00 | STEEL STRING INC | 0.08 AC |
| 24 | 12-11-05-CB-00700-00 | STEEL STRING INC | 0.03 AC |
| 25 | 12-11-00-00-03400-00 | EMERY INVESTMENTS INC | 0.08 AC |

PRELIMINARY
NOT FOR CONSTRUCTION
12/02/2021

NORTH

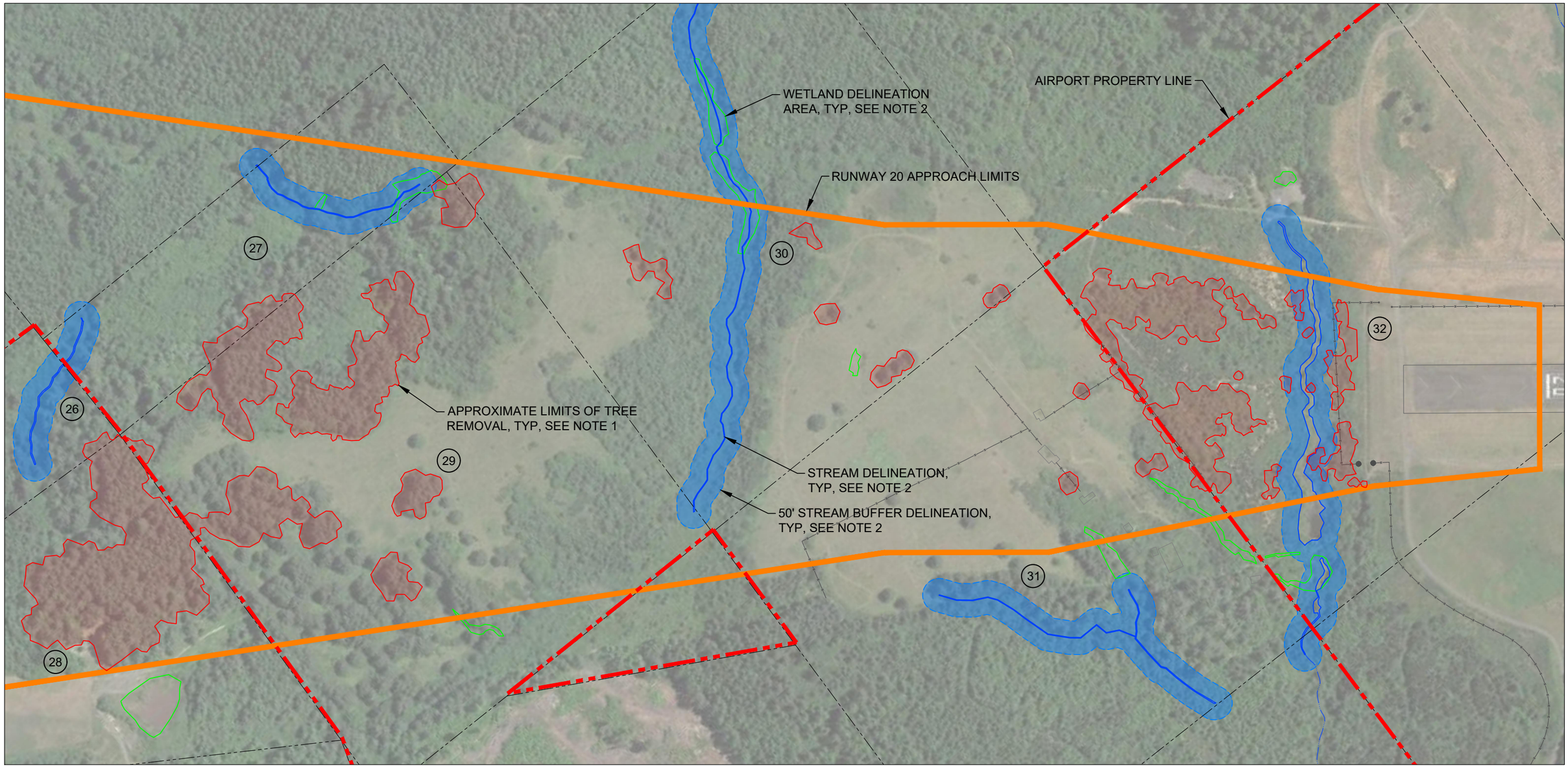
0 150 300
SCALE IN FEET

NEWPORT MUNICIPAL AIRPORT
APPROACH OBSTRUCTION REMOVAL

# RUNWAY 34 APPROACH (South)

**Figure 5** DEC 2021

PRECISION APPROACH ENGINEERING
5125 Southwest Hout Street
Corvallis, OR 97333
541•754•0043




| TAG | PARCEL ID | OWNER | TREE REMOVAL |
|---|---|---|---|
| 26 | 11-11-21-00-01600-00 | CITY OF NEWPORT | 0.06 AC |
| 27 | 11-11-28-00-00700-00 | HALL | 0.25 AC |
| 28 | 11-11-20-00-02700-00 | CITY OF NEWPORT | 4.80 AC |
| 29 | 11-11-29-00-00100-00 | HALL | 5.90 AC |
| 30 | 11-11-29-00-00600-00 | HALL | 0.72 AC |
| 31 | 11-11-29-00-00500-00 | HALL | 0.54 AC |
| 32 | 11-11-29-00-01000-00 | CITY OF NEWPORT | 3.70 AC |

NOTES:

1. LIMITS OF TREE REMOVAL SHOWN OUTSIDE OF STUDY AREA REPRESENT CANOPIES OF TREES TO BE REMOVED.
2. STREAM, BUFFERS AND WETLAND AREAS PROVIDED BY ESA, DATED OCT 19, 2021.

PRELIMINARY
NOT FOR CONSTRUCTION
12/02/2021

NORTH

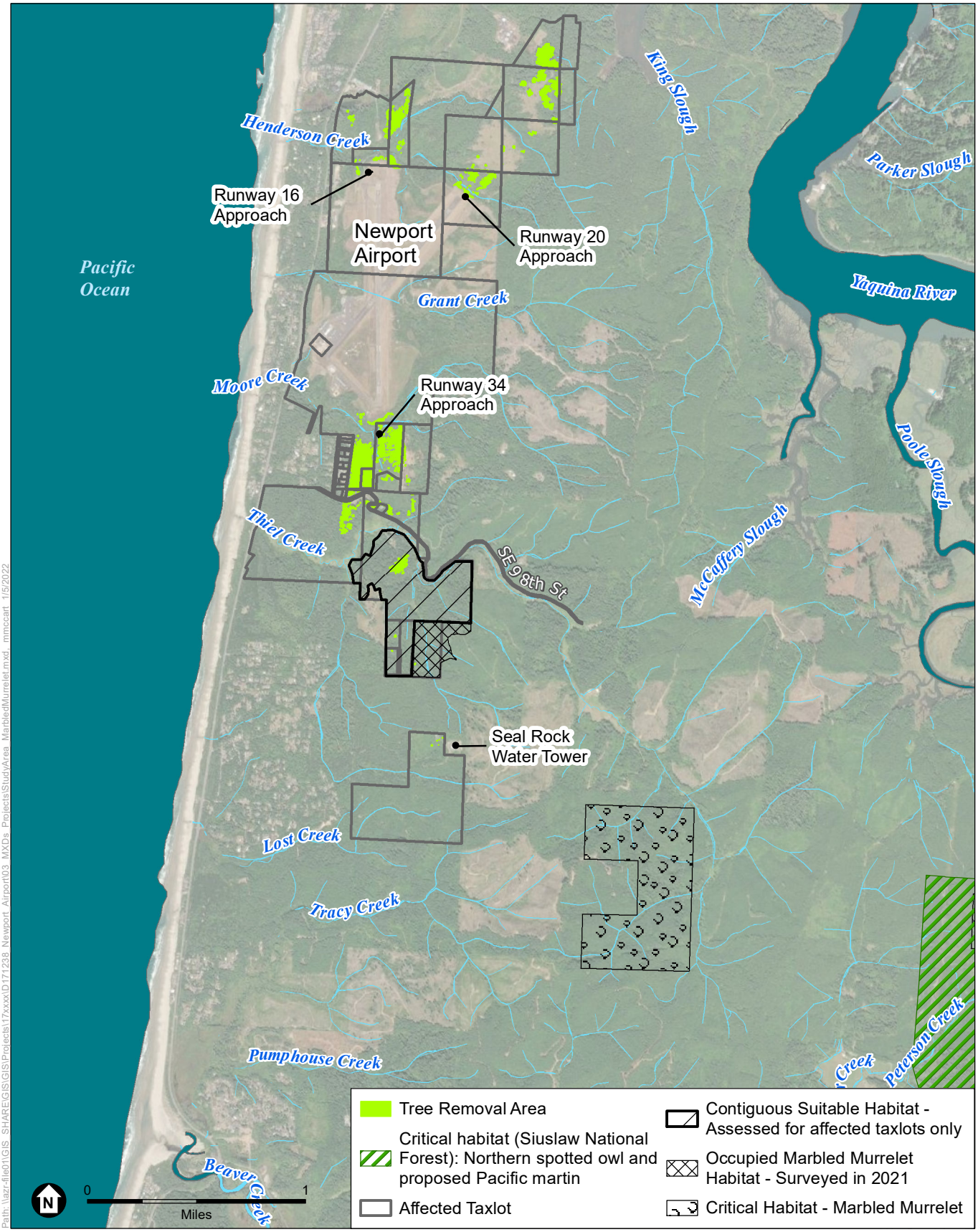
0 150 300
SCALE IN FEET

NEWPORT MUNICIPAL AIRPORT
APPROACH OBSTRUCTION REMOVAL

# RUNWAY 20 APPROACH

PRECISION APPROACH ENGINEERING
5125 Southwest Hout Street
Corvallis, OR 97333
541•754•0043

**Figure 6** DEC 2021

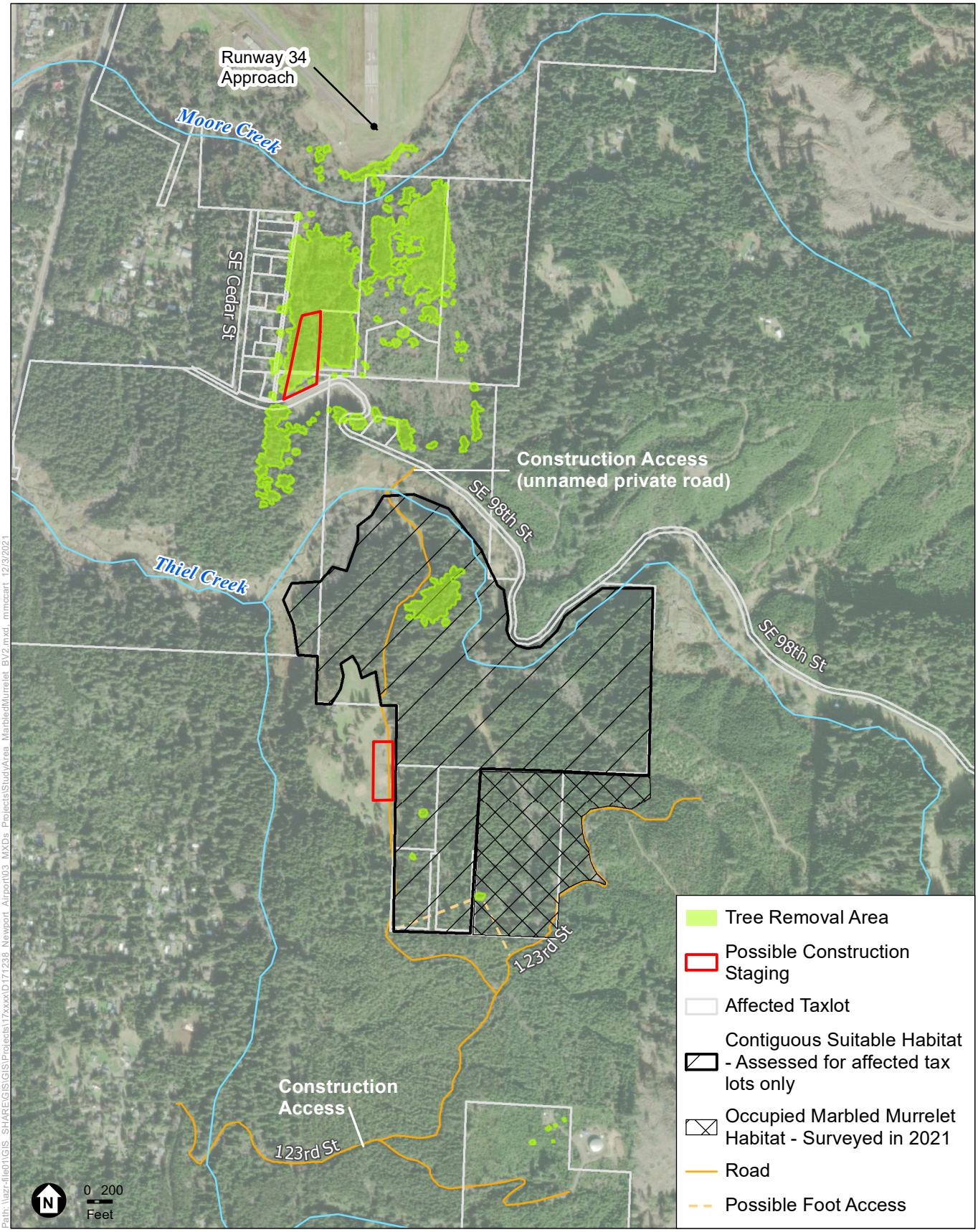



SOURCE: ESRI, 2020; Weyerhaeuser, 2021; Precision Approach Engineering, 2019

Newport Airport Obstruction Removal Phase 2

**Figure 7**
Study Area Overview and Critical Habitat

ESA




SOURCE: ESRI, 2020; Weyerhaeuser, 2021; Precision Approach Engineering, 2019

Newport Airport Obstruction Removal Phase 2

**Figure 8**
Construction Access and Staging

ESA

# Appendix B
## USFWS Species List

ESA

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# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish And Wildlife Office
2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398
Phone: (503) 231-6179 Fax: (503) 231-6195
https://www.fws.gov/oregonfwo/articles.cfm?id=149489416

In Reply Refer To: November 11, 2021
Consultation Code: 01EOFW00-2022-SLI-0095
Event Code: 01EOFW00-2022-E-00244
Project Name: Newport Airport Obstruction Removal Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. If you have questions regarding your responsibilities under the Act, please contact the Endangered Species Division at the Service's Oregon Fish and Wildlife Office at (503) 231-6179. For information regarding listed marine and anadromous species under the jurisdiction of NOAA Fisheries Service, please see their website (http://www.nwr.noaa.gov/habitat/habitat_conservation_in_the_nw/habitat_conservation_in_the_nw.html).

Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

# Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Oregon Fish And Wildlife Office**
2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398
(503) 231-6179

# Project Summary

Consultation Code: 01EOFW00-2022-SLI-0095
Event Code: Some(01EOFW00-2022-E-00244)
Project Name: Newport Airport Obstruction Removal Project
Project Type: TRANSPORTATION
Project Description: The City of Newport (City) proposes to remove obstructions from Federal Air Regulations (FAR) Part 77 airspace approach surfaces at the Newport Municipal Airport (Airport) to improve the safety of aircraft operations. Data gathered from evaluating the Airport Geographic Information System Survey as part of the Master Plan Update conducted in 2018 identified obstructions in the protected airspace. A LiDAR survey (Quantum Spatial, Inc. 2019) confirmed numerous obstructions (trees) penetrating the protected airspace.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.57426325,-124.05783486009176,14z


Counties: Lincoln County, Oregon

# Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

## Mammals

| NAME | STATUS |
|---|---|
| Pacific Marten, Coastal Distinct Population Segment *Martes caurina*<br>There is **proposed** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/9081 | Threatened |

## Birds

| NAME | STATUS |
|---|---|
| Marbled Murrelet *Brachyramphus marmoratus*<br>Population: U.S.A. (CA, OR, WA)<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/4467 | Threatened |
| Northern Spotted Owl *Strix occidentalis caurina*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/1123 | Threatened |
| Western Snowy Plover *Charadrius nivosus nivosus*<br>Population: Pacific Coast population DPS-U.S.A. (CA, OR, WA), Mexico (within 50 miles of Pacific coast)<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/8035 | Threatened |

## Reptiles

| NAME | STATUS |
|---|---|
| Leatherback Sea Turtle *Dermochelys coriacea*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/1493 | Endangered |
| Loggerhead Sea Turtle *Caretta caretta*<br>Population: North Pacific Ocean DPS<br>No critical habitat has been designated for this species.<br>Species profile: https://ecos.fws.gov/ecp/species/1110 | Endangered |
| Olive Ridley Sea Turtle *Lepidochelys olivacea*<br>Population: Wherever found, except when listed as endangered under 50 CFR 224.101<br>No critical habitat has been designated for this species.<br>Species profile: https://ecos.fws.gov/ecp/species/1513 | Threatened |

## Insects

| NAME | STATUS |
|---|---|
| Monarch Butterfly *Danaus plexippus*<br>No critical habitat has been designated for this species.<br>Species profile: https://ecos.fws.gov/ecp/species/9743 | Candidate |

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

# Appendix B. Service concurrence with findings with regard to effects to the northern spotted owl and coastal marten.

As detailed in the Consultation History section of this Biological Opinion, on January 7, 2022, the Service received a letter from the Federal Aviation Administration (FAA) requesting informal consultation on the proposed Newport Municipal Airport Obstruction Removal project and concurrence with their determination that the project may affect but is not likely to adversely affect the marbled murrelet, northern spotted owl, and coastal DPS of the Pacific marten (coastal marten). Based on information indicating that marbled murrelet occupancy had been documented within the action area and that potential nesting habitat was slated for removal as a part of the project, the Service determined that concurrence with a finding of "not likely to adversely affect" for the marbled murrelet was not appropriate; this resulted in formal consultation for this species and ultimately the development of this Biological Opinion. Further examination of the facts with regard to the potential effects of the proposed project on the northern spotted owl and coastal marten have led the Service to concur with the FAA's determination that the proposed project may affect, but is not likely to adversely affect, these species. Here we provide the rationale for this determination; we refer the reader to the BA for this project (Appendix A) and the Overview of the Project in the Biological Opinion for the marbled murrelet for a description of the proposed project and the action area relevant to this discussion.

In brief, because northern spotted owls and coastal martens may use habitat similar to that often selected by marbled murrelets for nesting (generally structurally complex forests with large trees and old-growth characteristics), to be conservative we assumed that the 140-acre forest patch of habitat that is considered occupied or potential habitat for the marbled murrelet within the action area might also provide potential habitat for the northern spotted owl or coastal marten. Importantly, the habitat needs of these species are generally much broader than those of marbled murrelets, which use forested habitats only for breeding behaviors; as a consequence, although not optimal, marbled murrelets may be able to make use of relatively small forest patches in proximity to the marine environment as long as they provide the requisite nesting structures. Northern spotted owls and coastal martens, by contrast, used forested habitats for all of their life history needs, including not only breeding but also foraging, shelter, dispersal, and other activities. As a consequence, a greater range of habitat characteristics must be present for habitat to be considered suitable for the northern spotted owl or coastal marten.

**Northern spotted owl**

According to the BA (Appendix A, p. 11), there are no documented occurrences of northern spotted owl in or near the action area (citing to ORBIC 2019). We additionally queried the database of northern spotted owl occurrences for the state, maintained by Oregon State University, and determined that there are no records of northern spotted owls within a minimum of 2 miles from the action area (Ackers in litt., 2022). Surveys for northern spotted owls were completed according to protocol in the spring and summer of 2021 on the Weyerhauser property, parcel ID 12-11-05-00-00802-00 (the same parcel where marbled murrelets were detected), but no northern spotted owls were seen or heard. Although this provides useful information, Service

protocol requires a minimum of 2 years of consecutive surveys to protocol to begin to assess northern spotted owl activity in an area (USFWS 2012, p. 22). Therefore, the single year's worth of survey on the Weyerhauser parcel is not in and of itself sufficient to determine whether northern spotted owls were present However, it is reasonably certain the area does not contain a sufficient amount of nesting/roosting habitat to support any resident northern spotted owl (see habitat discussion below).

As noted above, the presence of marbled murrelets in the same parcel implied that this area could potentially provide suitable habitat for northern spotted owls, as the two species share many similar habitat requirements (large trees with structural complexity usually associated with older forests, multiple canopy layers, canopy closure, etc.). Northern spotted owls have more diverse habitat needs, however, as resident owls must fulfill all of their life history requirements (nesting, roosting, foraging, and dispersal) within the landscape, whereas marbled murrelets require forested habitats only for essential breeding behaviors and have very specific requirements for suitable nest structures.

As described in the Biological Opinion, most of the action area is highly fragmented forest or industrial timberlands and in close proximity to residences and areas of high human activity and would not be considered potential habitat for northern spotted owls (see, e.g., Exhibit 5 of the BA and discussion on p. 7, Appendix A). We considered the140-acre patch occupied by marbled murrelets as likely the only place within the action area that might provide possible roosting, foraging, or dispersal habitat; there was no indication of large trees with deformities in this area (large cavities, broken tops, mistletoe infections, and other evidence of decadence) and no large snags that might be associated with nesting habitat.

As described in the Biological Opinion's Project Overview, within the 140-acre patch a total of approximately 3 acres of tall vegetation is slated for removal; most of this is in one contiguous patch of forest (approximately 2.55 acres). There are a few individual trees separately identified for removal that make up the total of approximately 3 acres. Northern spotted owls generally require larger blocks of habitat than marbled murrelets: a spotted owl nest patch is considered to be an area at least 70 acres in size centered in contiguous habitat around a potential nest tree, and core areas are composed of at least 500 acres of habitat where spotted owls would nest, roost, forage, and raise young (USFWS 2011, p. C-15). We did not observe any trees within the 140-acre patch of potential habitat that appeared to provide suitable nest cavities or other structures that would most likely be utilized by northern spotted owls within the Coast Range. Furthermore, barred owls have been observed in the area (S. Hartung, in litt.) and are known to displace northern spotted owls. Finally, the highly fragmented and isolated nature of the forested habitat patches and scarcity of habitat with old-growth characteristics indicate there is insufficient habitat within or in proximity to the action area to support resident northern spotted owls.

To evaluate this last point, we conducted a GIS exercise using the LiDAR data available for the action area. Although we did not have data available for stand age, we used tree height as a proxy, assuming taller trees were likely to be older and larger and would be most likely to provide the structural characteristics required for a nesting (territorial resident) northern spotted

owl. We would expect such trees to be on the order of at least 100 to 150 feet tall. We used the 140-acre occupied/contiguous patch of forest identified for marbled murrelets as our focal area (Figure 1 of the Biological Opinion) and evaluated the forest cover within a 0.25-mile and a 1-mile radius. The results indicate that there is not sufficient habitat to support resident northern spotted owls within the action area, nor is there sufficient habitat in proximity to the presumed 140-acre patch of potential habitat to support northern spotted owls (Figure C-1). The results indicate that the vast majority of the forested landscape within this area is younger forest less than 100 feet in height (Table C-1) Within a 0.25-mile radius only 9.4% of the forest is in the 100 to 150-foot height class and 0.2% is more than 150 feet in height; within the 1-mile radius, 4.2% of the forest is in the 100- to 150-foot height class and 0.1% is more than 150 feet.

Stands less than 100-feet tall could potentially serve as northern spotted owl dispersal habitat. Stands 100 to 150 feet tall could serve either as dispersal or low-quality forage habitat with no or negligible amounts of nesting attributes. None of the stands within the area we evaluated would likely support northern spotted owl nesting at the stand scale based on tree height. However, the analytical assumption is that the aforementioned 140-acre stand of murrelet habitat would be suitable for northern spotted owl roosting, foraging, or dispersal, if any northern spotted owls are present.

Based on all of this information and considering the landscape context, we expect it is highly unlikely that resident or nesting northern spotted owls occur within the action area. Although the area may provide habitat that could support northern spotted owls dispersing through the area or perhaps roosting or foraging on occasion, the combination of poor habitat quality, fragmentation, isolation, and presence of barred owls makes it unlikely that a northern spotted owl would remain in the area for any length of time.

**Table C-1.** Evaluation of canopy height as a proxy for tree size and age in the area surrounding the 140-acre patch of occupied/potential marbled murrelet habitat within the action area

| | **Percent of forest cover** | |
|---|---|---|
| **Canopy Height Class** | *w/in 0.25 mile* | *w/in 1 mile* |
| 0 – 50 feet | 64.0 | 68.3 |
| 50 – 100 feet | 26.4 | 27.3 |
| 100-150 feet | 9.4 | 4.2 |
| > 150 feet | 0.2 | 0.1 |

We do not anticipate the project will have adverse effects on resident or nesting northern spotted owls because there is most likely insufficient habitat in or near the action area to support a resident single or a nesting pair and there is no evidence of northern spotted owls occurring in or in proximity to the action area. In addition, all tree removal activities in the portion of the action area that would be most likely to be occupied by northern spotted owls will be conducted outside of the northern spotted owl nesting season (February 1 through August 31). No trees with cavities or structures suitable for nesting by northern spotted owls were observed within the area of potential habitat and our analysis of LiDAR imagery indicates it is unlikely that such trees

exist with the area of analysis. For all of these reasons, we do not expect resident single owls or nesting owls to be exposed to any of the project activities, nor do we expect tree removal to affect nesting habitat for northern spotted owls. Although the planned tree removals within the 140-acre are of potential habitat could result in the removal of some possible foraging, roosting, or dispersal habitat that could possibly be used on occasion by northern spotted owls, there is no shortage of those habitat types in the area, such that the very small areas proposed for removal would have only insignificant effects on any owls that might be present. If any northern spotted owls should happen to be present when tree removal activities are taking place, the most likely effect of the proposed action would be temporary displacement of the birds, which would merely relocate in response to activity. Furthermore, any effects from owls moving in response to noise disturbance from tree removal would likely be insignificant given the current level of noise occurring from aircraft traffic using Runway 34.

Based upon the information provided in your BA dated January 2022, and our analysis of the proposed project, we concur with the FAA's determination that the proposed action may affect, but is not likely to adversely affect the northern spotted owl for the following reasons:

1. No known northern spotted owl sites would be affected by the action;
2. Based on habitat conditions and a high amount of ambient noise from the airport, the action area likely does not support enough nesting, roosting, or foraging habitat to support any resident single or nesting pair of northern spotted owls. If any resident or breeding northern spotted owls are present in the action area, the removal of up to 3 acres of nesting/roosting/foraging habitat would not adversely affect northern spotted owl residency or breeding within any site territory;
3. The planned removal of fewer than 3 acres of trees that could possibly serve as dispersal and/or low-quality roosting/foraging habitat will have negligible impact on the availability of these habitat types in the action area. This small amount of habitat removal would not create a strong filter or barrier to any landscape dispersal of northern spotted owl individuals; and
4. Direct effects, if any northern spotted owl individuals should be present within the action area, would most likely be limited to minor disturbance and temporary displacement of birds; no nesting birds would be affected since all tree removal activities in the area of potential habitat for northern spotted owls will be limited to the non-breeding season.

All potential effects are insignificant. There is no designated critical habitat in the action area, so none will be affected.

**References Cited**

USFWS (U.S. Fish and Wildlife Service). 2011. Revised Recovery Plan for the Northern Spotted Owl (*Strix occidentalis caurina*). U.S. Fish and Wildlife Service, Portland, Oregon. 258+pp.

USFWS (U.S. Fish and Wildlife Service). 2012. Protocol for Surveying Proposed Management Activities that May Impact Northern Spotted Owls. Revision January 9, 2012. U.S. Fish and Wildlife Service, Portland, Oregon. 42 pp.

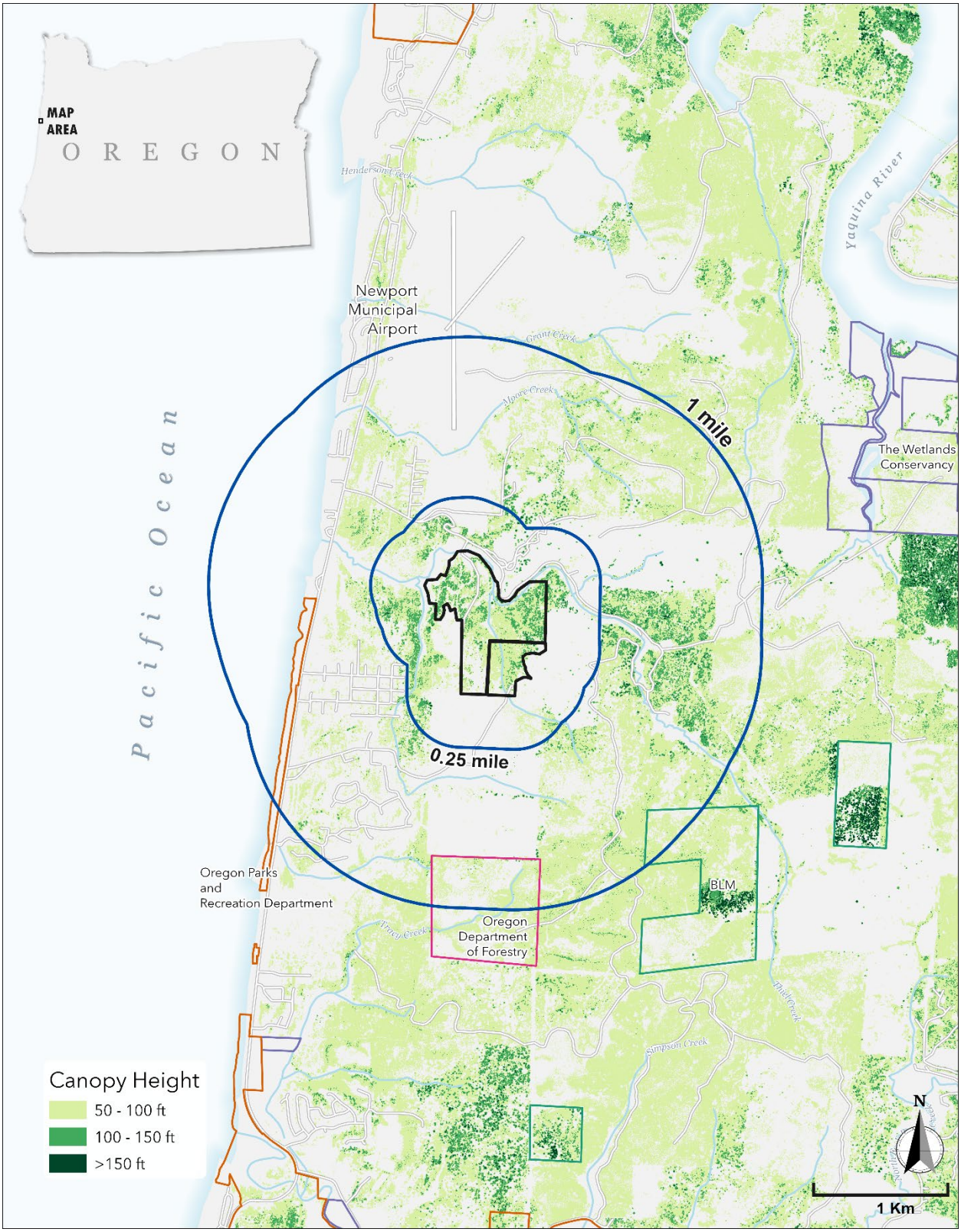


***Figure C-2.*** *Analysis of canopy height classes in 0.25-mile and 1-mile radii surrounding the 140-acre patch of occupied/potential habitat for marbled murrelets within the action area. This patch of occupied/potential habitat for the marbled murrelet is presumed to also represent the most likely potential habitat for northern spotted owls within the action area as well.*

**Coastal Marten**

According to the BA (Appendix A, p. 11), there are no documented occurrences of coastal marten in or near the action area (citing to ORBIC 2019). We additionally checked our database of known coastal marten occurrences and did not find any within or in proximity to the action area (USFWS 2022, unpublished data). The nearest known marten occurrence is a roadkill that was documented prior to 1996, and this was more than 5 km (3 mi) to the north across the Yaquina River and Bay, which is a significant impediment to movement of martens. The nearest recent documented occurrence of a coastal marten is from 2017 in the Siuslaw National Forest more than 16 km (10 mi) east of the southern project boundary (Figure C-3). The project area is not in proximity to an Extant Population Area (EPA) of marten (USFWS 2018, pp. 74-80), nor is it in proximity to proposed critical habitat for the coastal marten (USFWS 2021).

Coastal martens generally utilize older forest stands that are structurally complex and have multiple canopy layers, a dense understory, and snags or other decadent elements such as tree cavities or dead and downed wood that can serve as den sites. Suitable habitat is described as forest stands in old-growth or late-mature seral stages with a wide range of tree sizes, including trees with large diameter and height; deep, dense tree canopies with multiple canopy layers and irregular tree crowns; high numbers of snags, including large diameter snags; and abundant down wood, including large logs, ideally in a variety of decay stages. In addition, martens favor areas with a dense, spatially extensive shrub layer, particularly of ericaceous species such as salal, huckleberry, or rhododendron. Habitat that provides for movement between home ranges may have lesser representation of these characteristics but still provide sufficient forage and ocver from predators to allow a marten to traverse the landscape to areas of higher quality habitat. Highly fragmented forests are not suitable for coastal martens, as it greatly increases the risk of predation from their primary predator, the bobcat, which thrives in such fragmented forests.

As described in the Biological Opinion, most of the action area is highly fragmented forest or industrial timberlands and in close proximity to residences and areas of high human activity and would not be considered potential habitat for coastal martens (see, e.g., Exhibit 5 of the BA and discussion on p. 7, Appendix A). Although the BA describes the 140-acre patch of forest that is considered occupied/potential habitat for marbled murrelets as potential habitat for coastal marten as well, we find it unlikely that any of the forest within the action area supports coastal marten. The forest is highly fragmented and most of it is entirely lacking in the complex forest structure and decay elements (tree cavities, dead or downed wood) and extensive dense shrubby understory required by martens. Based on all of these considerations, we find it highly unlikely that resident martens would be expected within the action area.

It is possible that an occasional marten could traverse the action area, dispersing from the Siuslaw National Forest population. A distance of 16 km (10 mi) is within the travel capabilities of a marten. However, the combination of poor habitat quality, fragmentation, isolation, and proximity to human activity makes it unlikely that a coastal marten would remain in the area for any length of time. The project area is not included within nor in close proximity to any area identified as either a coastal marten habitat core or a least-cost corridor for movement of coastal martens (Schrott and Shinn 2020, pp. 38-39).

We do not anticipate the project will have adverse effects on breeding coastal martens because the action area does not provide habitat of sufficient quality to support denning or long-term occupancy, and there are no known observations of coastal martens in or near the action area. In the highly unlikely case that any martens should be present, all tree removal activities in the portion of the action area that would be most likely to be occupied by coastal martens will be conducted outside of the denning season (mid-April to mid-September). No snags or trees with cavities or other structures or downed wood suitable for denning by martens were observed within the area of potential habitat. Some dense shrub cover exists within the portion of the area considered to be potential habitat, which could serve as suitable dispersal habitat. Only a few single trees are identified for removal in this area, such that the possible dispersal function of this habitat would not be adversely affected, as it would still provide sufficient cover and forage for any dispersing martens. The single area of contiguous clearing, where up to 3 acres of smaller diameter trees will be removed, is lacking both the complex forest and decay elements and the dense shrubby understory required by martens, and would serve only as marginal dispersal habitat such that the removal of this small area of forest would not substantially reduce the amount of such habitat available to martens in the project area. For all of these reasons, we do not expect breeding coastal martens to be exposed to any of the project activities, nor do we expect tree removal to affect denning habitat for coastal marten. If any dispersing coastal martens should happen to be present when tree removal activities are taking place, the most likely short-term effect of the proposed action would be to redirect the movements of the animal in response to the activity. In the long term, the tree removals proposed would not affect the quality of the project area as potential dispersal habitat.

Based upon the information provided in your BA dated January 2022, and our analysis of the proposed project, we concur with the FAA's determination that the proposed action may affect, but is not likely to adversely affect the coastal marten for the following reasons:

1. No known coastal martens would be affected by the action;
2. Based on poor quality habitat conditions, the highly fragmented nature of the habitat, and a high amount of ambient noise from the airport, the action area does not provide habitat of sufficient quality to support resident or denning martens. In the unlikely event that any resident or denning martens are present in the action area, the removal of up to 3 acres of marginal quality habitat would not affect marten usage of the area;
3. The planned removal of fewer than 3 acres of trees that could possibly serve as dispersal or marginal habitat for martens will have negligible impact on the availability of these habitat types in the action area. This small amount of habitat removal would not serve as a strong filter or barrier to any landscape dispersal of coastal marten individuals; and
4. All tree removal activities in the area that is considered closest to potential habitat for coastal marten will take place outside of the denning season;
5. Direct effects, in the unlikely case that coastal martens are present within the action area, would most likely be limited to minor disturbance and altered movements in response to activity; no denning martens would be affected since all tree removal

activities in the area of potential habitat for coastal martens will be limited to outside the denning season.

All potential effects are insignificant. There is no designated critical habitat in the action area, so none will be affected.

**References Cited**

Schrott, G.R., and J. Shinn. 2020. A Landscape Connectivity Analysis for the Coastal Marten (*Martes caurina humboldtensis*). U.S. Fish and Wildlife Service, Arcata, California. 123 pp.

USFWS (U.S. Fish and Wildlife Service). 2018. Species status assessment report for the coastal marten (*Martes caurina humboldtensis*), Version 1.1. June 2018. Arcata, California. 132 pp.

USFWS (U.S. Fish and Wildlife Service). 2021. Designation of critical habitat for the coastal distinct population segment of the Pacific marten: proposed rule. Federal Register 86:58831-58858.

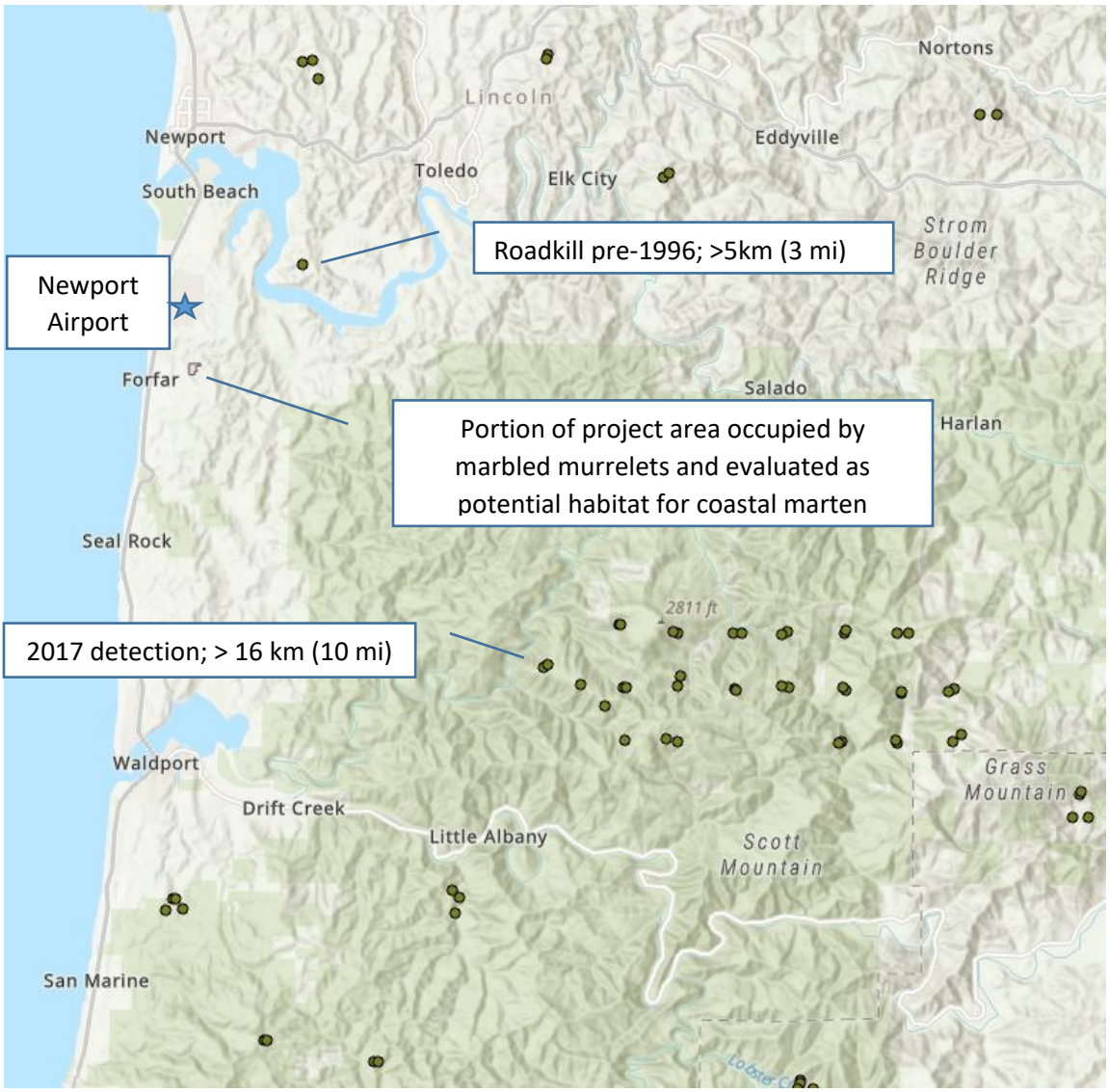


*Figure C-3. Marten occurrences in general vicinity of Newport Municipal Airport and area identified as occupied by marbled murrelets in particular (evaluated here as potential habitat for coastal marten). All relatively recent (post-1996) detections south of Yaquina Bay and River are more than 16 km (10 mi) from the proposed project area. Marten detection data from unpublished USFWS database (K. Moriarty) dated April 2022.*

This concludes informal consultation pursuant to section 7(a)(2) of the Endangered Species Act for the northern spotted owl and coastal marten. As provided in 50 CFR 402.16, reinitiation of consultation is required and shall be requested by the Federal action agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (1) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (2) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in our concurrence; or (3) If a new species is listed or critical habitat designated that may be affected by the identified action.

# Appendix C. Status of the marbled murrelet.

# STATUS OF THE SPECIES - MARBLED MURRELET

## Species Description

The murrelet is a small diving seabird that nests mainly in coniferous forests and forages in near-shore marine habitats. Males and females have sooty-brown upperparts with dark bars. Underparts are light, mottled brown. Winter adults have brownish-gray upperparts and white scapulars. The plumage of fledged young is similar to that of adults in winter. Chicks are downy and tan colored with dark speckling.

## Legal Status

The murrelet was listed as a threatened species on September 28, 1992, in Washington, Oregon, and northern California (USDI FWS 1992). Since the species' listing, the U.S. Fish and Wildlife Service (Service) has completed three 5-yr status reviews of the species: September 2004 (USDI FWS 2004), June 2009 (USDI FWS 2009), and May 2019 (USDI FWS 2019). The 2004 5-year review determined that the California, Oregon, and Washington distinct population segment of the murrelet did not meet the criteria outlined in the Service's 1996 Distinct Population Segment (DPS) policy (USDI FWS and NOAA 1996, USDI FWS 2004). However, the 2009 5-year review concluded the 2004 analysis of the DPS question was based on a flawed assumption regarding discreteness at the international border with Canada, and that the three-state population did, in fact, constitute a valid DPS (USDI FWS 2009, pp. 3-12). In 2010, the Service denied a petition to delist the marbled murrelet, and the U.S. Court of Appeals for the D.C. Circuit upheld the Service's decision. The most recent 5-year status review was completed in May 2019. This review did not propose changes to the listing status but noted that a change in listing status could be warranted if continued trends of manmade and natural threats continue at current or increased levels (USDI FWS 2019). The legal status of the murrelet remains unchanged from the original designation.

## Life history

Murrelets produce one egg per nest and usually only nest once a year, however re-nesting has been documented after nest failure. Nests are not built, but rather the egg is placed in a small depression or cup made in moss or other debris on the limb. Incubation lasts about 30 days, and chicks fledge after about 28 days after hatching. Both sexes incubate the egg in alternating 24-hour shifts. The chick is fed up to eight times daily, and is usually fed only one fish at a time. The young are semi-precocial, capable of walking but not leaving the nest. Fledglings fly directly from the nest to the ocean. If a fledgling is grounded before reaching the ocean, they usually die from predation or dehydration, as murrelets need to take off from an elevated site to obtain flight.

## Ecology/Habitat Characteristics

Murrelets spend most of their life in the marine environment, but use old-growth forests for nesting. Courtship, foraging, loafing, molting, and preening occur in near-shore marine waters. Throughout their range, murrelets are opportunistic feeders and utilize prey of diverse sizes and species. They feed primarily on fish and invertebrates in near-shore marine waters although they have also been detected on rivers and inland lakes.

In their terrestrial environment, the presence of platforms (large branches or deformities) used for nesting is the most important characteristic of their nesting habitat. Murrelet habitat use during the breeding season is positively associated with the presence and abundance of mature and old-growth forests, large core areas of old-growth, low amounts of edge habitat, reduced habitat fragmentation, proximity to the marine environment, and forests that are increasing in stand age and height. Additional information on murrelet taxonomy, biology, and ecology can be found in Ralph et al. (1995), McShane et al. (2004), and Piatt et al. (2007).

Aquatic Habitat Use

Birds occur off shore in Conservation Zones 1-6 year round and also occur in small numbers off southern California in the winter. Murrelets are usually found within 5 miles (8 km) from shore, and in water less than 60 meters deep (Ainley et al. 1995; Burger 1995; Strachan et al. 1995; Nelson 1997; Day and Nigro 2000; Raphael et al. 2007a). In general, birds occur closer to shore in exposed coastal areas and farther offshore in protected coastal areas (Nelson 1997). Courtship, foraging, loafing, molting, and preening occur in marine waters.

Murrelets are wing-propelled pursuit divers that forage both during the day and at night (Carter and Sealy 1986; Henkel et al. 2003; Kuletz 2005). Murrelets can make substantial changes in foraging sites within the breeding season, but many birds routinely forage in the same general areas and at productive foraging sites, as evidenced by repeated use over a period of time throughout the breeding season (Carter and Sealy 1990, Whitworth et al. 2000; Becker 2001; Hull et al. 2001; Mason et al. 2002; Piatt et al. 2007). Murrelets are also known to forage in freshwater lakes (Nelson 1997). Activity patterns and foraging locations are influenced by biological and physical processes that concentrate prey, such as weather, climate, time of day, season, light intensity, up-wellings, tidal rips, narrow passages between island, shallow banks, and kelp (*Nereocystis* spp.) beds (Ainley et al. 1995; Burger 1995; Strong et al. 1995; Speckman 1996; Nelson 1997).

Juveniles are generally found closer to shore than adults (Beissinger 1995) and forage without the assistance of adults (Strachan et al. 1995). Kuletz and Piatt (1999) found that in Alaska, juvenile murrelets congregated in kelp beds. Kelp beds are often associated with productive waters and may provide protection from avian predators (Kuletz and Piatt 1999). McAllister (in Strachan et al. 1995) found that juveniles were more common within 328 feet (100 m) of shorelines, particularly where bull kelp was present.

Within the area of use, murrelets usually concentrate feedings in shallow, near-shore water less than 98 feet (30 m) deep (Huff et al. 2006), but are thought to be able to dive up to depths of 157 feet (47 m) (Mathews and Burger 1998). During the non-breeding season, murrelets disperse and can be found farther from shore (Strachan et al. 1995). Although little information is available outside of the nesting season, limited information on winter distribution also suggests they do move further offshore (Strachan et al. 1995, p. 247). In areas with protective waters, there may be a general opportunistic shift from exposed outer coasts into more protected waters during the winter (Nelson 1997); for example, many murrelets breeding on the exposed outer coast of Vancouver Island appear to congregate in the more sheltered waters within the Puget Sound and the Strait of Georgia in fall and winter (Burger 1995). In many areas, murrelets also undertake occasional trips to inland nesting habitat during the winter months (Carter and Erickson 1992).

Throughout the listed range, murrelets do not appear to disperse long distances, indicating they are year-round residents (McShane et al. 2004).

Throughout their range, murrelets are opportunistic feeders and utilize prey of diverse sizes and species. They feed primarily on fish and invertebrates in marine waters although they have also been detected on rivers and inland lakes (Carter and Sealy 1986; USDI FWS 1992). In general, small schooling fish and large pelagic crustaceans are the main prey items. Pacific sand lance (*Ammodytes hexapterus*), northern anchovy (*Engraulis mordax*), immature Pacific herring (*Clupea harengus*), capelin (*Mallotus villosus*), Pacific sardine (*Sardinops sagax*), juvenile rockfishes (*Sebastas* spp.), and surf smelt (*Osmeridae*) are the most common fish species taken. Squid (*Loligo* spp.), euphausiids, mysid shrimp, and large pelagic amphipods are the main invertebrate prey. Murrelets are able to shift their diet throughout the year and over years in response to prey availability (Becker et al. 2007). However, long-term adjustment to less energetically-rich prey resources (such as invertebrates) appears to be partly responsible for poor murrelet reproduction in California (Becker and Beissinger 2006).

Breeding adults exercise more specific foraging strategies when feeding chicks, usually carrying a single, relatively large (relative to body size) energy-rich fish to their chicks (Burkett 1995; Nelson 1997), primarily around dawn and dusk (Nelson 1997, Kuletz 2005). Freshwater prey appears to be important to some individuals during several weeks in summer and may facilitate more frequent chick feedings, especially for those that nest far inland (Hobson 1990). Becker et al. (2007) found murrelet reproductive success in California was strongly correlated with the abundance of mid-trophic level prey (*e.g.*, sand lance, juvenile rockfish) during the breeding and postbreeding seasons. Prey types are not equal in the energy they provide; for example parents delivering fish other than age-1 herring may have to increase deliveries by up to 4.2 times to deliver the same energy value (Kuletz 2005). Therefore, nesting murrelets that are returning to their nest at least once per day must balance the energetic costs of foraging trips with the benefits for themselves and their young. This may result in murrelets preferring to forage in marine areas in close proximity to their nesting habitat. However, if adequate or appropriate foraging resources (*i.e.*, "enough" prey, and/or prey with the optimum nutritional value for themselves or their young) are unavailable in close proximity to their nesting areas, murrelets may be forced to forage at greater distances or to abandon their nests (Huff et al. 2006). Consequently, the distribution and abundance of prey suitable for feeding chicks may greatly influence the overall foraging behavior and location(s) during the nesting season, may affect reproductive success (Becker et al. 2007), and may significantly affect the energy demand on adults by influencing both the foraging time and number of trips inland required to feed nestlings (Kuletz 2005).

Nesting Biology

Incubation is shared by both sexes, and incubation shifts are generally one day, with nest exchanges occurring at dawn (Nelson 1997, Bradley 2002). Hatchlings appear to be brooded by a parent for one or two days and then left alone at the nest for the remainder of the chick period (from hatching until fledging) while both parents spend most of their time foraging at sea. Both parents feed the chick (usually a single fish carried in the bill) and the chick typically receives 1-8 meals per day (mean 3.2) (Nelson 1997). About two-thirds of feedings occur early in the morning, usually before sunrise, and about one-third occur at dusk. Feedings are sometimes scattered throughout the day (Hamer and Nelson 1995a). Chicks fledge 27-40 days after

hatching, at 58-71 percent of adult mass (Nelson 1997). Fledging has seldom been documented, but it typically appears to occur at dusk (Nelson 1997).

Nest Tree Characteristics

Lank et al. (2003) states that murrelets "occur during the breeding season in near-shore waters along the north Pacific coastline from Bristol Bay in Alaska to central California", nesting in single platform trees generally within 20 miles of the coast and older forest stands generally within 50 miles of the coast. Unlike most auks, murrelets nest solitarily on mossy platforms of large branches in old-forest trees (Lank et al. 2003). Suitable murrelet habitat may include contiguous forested areas with conditions that contain potential nesting structure. These forests are generally characterized by large trees greater than 18 inches dbh, multi-storied canopies with moderate canopy closure, sufficient limb size and substrate (moss, duff, etc.) to support nest cups, flight accessibility, and protective cover from ambient conditions and potential avian predators (Manley 1999, Burger 2002, Nelson and Wilson 2002). Over 95 percent of measured nest limbs were ≥15 cm diameter, with limb diameter ranges from 7-74 cm diameter (Burger 2002). Nelson and Wilson (2002) found that all 37 nest cups identified were in trees containing at least seven platforms. All trees in their study were climbed, however, and ground-based estimates of platforms per tree in the study were not analyzed. Lank et al. (2003) emphasizes that murrelets do not select nest sites based on tree species, but rather they select those individual trees that offer suitable nest platforms. Nest cups have been found in deciduous trees, albeit rarely and nest trees may be scattered or clumped throughout a forest stand.

A tree with potential nesting structure in Oregon typically has the following characteristics;

1. It occurs within 50 miles (81 km) of the coast (USDI FWS 1997, p. 32);
2. It is a conifer tree (USDI FWS 1997, p. 18, Burger 2002, p. 39);
3. It is ≥ 19.1 in. (49 cm) (dbh) in diameter and > 107 ft. (33 m) in height (Nelson and Wilson 2002, p 32), although smaller trees have been documented in Alaska (Nelson 1997, p. 30);
4. It has ≥ one platform with the following characteristics
    a. It is ≥ 4 in. (10 cm) wide (Nelson 1997, p. 30);
    b. It has nesting substrate (*e.g.*, moss, epiphytes, duff) (Burger 2002, p. 42; Nelson and Wilson 2002, pp. 24, 100),
    c. It is in the live crown of the tree, either on the tree with nesting structure or on an adjacent tree (how about right after noon., p. 16; Nelson and Wilson 2002, pp. 24,98 & 99);
    d. It is located ≥ 32.5 ft. (9.9 m) above the ground (Nelson and Wilson 2002, p. 28); and
5. It has an access route through the canopy that a murrelet could use to approach and land on the platform (Nelson and Wilson 2002, p. 103). Because access should be viewed from above the canopy and we are assessing habitat from below the canopy, this aspect of nesting habitat may not be visible. Nelson and Wilson (2002, p. vii) suggests assessing access by looking for canopy layering, either natural (streams, gaps) or man-made edges and gaps as measures of access.

Nest Stand Characteristics

Nest stands are typically composed of low elevation conifer species. In California, nest sites have been located in stands containing old-growth redwood and Douglas-fir, while nests in Oregon and Washington have been located in stands dominated by Douglas-fir, western hemlock and Sitka spruce. Murrelets appear to select forest stands greater than 123.6 acres (50 ha) (Burger 2002), but will use small patches of habitat surrounded by larger patches of unsuitable habitat (Nelson and Wilson 2002, p. 104). In surveys of mature or younger second-growth forests in California, murrelets were only found in forests where there were nearby old-growth stands or where residual older trees remained (USDI FWS 1992, Singer et al. 1995).

At the stand level, vertical complexity is correlated with nest sites (Meekins and Hamer 1998, Manley 1999, Waterhouse et al. 2002, Nelson and Wilson 2002), and flight accessibility is probably a necessary component of suitable habitat (Burger 2002). Some studies have shown higher murrelet activity near stands of old-forest blocks over fragmented or unsuitable forest areas (Paton et al. 1992, Rodway et al. 1993, Burger 1995, Deschesne and Smith 1997, Rodway and Regehr 2002), but this correlation may be confounded by ocean conditions, distance inland, elevation, survey bias and disproportionately available habitat. Nelson and Wilson (2002) found that potential nest platforms per acre were a strong correlate for nest stand selection by murrelets in Oregon.

Adjacent forests can contribute to the conservation of the murrelet by reducing the potential for windthrow during storms by providing area buffers and creating a landscape with a higher probability of occupancy by murrelets (USDI FWS 1996, Burger 2001, Meyer et al. 2002, and Raphael et al. 2002). Trees surrounding and within the vicinity of a potential nest tree(s) may provide protection to the nest platform and potentially reduce gradations in microclimate (Chen et al. 1993).

Landscape Characteristics

Studies have determined the characteristics of murrelet nesting habitat at a landscape-scale and the correlation of occupancy using a variety of methods, including predictive models, radio telemetry, audio-visual surveys (Evans Mack et al. 2003), and radar. McShane et al. (2004, p. 4-103) reported, “At the landscape level, areas with evidence of occupancy tended to have higher proportions of large, old-growth forest, larger stands and greater habitat complexity, but distance to the ocean (up to about 37 miles [60 km]) did not seem important.” Raphael et al. (2016a, p. 115, in Falxa and Raphael 2016) found that among the factors they investigated, nesting habitat factors (amounts and pattern, large contiguous patches) were the best predictors of murrelet population distribution and trends at sea. Recently, Betts and others (2020, pp. 5-7) found occupancy was correlated with amounts of mature forest, ocean conditions, and distance to the coast. Elevation had a negative association in some studies with murrelet habitat occupancy (Burger 2002). Hamer and Nelson (1995b) sampled 45 nest trees in British Columbia, Washington, Oregon, and California and found the mean elevation to be 1,089 feet (332 m).

Multiple radar studies (*e.g.*, Burger 2001, Cullen 2002, Raphael et al. 2002, Steventon and Holmes 2002) in British Columbia and Washington have shown that radar counts of murrelets are positively associated with total watershed area, increasing amounts of late-seral forests, and with increasing age and height class of associated forests. Murrelet radar counts are also

negatively associated with increasing forest edge and areas of logged and immature forests (McShane et al. 2004). Several studies have concluded that murrelets do not pack into higher densities within remaining habitat when nesting habitat is removed (Burger 2001, Manley et al. 2001, Cullen 2002).

There is a relationship between proximity of human-modified habitat and increased avian predator abundance. However, increased numbers of avian predators does not always result in increased predation on murrelet nests. For example, Luginbuhl et al. (2001, p. 565) report, in a study using simulated murrelet nests, that "Corvid numbers were poorly correlated with the rate of predation within each forested plot". Luginbuhl et al. (2001, p. 569), conclude, "that using measurements of corvid abundance to assess nest predation risk is not possible at the typical scale of homogenous plots (0.5-1.0 $km^2$ in our study). Rather this approach should be considered useful only at a broader, landscape scale on the order of 5-50 $km^2$ (based on the scale of our fragmentation and human-use measures)."

Artificial murrelet nest depredation rates were highest in western conifer forests where stand edges were close to human development (Luginbuhl et al. 2001), and Bradley (2002) found increased corvid densities within three miles of an urban interface, probably due to supplemental feeding opportunities from anthropogenic activities. Golightly et al. (2002) found extremely low reproductive success for murrelets nesting in large old-growth blocks of redwoods in the California Redwoods National and State Parks. Artificially high corvid densities from adjacent urbanization and park Campgrounds are suspected to be a direct cause of the high nesting failure rates for murrelets in the redwoods parks.

If the surrounding landscape has been permanently modified to change the predators' numbers or densities through, for example, agriculture, urbanization, or recreation, and predators are causing unnaturally high nest failures, murrelet reproductive success may remain depressed. Because corvids account for the majority of depredations on murrelet nests and corvid density can increase with human development, corvid predation on murrelet habitat is a primary impact consideration. The threat of predation on murrelet populations (both nests and adults) appears to be greater than previously anticipated (McShane et al. 2004).

**Population Dynamics**

*Current population and distribution of the listed species*
Since 2014, the at-sea-surveys moved to an annual every-other zone survey effort, with Conservation Zones 1 and 3 surveyed in even years and zones 2, 4, and 5 surveyed in odd years (Figure MAMU 1). Due to the staggered surveys, the At-sea Monitoring-2021 Summary Report (McIver et al. 2022) reported the range-wide population estimate to be 19,700 in 2020 (Table MAMU 1). The 2021 surveys estimated approximately 3,100 murrelets in Conservation Zone 1 and 8,400 murrelets in Conservation Zone 3 (McIver et al. 2021a, p. 3). Conservation Zone 1 continues to show a declining population (-5.0 annual rate of change) while Conservation Zone 3 continues to show a stable to increasing population (1.5 annual rate of change) (Table MAMU 2). Recovery zones are the functional equivalent of recovery units as defined by Service policy (USDI FWS 1997, p. 115). The 2022 surveys of Conservation Zones 2, 4 and 5 indicate the population in Conservation Zone 2 continues to decline, with a -3.3 annual rate of change, while

Conservation Zone 4 remains the strongest zone with a 2.8 annual rate of change, with 95 percent confidence intervals that do not overlap zero (McIver et al. 2022, Table 5, p. 20).

The data no longer demonstrate a significant murrelet population decline within the range of the NWFP, but the decline is still significant in WA (Table MAMU 2). This lack of a demonstrated NWFP-wide decline may be due to sample size or statistical power of the sampling design (see Table MAMU 1 for confidence intervals). Conservation Zones 3 and 4 support 47 percent of the murrelet population within the U.S. (Table MAMU 3), and consistently have the highest – at-sea densities during the nesting season and have recently continued to have positive annual rates of change. Murrelets continue to occur in the lowest abundance in Conservation Zones 5 and 6.

At-sea surveys are also conducted in Conservation Zone 6, independent of the NWFP Effectiveness Monitoring Program, using similar survey methods. The 2018, marbled murrelet population for Conservation Zone 6 is estimated at about 370 birds (95 percent confidence limit [CL]: 250-546; Felis et al. 2019, p. 7 Table 3, see Table MAMU 4).

**Figure MAMU 1.** The six geographic areas identified as Conservation Zones in the recovery plan for the murrelet (USDI FWS 1997, p. 114). Critical habitat beyond these mapped areas is considered part of the conservation zone (USDI FWS 1997, p. 127).

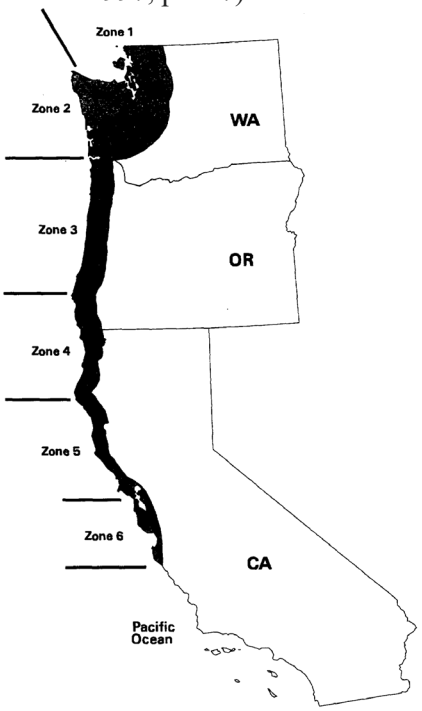

**Table MAMU 1.** Summary of 2001-2019 marbled murrelet density and abundance estimates (rounded to nearest 100 birds) for Conservation Zones 1-5 combined. Numbers in some years may differ slightly from those in previous summary reports (as indicated by an asterisk [*], as a result of additional data quality reviews performed in 2019. Note that the most recent rangewide estimate is always one year behind the current sampling year because it takes two years to derive estimates when sampling units every other year. (McIver et al. 2022, p. 10, Table 2).

| Year | Density (birds/km$^2$) | Bootstrap Standard Error (birds/km$^2$) | Coefficient of Variation of Density (%) | Birds | Birds Lower 95% CL | Birds Upper 95% CL |
|---|---|---|---|---|---|---|
| 2001* | 2.47 | 0.25 | 10.1 | 21,800 | 17,500 | 26,100 |
| 2002* | 2.56 | 0.31 | 11.9 | 22,500 | 17,300 | 27,800 |
| 2003* | 2.60 | 0.25 | 9.6 | 22,800 | 18,500 | 27,100 |
| 2004 | 2.46 | 0.26 | 10.5 | 21,600 | 17,100 | 26,000 |
| 2005 | 2.30 | 0.25 | 10.7 | 20,200 | 16,000 | 24,400 |
| 2006 | 2.09 | 0.17 | 8.2 | 18,300 | 15,400 | 21,300 |
| 2007 | 1.97 | 0.27 | 13.7 | 17,300 | 12,700 | 22,000 |
| 2008 | 2.06 | 0.18 | 8.9 | 18,100 | 15,000 | 21,300 |
| 2009 | 1.96 | 0.21 | 10.6 | 17,200 | 13,600 | 20,800 |
| 2010 | 1.89 | 0.21 | 11.1 | 16,600 | 13,000 | 20,200 |
| 2011 | 2.50 | 0.31 | 12.6 | 22,000 | 16,600 | 27,400 |
| 2012 | 2.40 | 0.27 | 11.3 | 21,100 | 16,400 | 25,800 |
| 2013 | 2.24 | 0.25 | 11.1 | 19,700 | 15,400 | 23,900 |
| 2014* | 2.43 | 0.22 | 9.1 | 21,300 | 17,500 | 25,100 |
| 2015 | 2.75 | 0.26 | 9.5 | 24,100 | 19,700 | 28,600 |
| 2016 | 2.58 | 0.26 | 10.0 | 22,600 | 18,200 | 27,100 |
| 2017 | 2.62 | 0.26 | 10.1 | 23,000 | 18,500 | 27,600 |
| 2018 | 2.56 | 0.29 | 11.4 | 22,500 | 17,500 | 27,600 |
| 2019 | 2.42 | 0.28 | 11.5 | 21,200 | 16,400 | 26,000 |
| 2020 | 2.24 | 0.24 | 10.9 | 19,700 | 15,500 | 23,900 |

**Table MAMU 2.** Estimates of average annual rate of marbled murrelet population change based on at-sea population surveys. Confidence limits are for the estimates of percent annual change. The P-value is based on a 2-tailed test for whether the annual rate of change is less than zero, significant values are shaded in gray. Please note that the period of analysis vary by sampling unit, depending on which year sampling units were last surveyed. (McIver et al. 2022, p. 20 Table 5).

| Year | State | Density (murrelets per km$^2$) | Murrelets | | Murrelets 95% CL Lower | Murrelets 95% CL Upper |
|---|---|---|---|---|---|---|
| | | | Year | State | | |
| Zone 1[1] | 2001-2020 | -5.0 | -7.0 | -2.9 | 0.579 | <0.001 |
| Zone 2[2] | 2001-2021 | -3.3 | -6.1 | 0.4 | 0.226 | 0.027 |
| Zone 3[1] | 2000-2020 | 1.5 | 0.02 | 3.1 | 0.175 | 0.047 |
| Zone 4[2] | 2000-2021 | 2.8 | 0.9 | 4.6 | 0.361 | 0.005 |
| Zone 5 | 2000-2021 | 1.5 | −7.7 | 11.7 | 0.000 | 0.726 |
| WA | 2001-2020 | -4.1 | -5.5 | -2.8 | 0.670 | <0.001 |
| OR | 2000-2020 | 2.0 | 0.8 | 3.2 | 0.374 | 0.002 |
| CA | 2000-2021 | 3.9 | 2.2 | 5.6 | 0.515 | <0.001 |
| All Zones | 2001-2020 | 0.3 | −0.6 | 1.2 | 0.000 | 0.486 |

[1] Last surveyed in 2020
[2] Last surveyed in 2021

**Table MAMU 3.** Summary of 2000 to 2019 marbled murrelet density and population size estimates within the NWFP area at the State scale (Periods of analysis: 2001-2021 for Washington, 2000-2020 for Oregon and 2000-2020 for California 2000-2021 (From McIver et al. 2022, pp. 18 - 19, Table 4).

| Year | State | Density (murrelets per km2) | Murrelets | Murrelets 95% CL Lower | Murrelets 95% CL Upper | Area (km2) |
|---|---|---|---|---|---|---|
| 2001 | WA | 2.01 | 10,453 | 7,057 | 13,849 | 5,188 |
| 2002 | WA | 2.29 | 11,789 | 7,507 | 16,071 | 5,151 |
| 2003 | WA | 2.42 | 12,467 | 8,906 | 16,028 | 5,149 |
| 2004 | WA | 1.65 | 8,474 | 5,625 | 11,322 | 5,149 |
| 2005 | WA | 2.05 | 10,533 | 7,179 | 13,887 | 5,148 |
| 2006 | WA | 1.61 | 8,280 | 6,024 | 10,536 | 5,148 |
| 2007 | WA | 1.85 | 9,520 | 5,946 | 13,095 | 5,148 |
| 2008 | WA | 1.29 | 6,628 | 4,808 | 8,448 | 5,148 |
| 2009 | WA | 1.34 | 6,886 | 4,486 | 9,285 | 5,148 |
| 2010 | WA | 1.10 | 5,679 | 3,840 | 7,518 | 5,148 |
| 2011 | WA | 1.63 | 8,376 | 5,802 | 10,950 | 5,148 |
| 2012 | WA | 1.87 | 9,629 | 6,116 | 13,142 | 5,148 |
| 2013 | WA | 1.10 | 5,665 | 3,217 | 8,114 | 5,148 |
| 2014 | WA | 0.97 | 4,998 | 3,311 | 6,686 | 5,148 |
| 2015 | WA | 1.46 | 7,494 | 4,711 | 10,276 | 5,148 |
| 2016 | WA | 1.38 | 7,095 | 4,060 | 10,130 | 5,148 |
| 2017 | WA | 1.16 | 5,987 | 3,209 | 8,765 | 5,148 |
| 2018 | WA | 1.08 | 5,551 | 2,795 | 8,307 | 5,148 |
| 2019 | WA | 1.00 | 5,151 | 2,958 | 7,344 | 5,148 |
| 2020 | WA | 0.87 | 4,481 | 2,997 | 5,965 | 5,148 |
| 2000 | OR | 3.85 | 7,983 | 4,992 | 10,974 | 2,071 |
| 2001 | OR | 4.43 | 9,168 | 6,537 | 11,800 | 2,071 |
| 2002 | OR | 3.64 | 7,530 | 4,727 | 10,332 | 2,071 |
| 2003 | OR | 3.56 | 7,380 | 5,370 | 9,390 | 2,075 |
| 2004 | OR | 4.40 | 9,112 | 6,833 | 11,391 | 2,071 |
| 2005 | OR | 3.36 | 6,966 | 4,812 | 9,121 | 2,071 |
| 2006 | OR | 3.68 | 7,617 | 5,916 | 9,318 | 2,071 |
| 2007 | OR | 2.59 | 5,357 | 3,332 | 7,381 | 2,071 |
| 2008 | OR | 3.64 | 7,541 | 5,682 | 9,400 | 2,071 |
| 2009 | OR | 3.58 | 7,423 | 5,208 | 9,638 | 2,071 |
| 2010 | OR | 3.95 | 8,182 | 5,743 | 10,622 | 2,071 |
| 2011 | OR | 4.05 | 8,379 | 5,943 | 10,816 | 2,071 |
| 2012 | OR | 3.76 | 7,780 | 5,605 | 9,956 | 2,071 |
| 2013 | OR | 4.74 | 9,819 | 7,195 | 12,443 | 2,071 |
| 2014 | OR | 5.50 | 11,384 | 8,839 | 13,930 | 2,071 |
| 2015 | OR | 5.30 | 10,975 | 8,188 | 13,762 | 2,071 |
| 2016 | OR | 4.86 | 10,060 | 7,541 | 12,579 | 2,071 |
| 2017 | OR | 5.29 | 10,959 | 8,044 | 13,874 | 2,071 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2018 | OR | 5.34 | 11,063 | 7,610 | 14,515 | 2,071 |
| 2019 | OR | 4.99 | 10,339 | 7,070 | 13,607 | 2,017 |
| 2020 | OR | 4.69 | 10,742 | 7,565 | 13,919 | 2,071 |
| 2000 | CA | 2.28 | 3,571 | 1,884 | 5,258 | 1,566 |
| 2001 | CA | 1.31 | 2,051 | 608 | 3,495 | 1,566 |
| 2002 | CA | 2.04 | 3,202 | 2,181 | 4,224 | 1,566 |
| 2003 | CA | 1.9 | 2,985 | 1,753 | 4,217 | 1,567 |
| 2004 | CA | 2.55 | 3,986 | 2,197 | 5,775 | 1,566 |
| 2005 | CA | 1.73 | 2,710 | 1,896 | 3,523 | 1,566 |
| 2006 | CA | 1.56 | 2,438 | 1,727 | 3,149 | 1,566 |
| 2007 | CA | 1.56 | 2,440 | 1,465 | 3,415 | 1,566 |
| 2008 | CA | 2.53 | 3,964 | 2,802 | 5,126 | 1,566 |
| 2009 | CA | 1.87 | 2,928 | 1,589 | 4,268 | 1,566 |
| 2010 | CA | 1.69 | 2,644 | 1,098 | 4,191 | 1,566 |
| 2011 | CA | 3.33 | 5,217 | 1,962 | 8,472 | 1,566 |
| 2012 | CA | 2.24 | 3,514 | 1,812 | 5,216 | 1,566 |
| 2013 | CA | 2.67 | 4,178 | 2,662 | 5,694 | 1,566 |
| 2014 | CA | 3.14 | 4,922 | 3,410 | 6,433 | 1,566 |
| 2015 | CA | 3.62 | 5,666 | 3,970 | 7,361 | 1,566 |
| 2016 | CA | 3.49 | 5,469 | 3,963 | 6,974 | 1,566 |
| 2017 | CA | 3.88 | 6,073 | 4,415 | 7,730 | 1,566 |
| 2018 | CA | 3.77 | 5,907 | 4,164 | 7,650 | 1,566 |
| 2019 | CA | 3.67 | 5,741 | 3,894 | 7,588 | 1,566 |
| 2020 | CA | 3.33 | 5,217 | 3,669 | 6,765 | 1,566 |
| 2021 | CA | 2.47 | 3,870 | 2,727 | 5,014 | 1,566 |

**Table MAMU 4.** Annual at-sea murrelet estimates for surveys drawn in both directions, surveys only drawn from the north, and surveys only drawn from the south, U.S. Fish and Wildlife Service Conservation Zone 6, central California, 1999–2018. (Felis et al. 2019, p. 7 Table 3).

| Year | Both directions | | | North | | | South | | |
|---|---|---|---|---|---|---|---|---|---|
| | *N* | 95% CI | *n* | *N* | 95% CI | *n* | *N* | 95% CI | *n* |
| 1999 | | N/A | | 487 | 333–713 | 5 | | No surveys | |
| 2000 | | N/A | | 496 | 338–728 | 8 | | No surveys | |
| 2001 | 661 | 556–786 | 15 | 637 | 441–920 | 8 | 733 | 583–922 | 7 |
| 2002 | 683 | 561–832 | 15 | 628 | 487–809 | 9 | 729 | 494–1,075 | 6 |
| 2003 | 699 | 567–860 | 12 | 615 | 463–815 | 6 | 782 | 570–1,074 | 6 |
| 2004 | | No surveys | | | No surveys | | | No surveys | |
| 2005 | | No surveys | | | No surveys | | | No surveys | |
| 2006 | | No surveys | | | No surveys | | | No surveys | |
| 2007 | 378 | 238–518 | 4 | 269 | 109–429 | 2 | 488 | 349–626 | 2 |
| 2008 | 174 | 91–256 | 4 | 122 | 61–184 | 1 | 225 | 131–319 | 3 |
| 2009 | 631 | 449–885 | 8 | 495 | 232–1,054 | 4 | 789 | 522–1193 | 4 |
| 2010 | 446 | 340–585 | 7 | 366 | 240–559 | 4 | 560 | 343–925 | 3 |
| 2011 | 433 | 339–553 | 6 | 320 | 225–454 | 2 | 452 | 331–618 | 4 |
| 2012 | 487 | 403–588 | 6 | 475 | 373–605 | 3 | 501 | 359–699 | 3 |
| 2013 | 628 | 386–1,022 | 6 | 439 | 233–827 | 3 | 556 | 126–2,456 | 3 |
| 2014 | 438 | 307–624 | 9 | 444 | 258–765 | 4 | 434 | 231–817 | 4 |
| 2015 | 243 | 152–386 | 9 | 225 | 136–370 | 4 | 296 | 159–549 | 5 |
| 2016 | 657 | 406–1,063 | 7 | 510 | 358–726 | 3 | 720 | 297–1,747 | 4 |
| 2017 | 530 | 384–732 | 9 | 413 | 247–689 | 4 | 790 | 487–1,280 | 5 |
| 2018 | 370 | 250–546 | 9 | 513 | 334–788 | 4 | 227 | 112–460 | 5 |

The at-sea distribution also exhibits discontinuity within Conservation Zones 1, 2, 5, and 6, where five areas of discontinuity are noted: a segment of the border region between British Columbia, Canada and Washington, southern Puget Sound, WA, Destruction Island, WA to Tillamook Head, OR, Humboldt County, CA to Half Moon Bay, CA, and the entire southern end of the breeding range in the vicinity of Santa Cruz and Monterey Counties, CA (McShane et al. 2004, p. 3-70).

*Current Nesting Habitat*

The most recent nesting habitat evaluation was published in 2021 for the NWFP's series of 25-year monitoring reviews. Lorenz et al. (2021) assessed habitat changes between 1993 and 2017 through an updated habitat assessment process that re-evaluated the assumptions, methods and reporting as compared to past reviews. The authors applied the current assessment parameters to the data from 1993, so while the results of the 25-year review are not directly comparable to the past years' reports; the changes reported between 1993 and 2017 are accurate. As the interim data is not directly comparable, we retained the information from both the 15-year and 20-year reports in this Status of the Species. A comprehensive discussion of how the 25-year monitoring differed from the 20-year modeling is found on pages 11-17 of the 25-year monitoring report (Lorenz et al. 2021).

Early habitat assessments include McShane et al. (2004, p. 4-2), in which authors reviewed and summarized habitat estimates from 16 sources and estimated the amount of murrelet nesting habitat at 2,223,048 acres distributed throughout Washington, Oregon, and California (McShane et al. 2004, p. 4-5). At that time, Washington State contained almost half of all remaining nesting habitat with an estimated 1,022,695 acres or 48 percent of the total. Approximately 93 percent (2,000,000 acres) were reported to occur on Federal lands (McShane et al. 2004, p. 4-10).

In another effort, Raphael et al. (2006, in Huff et al. 2006) produced two spatial models for the NWFP Effectiveness Monitoring program to predict the amount, location, and distribution of murrelet nesting habitat. Combining vegetation-based maps derived from satellite imagery and prior estimates of habitat on State and private lands from 1994 to 2003, (Raphael et al. 2006, p. 109 in Huff et al. 2006) used a panel of experts to reclassify 22 old-growth forest classes into four classes of murrelet habitat based upon nesting suitability. Referred to as the Expert Judgment Model, the model classifies existing forest structure, based upon percent conifer cover, canopy structure, quadratic mean diameter, and forest patch size, into four classes of suitability 4 for nesting murrelets. Raphael et al. (2006, p. 116-123 in Huff et al. 2006) found that across the murrelet range, most habitat-capable land (52 percent) is unsuitable nesting habitat (Class 1) and 18 percent is classified as Class 4 habitat (highest suitability), with an estimated 41 percent of the Class 4 habitat (1,620,800 acres) occurring on non-Federal lands.

The second habitat model developed by Raphael et al. (2006 in Huff et al. 2006) used the Biomapper Ecological Niche-Factor Analysis methodology developed by Hirzel et al. (2002). The resulting murrelet habitat suitability maps are based on both the physical and vegetative attributes adjacent to known murrelet occupied polygons or nest locations for each NWFP province. The maps provide a range of habitat suitability values, each with acreage estimates. In Washington, 2.1 million acres of habitat were rated with a habitat suitability (HS) greater than 60 and captured 82 percent of the stands documented as occupied, while 440,700 acres of habitat were rated as HS >80 habitat and captured 36 percent of the known occupied stands.

Falxa and Raphael (2016) used habitat modeling to estimate habitat within the NWFP. Because the modeling was improved (updated data, models, and methods) from the previous modeling effort, results, including the 1993 baseline, are different (Falxa and Raphael 2016, p. 85– see Table 46). The habitat analysis output for the 20-year NWFP review divided habitat in to one of four classes, with class 3 and 4 representing "higher suitability" habitat (Falxa and Raphael 2016, p. 54). Lorenz et al. (2021, in entirety), followed a similar approach in the recent NWFP habitat update, with updated GNN and forest disturbance data from the U.S. Forest Service's Laboratory for Applications of Remote Sensing in Ecology. This 25-year monitoring report applied updated parameters for training the models and a slightly reduced edge width for identifying core habitat (Lorenz et al. 2021, pp. 12-13). This report does not describe habitat in the classes used in the previous reports, but instead uses the terminology; "higher probability", "moderate probability", and "lower probability", referring to the likelihood of murrelet occupancy. While the terminology has been updated, the 25-year report classes still correspond with the habitat classifications from previous NWFP monitoring reports, with "higher probability" corresponding with Class 4, "moderate probability" corresponding with Class 3, and "lower probability" corresponding with Classes 1 and 2 (Lorenz et al. 2021, p. 12-13)

*Status of Nesting Habitat Lost Since 1992*

The Service has determined that the rate of habitat loss has declined since listing, particularly on Federal lands due to implementation of the NWFP (USDI FWS 2004, pp. 11 and 13). Between 1992 and 2003, the estimated loss of suitable murrelet habitat totaled 22,398 acres in Washington, Oregon, and California combined, of which 5,364 acres resulted from timber harvest and 17,034 acres resulted from natural events (McShane et al. 2004, pp. 4-64). Those data primarily represented losses on Federal lands, and did not include data for most private or State lands within the murrelet's range.

Falxa and Raphael (2016, p. 72) used habitat modeling to estimate losses of potential murrelet habitat for the period from 1993 to 2012 on both Federal and non-federal lands within the five Conservation Zones in the NWFP area. They estimated there were 2.53 million acres of potential nesting habitat over all lands in the murrelet's range in Washington, Oregon, and California at the start of the NWFP (1993). Of this, 0.46 million acres were identified as the highest quality habitat. Ninety percent of the 1993 potential nesting habitat on federally-administered lands occurred within reserved-land allocations. Forty one percent of potential nesting habitat occurred on non-federal lands, including 44 percent of the highest quality habitat.

Raphael et al. (2016b, p. 72, in Falxa and Raphael 2016) found a net loss of 12 percent of potential nesting habitat from 1993 to 2012. Loss on Federal lands was about 2 percent of the potential nesting habitat from 1993 to 2012, and on non-federal lands the loss was about 27 percent of the potential nesting habitat from 1993 to 2012. Fire was the major cause of nesting habitat loss on Federal lands since 1993; timber harvest was the primary cause of loss on non-federal lands. Raphael et al. (2016b, p. 37, in Falxa and Raphael 2016) concluded that the NWFP has been successful in conserving murrelet habitat on Federal lands and that losses of habitat on Federal lands will continue due to fires and other disturbance events, but they expect those losses to be exceeded by recovery of currently unsuitable habitat within reserves as forests mature.

Lorenz et al. (2021) completed the NWFP 25-year review including only three habitat classes based on presence and nesting probabilities, compared to the four classes from previous years (as described above), and thus the authors recalculated the 1993 habitat values based on the updated assumptions. They

estimated in 1993 approximately 1.51 million acres of higher probability nesting habitat were available across all lands in NWFP portion of the murrelet's range (p. 28). A majority (approximately 75 percent) of this habitat was on Federally managed lands in reserve land use allocations, but tended to be scattered fragments on the landscape rather than blocks of core habitat (p. 29). Over the 25 years of the plan, the authors note a loss of more than 20,000 acres of high quality habitat across the range (p. 29). This net loss of 1.4 percent of high probability nesting habitat from 1993 to 2017 includes a net loss of 1.8 percent of core habitat (Table MAMU 5 and Table MAMU 6). When reviewed by ownership, acres of high probability nesting habitat on federal and state lands increased by almost 3 percent from 1993 through 2017 but decreased on privately managed lands (p. 30-31). While habitat gains were reported on federal lands, modeling indicates core habitat was lost in Washington and California, and a majority of the increases in high probability habitat occurred in scattered parcels. Modeling indicates an increase in high probability habitat on Oregon's federal lands, primarily in identified reserve LUAs (p. 48). When reviewing changes across the three states in the NWFP, Washington experienced the greatest losses, including on federal lands, while Oregon dominantly indicated gains in the high probability nesting habitat on federal lands (Table MAMU 6). Authors were able to identify the cause of habitat loss in approximately 74 percent of the landscape, with 96 percent attributed to timber harvest (p. 31). On non-federal lands, 99 percent of high probability habitat loss was due to timber harvest (p. 48). Although, authors note that 66 percent of the loss of high probability core habitat was not attributed (p. 31).

Lorenz et al. (2021) caution comparing absolute habitat estimates of this report to previous versions, as modeling parameters change from report to report. Readers are encouraged review the habitat trends reported in each iteration. Trends in the 25-year report indicate an increase in higher probably core habitat in Oregon, which contrasts with the results of previous reports (Raphael et al. 2016). The authors reviewed this trend change and determined it is entirely attributable to the GNN data, which were determined to be more accurate than GNN data used in previous iterations (Lorenz et al. 2021, pp. 50-51).

**Table MAMU 5.** Distribution of murrelet nesting habitat on all lands, by habitat suitability class, for the baseline period (1993) and final year of analysis (2017). Table from Lorenz et al. (2021 p. 28, Table 7).

| | 1993 | | | 2017 | | |
|---|---|---|---|---|---|---|
| State/landowner | Lower probability | Moderate probability | Higher probability | Lower probability | Moderate probability | Higher probability |
| Washington | | | | | | |
| Federal reserved | 1,327,727 | 1,016,831 | 709,216 | 1,287,155 | 1,064,228 | 702,392 |
| Federal nonreserved | 306,865 | 101,086 | 38,268 | 275,401 | 131,177 | 39,641 |
| Federal total | 1,634,592 | 1,117,917 | 747,484 | 1,562,556 | 1,195,405 | 742,033 |
| State | 1,246,994 | 290,022 | 109,907 | 1,277,591 | 274,532 | 94,800 |
| Other landowners | 4,995,937 | 563,834 | 142,627 | 5,231,260 | 371,990 | 99,147 |
| Total | 7,877,523 | 1,971,773 | 1,000,018 | 8,071,407 | 1,841,927 | 935,980 |
| Oregon | | | | | | |
| Federal reserved | 1,572,290 | 169,986 | 248,182 | 1,472,982 | 243,721 | 273,755 |
| Federal nonreserved | 403,251 | 27,630 | 27,859 | 365,324 | 55,144 | 38,272 |
| Federal total | 1,975,541 | 197,616 | 276,041 | 1,838,306 | 298,865 | 312,027 |
| State | 537,229 | 101,217 | 56,539 | 449,922 | 163,971 | 81,092 |
| Other landowners | 3,116,361 | 210,315 | 138,640 | 3,114,679 | 226,070 | 124,567 |
| Total | 5,629,131 | 509,148 | 471,220 | 5,402,907 | 688,906 | 517,686 |
| California | | | | | | |
| Federal reserved | 764,231 | 7,841 | 11,377 | 765,883 | 6,367 | 11,200 |
| Federal nonreserved | 217,260 | 234 | 461 | 217,222 | 260 | 473 |
| Federal total | 981,491 | 8,075 | 11,838 | 983,105 | 6,627 | 11,673 |
| State | 164,909 | 7,346 | 20,295 | 166,055 | 6,253 | 20,242 |
| Other landowners | 2,015,236 | 31,145 | 9,707 | 2,026,379 | 23,059 | 6,649 |
| Total | 3,161,636 | 46,566 | 41,840 | 3,175,539 | 35,939 | 38,564 |
| Plan area total | | | | | | |
| Federal reserved | 3,664,248 | 1,194,658 | 968,775 | 3,526,020 | 1,314,316 | 987,347 |
| Federal nonreserved | 927,376 | 128,950 | 66,588 | 857,947 | 186,581 | 78,386 |
| Federal total | 4,591,624 | 1,323,608 | 1,035,363 | 4,383,967 | 1,500,897 | 1,065,733 |
| State | 1,949,132 | 398,585 | 186,741 | 1,893,568 | 444,756 | 196,144 |
| Other landowners | 10,127,534 | 805,294 | 290,974 | 10,372,318 | 621,119 | 230,353 |
| Total | 16,668,290 | 2,527,487 | 1,513,078 | 16,649,853 | 2,566,772 | 1,492,230 |

**Table MAMU 6.** Net changes in acres of higher probability nesting habitat and core, edge, and scatter between 1993 and 2017 by State and landowner (Lorenz et al. 2021, p. 32, Table 10).

| State/landowner | Higher probability nesting habitat | Core | Edge | Scatter |
|---|---|---|---|---|
| Washington | | | | |
| Federal reserved | -6,824 | -2,585 | -3,683 | -556 |
| Federal nonreserved | 1,373 | 0 | 37 | 1,336 |
| Federal total | -5,451 | -2,585 | -3,646 | 780 |
| State | -15,107 | -128 | -762 | -14,217 |
| Other landowners | -43,480 | -437 | -1,725 | -41,318 |
| Total | -64,038 | -3,150 | -6,133 | -54,755 |
| Oregon | | | | |
| Federal reserved | 25,573 | 656 | 2,251 | 22,665 |
| Federal nonreserved | 10,413 | 254 | 848 | 9,310 |
| Federal total | 35,986 | 910 | 3,099 | 31,975 |
| State | 24,553 | 830 | 1,857 | 21,866 |
| Other landowners | -14,073 | -1,072 | -3,651 | -9,347 |
| Total | 46,466 | 668 | 1,305 | 44,494 |
| California | | | | |
| Federal reserved | -177 | -6 | 2 | -174 |
| Federal nonreserved | 12 | 0 | -6 | 18 |
| Federal total | -165 | -6 | -4 | -156 |
| State | -53 | -18 | 31 | -66 |
| Other landowners | -3,058 | -16 | -122 | -2,920 |
| Total | -3,276 | -40 | -95 | -3,142 |
| Plan area total | | | | |
| Federal reserved | 18,572 | -1,935 | -1,430 | 21,935 |
| Federal nonreserved | 11,798 | 254 | 879 | 10,664 |
| Federal total | 30,370 | -1,681 | -551 | 32,599 |
| State | 9,403 | 684 | 1,126 | 7,583 |
| Other landowners | -60,621 | -1,525 | -5,498 | -53,585 |
| Total | -20,848 | -2,522 | -4,923 | -13,403 |

Note: Color gradient indicates the percentile rank among all values in the analysis area and is bounded by the maximum (green) and minimum (red).

Consulted on effects that impact suitable habitat rangewide from October 1, 2003 to March 9, 2022, are summarized in Table MAMU 7. The Service has consulted on the removal of 123,969 acres of nesting habitat acres have been 'removed' in association with consultations. This is a substantial increase (just under 100,000 acres) over the last two years, and is directly associated to recent, long-term, HCP consultations in Washington and Oregon. Habitat effects reported in the tracking database have not increased measurably during that time.

**Table MAMU 7.** Aggregate results of all suitable habitat (acres) affected as determined by section 7 consultation for the marbled murrelet; summary of effects by Conservation Zone and habitat type from October 1, 2003 to Present (from USDI FWS Tracking and Integrated Logging System database).

**Table A: Aggregate Results of All Suitable Habitat (Acres) Affected by Section 7 Consultation for the Marbled Murrelet; Summary of Effects By Conservation Zone and Habitat Type From October 1st, 2003 to Present.**

**Wednesday, March 9, 2022 8:57:08 AM**

| Conservation Zone[1] | Authorized Habitat Effects[2] | | Reported Habitat Effects[2] | |
|---|---|---|---|---|
| | Stands[3] | Remnants[4] | Stands[3] | Remnants[4] |
| Puget Sound | -24,356 | 0 | -1 | 0 |
| Western Washington | -17,583 | 0 | -12 | 0 |
| Outside CZ Area in WA | 0 | 0 | 0 | 0 |
| Oregon Coast Range | -65,761 | -2,671 | -2,924 | -1,608 |
| Siskiyou Coast Range | -16,193 | -271 | -5,184 | -187 |
| Outside CZ Area in OR | -36 | -3 | 0 | 0 |
| Mendocino | 0 | 0 | 0 | 0 |
| Santa Cruz Mountains | 0 | 0 | 0 | 0 |
| Outside CZ Area in CA | 0 | 0 | 0 | 0 |
| **Total** | **-123,929** | **-2,945** | **-8,121** | **-1,795** |

**Notes:**

1. Conservation Zones (CZ) six zones were established by the 1997 Recovery Plan to guide terrestrial and marine management planning and monitoring for the Marbled Murrelet. *Marbled Murrelet Recovery Plan, September, 1997*
2. Habitat includes all known occupied sites, as well as other suitable habitat, though it is not necessarily occupied. Importantly, there is no single definition of suitable habitat, though the Marbled Murrelet Effectiveness Monitoring Module is in the process. Some useable working definitions include the Primary Constituent Elements as defined in the Critical Habitat Final Rule, or the criteria used for Washington State by Raphael et al. (Condor 104:331-342).
3. Stand: A patch of older forest in an area with potential platform trees.
4. Remnants: A residual/remnant stand is an area with scattered potential platform trees within a younger forest that lacks, overall, the structures for marbled murrelet nesting.

*Historical status and distribution*

Murrelet abundance during the early 1990s in Washington, Oregon, and California was estimated at 18,550 to 32,000 birds (Ralph et al. 1995).

The historical breeding range of the murrelet extends from Bristol Bay, Alaska, south to the Aleutian Archipelago, northeast to Cook Inlet, Kodiak Island, Kenai Peninsula and Prince William Sound, south coastally throughout the Alexander Archipelago of Alaska, and through British Columbia, Washington, Oregon, to northern Monterey Bay in central California. Birds winter throughout the breeding range and also occur in small numbers off southern California.

At the time of listing, the distribution of active nests in nesting habitat was described as non-continuous (USDI FWS 1997, p. 14). The at-sea extent of the species currently encompasses an area similar in size to the species' historic distribution, but with the extremely low density of murrelets in Conservation Zone 5, and the small population in Conservation Zone 6, the southern end of the murrelet distribution is sparsely populated compared to Conservation Zones 1-4 (Table 42).

*Population structure*
Murrelets are long-lived seabirds that spend most of their life in the marine environment, with breeding adult birds, usually age 3 or greater, annually nesting in the forest canopy of mature and old-growth forests from about March 24 through September 15. Murrelets have a naturally low reproductive rate, with pair's reproduction limited to one young per year.

*Recovery Zones*
The Recovery Plan identified six Conservation Zones (Figure 11) throughout the listed range of the species: Puget Sound (Conservation inland zone 1), Western Washington Coast Range (Conservation inland zone 2), Oregon Coast Range (Conservation Zone 3), Siskiyou Coast Range (Conservation Zone 4), Mendocino (Conservation Zone 5), and Santa Cruz Mountains (Conservation Zone 6). Recovery zones are the functional equivalent of recovery units as defined by Service policy (USDI FWS 1997, p. 115). Conservation Zones 3 and the northern part of 4 occur in Oregon and these conservation zones includes all lands within 35 miles of the coast and any lands designated as critical habitat beyond 35 miles of the coast (USDI FWS 1997, p. 127).

*Reproductive estimates*
Generally, estimates of murrelet fecundity are directed at measures of breeding success, either from direct assessments of nest success in the terrestrial environment, marine counts of hatch-year birds, or computer models. Telemetry estimates are typically preferred over marine counts for estimating breeding success due to fewer biases (McShane et al. 2004, p. 3-2). However, because of the challenges of conducting telemetry studies, estimating murrelet reproductive rates with an index of reproduction, referred to as the juvenile ratio (Ŕ), continues to be important, despite the debate over use of this index (see discussion in Beissinger and Peery 2007, p. 296).

Although difficult to obtain, nest success rates are available from telemetry studies conducted in California (Hebert and Golightly 2006; Peery et al. 2004) and Washington (Bloxton and Raphael 2006). In northwestern Washington, Bloxton and Raphael (2005, p. 5) documented a nest success rate of 0.20 (2 chicks fledging from 10 nest starts). In central California, murrelet nest success is 0.16 (Peery et al. 2004, p. 1098) and in northern California it is 0.31 to 0.56 (Hebert and Golightly 2006, p. 95). No studies or published reports from Oregon are available.

Unadjusted and adjusted values for annual estimates of murrelet juvenile ratios at sea suggest extremely low breeding success in all parts of the listed range, including Conservation Zone 4 (mean ratio for 2000-2011 of 0.046, range 0.01 to 0.1, CCR 2012, p. 11), northern California (0.003 to 0.029 - Long et al. 2008, pp. 18-19; CCR 2012, p. 11), central California (0.035 and 0.032 - Beissinger and Peery 2007, pp. 299, 300), and in Oregon (0.0254 - 0.0598 - CCR 2008, p. 13). Estimates for Ŕ (adjusted) in the San Juan Islands in Washington have been below 0.15 every year since surveys began in 1995, with three of those years below 0.05 (Raphael et al. 2007b, p. 16).

These current estimates of Ŕ are assumed to be below the level necessary to maintain or increase the murrelet population within the listed range. Demographic modeling suggests murrelet population stability requires a minimum reproductive rate of 0.2 to 0.3 chicks per pair per year (Beissinger and Peery 2007, p. 302; USDI FWS 1997, p. B-35; Beissinger 1995, p. 390). The estimates for Ŕ discussed above from individual studies, as well as Ŕ estimates for the listed range (0.02 to 0.13) are all below the lowest estimated Ŕ value (0.2) identified as required for population stability (Beissinger and Peery 2007, p. 302).

The current estimates for Ŕ also appear to be well below what may have occurred prior to the murrelet population decline. Beissinger and Peery (2007, p. 298) performed a comparative analysis using historic data from 29 bird species to predict the historic Ŕ for murrelets in central California, resulting in an estimate of 0.27 (95 percent CI: 0.15 - 0.65). Therefore, the best available scientific information of current murrelet fecundity from model predictions, and from juvenile ratios and trend analyses based on population survey data appear to align well; both indicate that the murrelet reproductive rate is generally insufficient to maintain stable population numbers throughout all or portions of the species' listed range.

**Status and Distribution**

*Historical status and distribution*
Murrelet abundance during the early 1990s in Washington, Oregon, and California was estimated at 18,550 to 32,000 birds (Ralph et al. 1995).

The historical breeding range of the murrelet extends from Bristol Bay, Alaska, south to the Aleutian Archipelago, northeast to Cook Inlet, Kodiak Island, Kenai Peninsula and Prince William Sound, south coastally throughout the Alexander Archipelago of Alaska, and through British Columbia, Washington, Oregon, to northern Monterey Bay in central California. Birds winter throughout the breeding range and also occur in small numbers off southern California.

At the time of listing, the distribution of active nests in nesting habitat was described as non-continuous (USDI FWS 1997, p. 14). The at-sea extent of the species currently encompasses an area similar in size to the species' historic distribution, but with the extremely low density of murrelets in Conservation Zone 5, and the small population in Conservation Zone 6, the southern end of the murrelet distribution is sparsely populated compared to Conservation Zones 1-4 (Table 42).

***Rangewide Trend, Population***

There are two general approaches that researchers use to assess murrelet population trend: at-sea surveys and population modeling based on demographic data. In general, the Service assigns greater weight to population trend and status information derived from at-sea surveys than estimates derived from population models because survey information generally provides more reliable estimates of trend and abundance.

The annual rate of population change for all NWFP zones between 2000 and 2019 was 0.5 percent, based on at-sea surveys (McIver et al. 2021a, p. 20 and Table MAMU 2). However, these results are inconclusive because the confidence interval for the rate of population change overlap zero.

The lack of a conclusive trend in murrelet populations described above is different from previous reports. Previously, Miller et al. (2012) reported that the murrelet population was declining throughout its range (estimated at 29 percent decline for the listed population from 2001 to 2010). The annual population decline during 2001 to 2010 was 3.7 percent. It is unknown what is driving recent population levels. According to Falxa et al. (2016, p. 29, in Falxa and Raphael 2016) the increase in the murrelet population between 2011 and 2018 is too rapid, particularly in Conservation Zone 4, to be attributable to habitat change because nesting habitat takes many decades to several centuries to develop and is too slow a process to account for the rate of population change. Data does suggest that the habitat loss is likely contributing to variation in trends across the listed range of the murrelet (Falxa et al. 2016, p. 26, in Falxa and Raphael

2016). However, Lorenz et al. (2021, p. 48) found a positive relationship between habitat gains and population estimates in Oregon and California, but included that these relationships may be altered by at-sea changes and are not necessarily habitat driven. McIver et al. (2021b, p. 28), suggested that factors; local recruitment, abnormal adult presence on the water or a combination of factors, may be influencing the increase in the at-sea survey numbers for Conservation Zone 4. Authors describe how abnormal adult presence may be influenced by altered timing of nesting, increased numbers of non-breeding adults, or an influx of non-breeding adults from neighboring conservation zones. Additional research is necessary to decern the magnitude to which these variations in at-sea movements may influence the bi-annual survey results (p. 30).

Population Models

Prior to the use of survey data to estimate trend, demographic models were more heavily relied upon to generate predictions of trends and extinction probabilities for the murrelet population (Beissinger 1995; Cam et al. 2003; McShane et al. 2004; USDI FWS 1997). However, murrelet population models remain useful because they provide insights into the demographic parameters and environmental factors that govern population stability and future extinction risk, including stochastic factors that may alter survival, reproductive, and immigration/emigration rates.

In a report developed for the 5-year Status Review of the Murrelet in Washington, Oregon, and California (McShane et al. 2004, pp. 3-27 to 3-60), computer models were used to forecast 40-year murrelet population trends. A series of female-only, multi-aged, discrete-time stochastic Leslie Matrix population models were developed for each conservation zone to forecast decadal population trends over a 40-year period and extinction probabilities beyond 40 years (to 2100). The authors incorporated available demographic parameters (Table MAMU 8) for each conservation zone to describe population trends and evaluate extinction probabilities (McShane et al. 2004, p. 3-49).

McShane et al. (2004) used mark-recapture studies conducted in British Columbia by Cam et al. (2003) and Bradley et al. (2004) to estimate annual adult survival and telemetry studies or at-sea survey data to estimate fecundity. Model outputs predicted 3.1 to 4.6 percent mean annual rates of population decline per decade the first 20 years of model simulations in murrelet Conservation Zones 1 through 5 (McShane et al. 2004, p. 3-52). Simulations for all zone populations predicted declines during the 20 to 40-year forecast, with mean annual rates of 2.1 to 6.2 percent decline per decade (McShane et al. 2004, p. 3-52). These reported rates of decline are similar to the estimates of 4 to 7 percent per year decline reported in the Recovery Plan (USDI FWS 1997, p. 5).

**Table MAMU 8.** Murrelet demographic parameter values based on four studies all using Leslie Matrix models.

| Demographic Parameter | Beissinger 1995 | Beissinger and Nur 1997* | Beissinger and Peery (2007) | McShane et al. 2004 |
|---|---|---|---|---|
| Juvenile Ratio (Ŕ) | 0.10367 | 0.124 or 0.131 | 0.089 | 0.02 - 0.09 |
| Annual Fecundity | 0.11848 | 0.124 or 0.131 | 0.06-0.12 | - |
| Nest Success | - | - | 0.16-0.43 | 0.38 - 0.54 |
| Maturation | 3 | 3 | 3 | 2 - 5 |
| Estimated Adult Survivorship | 85 % – 90% | 85 % – 88 % | 82 % - 90 % | 83 % – 92 % |

*In USDI FWS (1997).

McShane et al. (2004, pp. 3-54 to 3-60) modeled population extinction probabilities beyond 40 years under different scenarios for immigration and mortality risk from oil spills and gill nets. Modeled results forecast different times and probabilities for local extirpations, with an extinction risk of 16 percent and mean population size of 45 individuals in 100 years in the listed range of the species (McShane et al. 2004, pp. 3-58).

***Reason for Listing-Threats***

When the murrelet was listed under the Endangered Species Act (USDI FWS 1992) and threats summarized in the Recovery Plan (USDI FWS 1997, pp. 43-76), several anthropogenic threats were identified as having caused the dramatic decline in the species:

- habitat destruction and modification in the terrestrial environment from timber harvest and human development caused a severe reduction in the amount of nesting habitat;
- unnaturally high levels of predation resulting from forest "edge effects";
- the existing regulatory mechanisms, such as land management plans (in 1992), were considered inadequate to ensure protection of the remaining nesting habitat and reestablishment of future nesting habitat; and
- manmade factors such as mortality from oil spills and entanglement in fishing nets used in gill-net fisheries.

There have been changes in the levels of these threats since the 1992 listing (USDI FWS 2004, pp. 11-12; USDI FWS 2009, pp. 27-67). The regulatory mechanisms implemented since 1992 that affect land management in Washington, Oregon, and California (for example, the NWFP) and new gill-netting regulations in northern California and Washington have reduced the threats to murrelets (USDI FWS 2004, pp. 11-12). The levels for the other threats identified in 1992 listing (USDI FWS 1992) including the loss of nesting habitat, predation rates, and mortality risks from oil spills and gill net fisheries (despite the regulatory changes) remained unchanged following the FWS's 2004, 5-year, rangewide status review for the murrelet (USDI FWS 2004, pp. 11-12). However, the continued downward population trends found Washington, combined with the species' continued vulnerability from a broad range of threats across its entire listed range are recognized as a serious concern for the species (USDI FWS 2019, p. 64-65).

***New Threats***

New threats identified in the FWS's 2009, 5-year review for the murrelet (USDI FWS 2009, pp. 27-67) include:

- Habitat destruction, modification, or curtailment of the marine environmental conditions necessary to support murrelets due to:
  - elevated levels of polychlorinated biphenyls in murrelet prey species;
  - changes in prey abundance and availability;
  - changes in prey quality;
  - harmful algal blooms that produce biotoxins leading to domoic acid and paralytic shellfish poisoning that have caused murrelet mortality; and
  - climate change in the Pacific Northwest.

- Manmade factors that affect the continued existence of the species include:
  - derelict fishing gear leading to mortality from entanglement;
  - energy development projects (wave, tidal, and on-shore wind energy projects) leading to mortality; and

- disturbance in the marine environment (from exposures to lethal and sub-lethal levels of high underwater sound pressures caused by pile-driving, underwater detonations, and potential disturbance from high vessel traffic; particularly a factor in Washington state).

The 2019 5-year review did not describe new threats from this list but did reference new information on increasing at risk of mortality in trawling gear, but that the scope and severity of the threat to murrelets of entanglement in derelict fishing gear has not changed (USDI FWS 2019, p. 64).

There is growing evidence that recent climate change has impacted a wide range of ecological systems (Stenseth et al. 2002; Walther et al. 2002; Ådahl et al. 2006; Karl et al. 2009; Moritz et al. 2012; Westerling et al. 2011, p. S459; Marlon et al. 2012, p. E541). Climate change, combined with effects from past management practices, is exacerbating changes in forest ecosystem processes and dynamics to a greater degree than originally anticipated under the NWFP. Environmental variation affects all wildlife populations; however, climate change presents new challenges as systems may change beyond historical ranges of variability. In some areas, changes in weather and climate may result in major shifts in vegetation communities that can persist in particular regions. See MAMU Table 9 for causes of habitat loss based on analysis in the most recent NWFP review (Lorenz et al. 2021, p. 33, Table 11). While Oregon, and the NWFP analysis area, has had an increase in higher suitability habitat overall, it is primarily in scattered patches. California's habitat is reported as fairly stable; however, available sources do not include habitat lost from the 2020 fires in Conservation Zone 5.

The 2019 5-year review concluded that climate change could exacerbate the impacts of continued nesting habitat loss and fragmentation (USDI FWS 2019, p. 64) and will affect the environmental baseline for murrelets and other listed species. Although it appears likely that the murrelet will be adversely affected by long-term consequences of climate change, we are not able to specifically quantify the magnitude of effects to the species (USDI FWS 2009, p. 34). The threats present in both the marine and terrestrial environments collectively comprise a suite of environmental stressors that, individually or through interaction, have likely disrupted or impaired behaviors which are essential to the reproduction or survival of individuals. When combined with the species naturally low reproductive rate, these stressors have led to declines in murrelet abundance, distribution, and reproduction at the population scale within the listed range.

Detailed discussions of the above-mentioned threats, life-history, biology, and status of the murrelet are presented in the Federal Register, listing the murrelet as a threatened species (USDI FWS 1992); the Recovery Plan, Ecology and Conservation of the Murrelet (Ralph et al. 1995); the final rule designating murrelet critical habitat (USDI FWS 1996); the Evaluation Report in the 5-Year Status Review of the Murrelet in Washington, Oregon, and California (McShane et al. 2004); the 2004,2009, and 2019 5-year Reviews for the Murrelet (USDI FWS 2004; USDI FWS 2009; USDI FWS 2019), and the final rule revising critical habitat for the murrelet (USDI FWS 2011]).

**Table MAMU 9.** Attribution of gross loss (acres) of higher probability nest and core habitat from 1993 to 2017 by state and landowner (Lorenz et al. 2021, p. 33, Table 11).

| | Higher probability nesting habitat | | | | | Core habitat | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State/landowner | Timber harvest | Wildfire | Insect damage | Other | Unattributable loss | Timber harvest | Wildfire | Insect damage | Other | Unattributable loss |
| Washington | | | | | | | | | | |
| Federal reserved | 2,417 | 2,895 | 113 | 2,787 | 20,447 | 339 | 537 | 2 | 407 | 4,889 |
| Federal nonreserved | 687 | 27 | 1 | 1 | 1,556 | 7 | 0 | 0 | 0 | 115 |
| Federal total | 3,103 | 2,923 | 114 | 2,788 | 22,003 | 346 | 537 | 2 | 407 | 5,005 |
| State | 21,383 | 2 | 137 | 2 | 5,518 | 180 | 0 | 0 | 0 | 201 |
| Other landowners | 49,857 | 92 | 415 | 17 | 5,916 | 525 | 0 | 3 | 2 | 117 |
| Total | 74,343 | 3,017 | 666 | 2,807 | 33,436 | 1,051 | 537 | 6 | 409 | 5,323 |
| Oregon | | | | | | | | | | |
| Federal reserved | 1,774 | 38 | 2 | 30 | 12,788 | 111 | 0 | 0 | 3 | 1,098 |
| Federal nonreserved | 1,052 | 0 | 0 | 1 | 1,760 | 13 | 0 | 0 | 0 | 54 |
| Federal total | 2,826 | 38 | 2 | 31 | 14,548 | 124 | 0 | 0 | 3 | 1,152 |
| State | 10,331 | | 10 | | 3,034 | 121 | 0 | 0 | 0 | 115 |
| Other landowners | 65,492 | 39 | 137 | 0 | 5,023 | 1,310 | 0 | 2 | 0 | 178 |
| Total | 78,650 | 77 | 149 | 31 | 22,606 | 1,554 | 0 | 2 | 3 | 1,445 |
| California | | | | | | | | | | |
| Federal reserved | 14 | 238 | 1 | 14 | 193 | 1 | 12 | 0 | 0 | 34 |
| Federal nonreserved | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| Federal total | 14 | 238 | 1 | 14 | 197 | 1 | 12 | 0 | 0 | 34 |
| State | 147 | 1 | 0 | 0 | 274 | 5 | 0 | 0 | 0 | 49 |
| Other landowners | 2,683 | 5 | 3 | 0 | 767 | 6 | 0 | 0 | 0 | 11 |
| Total | 2,844 | 244 | 4 | 14 | 1,238 | 12 | 12 | 0 | 0 | 94 |
| Plan area total | | | | | | | | | | |
| Federal reserved | 4,205 | 3,172 | 116 | 2,831 | 33,429 | 451 | 549 | 2 | 410 | 6,022 |
| Federal nonreserved | 1,739 | 28 | 2 | 2 | 3,319 | 20 | 0 | 0 | 0 | 170 |
| Federal total | 5,944 | 3,199 | 117 | 2,833 | 36,748 | 471 | 549 | 2 | 410 | 6,191 |
| State | 31,860 | 3 | 148 | 2 | 8,825 | 306 | 0 | 0 | 0 | 365 |
| Other landowners | 118,032 | 136 | 555 | 17 | 11,707 | 1,841 | 0 | 5 | 2 | 306 |
| Total | 155,836 | 3,338 | 820 | 2,852 | 57,280 | 2,618 | 549 | 8 | 412 | 6,862 |

## Conservation

### *Needs*

Reestablishing an abundant supply of high-quality murrelet nesting habitat is a vital conservation need given the extensive habitat removal during the 20th century. However, there are other conservation imperatives. Foremost among the conservation needs are those in the marine and terrestrial environments to increase murrelet fecundity by increasing the number of breeding adults, improving murrelet nest success (due to low nestling survival and low fledging rates), and reducing anthropogenic stressors that reduce individual fitness or lead to mortality.

The overall reproductive success (fecundity) of murrelets is directly influenced by nest predation rates (reducing nestling survival rates) in the terrestrial environment and an abundant supply of high-quality prey in the marine environment during the breeding season (improving potential nestling survival and fledging rates). Anthropogenic stressors affecting murrelet fitness and survival in the marine environment are associated with commercial and tribal gillnets, derelict fishing gear, oil spills, and high underwater sound pressure (energy) levels generated by pile-driving and underwater detonations (that can be lethal or reduce individual fitness).

General criteria for murrelet recovery (delisting) were established at the inception of the Plan and they have not been met. More specific delisting criteria are expected in the future to address population, demographic, and habitat based recovery criteria (USDI FWS 1997, pp. 114-115). The general criteria include:

- documenting stable or increasing population trends in population size, density, and productivity in four of the six Conservation Zones for a 10-year period; and
- implementing management and monitoring strategies in the marine and terrestrial environments to ensure protection of murrelets for at least 50 years.

Thus, in addition to habitat protection, increasing murrelet reproductive success and reducing the frequency, magnitude, or duration of any anthropogenic stressor that directly or indirectly affects murrelet fitness or survival in the marine and terrestrial environments are the priority conservation needs of the species. The Service estimates recovery of the murrelet will require at least 50 years (USDI FWS 1997, pp. vi and 10). The recent 5-year review determined that if reproductive success continues to be too low to sustain the population, the observed population trends continue to decline significantly, and manmade and natural threats continue at current or increased levels, then a change in listing status to endangered may be warranted in the future (USDI FWS 2019, p. 65).

### *Recovery Plan*

The Marbled Murrelet Recovery Plan outlines the conservation strategy with both short- and long-term objectives. The Plan places special emphasis on the terrestrial environment for habitat-based recovery actions due to nesting occurring in inland forests.

In the short-term, specific actions identified as necessary to stabilize the population include protecting occupied habitat and minimizing the loss of unoccupied but suitable habitat (USDI FWS 1997, p. 119). Specific actions include maintaining large blocks of suitable habitat, maintaining and enhancing buffer habitat, decreasing risks of nesting habitat loss due to fire and windthrow, reducing predation, and minimizing disturbance. The designation of critical habitat also contributes towards the initial objective of stabilizing the population size through the

maintenance and protection of occupied habitat and minimizing the loss of unoccupied but suitable habitat.

Long-term conservation needs identified in the Plan include:

- increasing productivity (abundance, the ratio of juveniles to adults, and nest success) and population size;
- increasing the amount (stand size and number of stands), quality, and distribution of suitable nesting habitat;
- protecting and improving the quality of the marine environment; and
- reducing or eliminating threats to survivorship by reducing predation in the terrestrial environment and anthropogenic sources of mortality at sea.

*Conservation Zone 3 Recovery objectives*: Murrelet occupied sites along the western portion of the Tillamook State Forest are especially important to maintaining well distributed murrelet populations. The murrelet recovery plan states that efforts should focus on maintaining these occupied sites, minimizing the loss of unoccupied but suitable habitat, and decreasing the time for development of new habitat. Relatively few known occupied sites occur north of the Tillamook State Forest. Recovery efforts should be directed at restoring some of the north-south distribution of murrelet populations and habitat in this Zone. Murrelet sites along the western portion of the Tillamook State Forest are especially important to maintaining well-distributed murrelet populations. Maintaining suitable and occupied murrelet habitat on the Elliot State Forest, Tillamook State Forest, Siuslaw NF, and BLM-administered forests is an essential component for the stabilization and recovery of murrelets (USDI FWS 1997, p. 127).

*Conservation Zone 4 Recovery Objectives*: Recovery actions in Zone 4 should be focused on preventing the loss of occupied nesting habitat, minimizing the loss of unoccupied but suitable habitat, and decreasing the time for development of new suitable habitat. Much murrelet nesting habitat is found in state and national parks that receive considerable recreational use. The need to maintain high quality murrelet terrestrial habitat should be considered in planning any modifications to state or national parks for recreational purposes. Both highway and campground construction, including picnic areas, parking lots, and visitors centers, could present threats to the murrelet through loss of habitat, nest disturbance, and/or increasing potential predation from corvids associated with human activities such as Steller's jays and crows. Implementing appropriate garbage/trash disposal may help decrease potential predator populations in high human use areas such as county, state and national parks. Zone 4 has large blocks of suitable habitat critical to the three-state murrelet population recovery over the next 100 years. However, the amount of suitable habitat protected in parks is probably not sufficient by itself to guarantee long-term survival of murrelets in this Zone. On the other hand, a considerable amount of habitat is preserved in parks such that survival may be more likely in this Zone than in several other Zones. Private lands at the southern end of this Zone are important for maintaining the current distribution of the species. There is already a considerable gap in distribution between this area and the central California population in Zone 6. Efforts should be implemented to, at a minimum, not expand the current distribution gap (USDI FWS 1997, p. 128).

**NWFP Protections**

On Federal lands under the NWFP surveys are required for all timber sales that remove murrelet habitat. If habitat outside of mapped Late-Successional Reserves (LSRs) is found to be used by murrelets, then the habitat and recruitment habitat (within 25 years) within a 0.5-mile radius of the occupied behavior is designated as a new LSR. Timber harvest within LSRs is designed to

benefit the development of late-successional conditions, which should improve future conditions of murrelet nesting habitat. Designated LSRs not only protect habitat currently suitable to murrelets (whether occupied or not), but will also develop future suitable habitat in large blocks.

**Western Oregon RMP Protections**

The Bureau of Land Management's (BLM) Wildlife Resource Program's Management Direction for murrelets provides some protection for murrelets. The extent to which the protective measures are applied within the action area is directed by the LUAs and distance from the ocean (inland zone 1 or 2). As described in its biological opinion for the RMP, the Service found that overall, the plan would provide for the survival and recovery of the murrelet. There was an expected immediate net gain of 79,500 acres to the reserve system including a gain of 48,182 acres of murrelet nesting habitat, about half of which was considered high-quality murrelet nesting habitat that would be added to the BLM's reserve system. An important provision required the incorporation of all occupied murrelet sites known at the time of implementation within the Late-successional Reserves (LSRs). Additionally, future sites discovered outside of LSRs in inland zone 1 and future sites discovered within Riparian Reserves within inland zone 2 will have the LUAs updated to LSR to protect the occupied stand. Proposed actions would significantly minimize habitat modification by applying protective measures to activities in all land allocations (LUAs) in inland zone 1 and to activities in the late-successional and riparian LUAs in inland zone 2. Nest disturbance will be minimized by applying protective measures to activities in all LUAs in inland zone 1 and to activities in the reserve LUAs in inland zone 2 to allow for undisrupted murrelets nesting. Future activities are expected to impact murrelet nest sites in zone 2 (35- 50 miles from the coast) within the harvest land base and the district designated reserve LUAs (all of which will be subject to their own, future consultation), but the overall protections and management of murrelet habitat and sites are expected to result in an increase in the murrelet population within BLM lands and within the action area over time (USDI FWS 2016a, p. 284).

**Tree Removal**

Terrestrial habitat for murrelets has both a local and landscape aspect. At the local level a forest stand with branch platforms can provide nesting structure with minimal requirements for the murrelet, although we know murrelets are more likely to occur where there is large contiguous blocks of late-successional or old growth habitat on the landscape (Falxa and Raphael 2016, pp. 113-114). This patch of forested area can be either late-successional or old growth habitat with wide branches or younger trees with mistletoe infections or other deformities that form a platform wide enough for a nest. Murrelets use a wide variety of forest stands although they all must contain nesting structure.

There can be short and/or long-term potential effects associated with habitat modification. Thinning to increase growth rates and crowns by reducing competition for the retained trees can make currently unsuitable nest trees and trees of marginal habitat quality become nest trees sooner than without treatment. These types of thinning treatments also encourage currently suitable trees to maintain full crowns and branch development, and to create holes and gaps in the canopy that allow murrelets better access into tree crowns.

A 300-600 foot buffer from occupied or unsurveyed murrelet nesting habitat is recommended in the murrelet recovery plan as a short-term conservation action to stabilize and increase the population (USDI FWS 1997, p. 140). The part of an adjacent stand which lacks nesting structure, but supports an adjacent stand or individual trees with murrelet nesting structure is

referred to as buffer habitat. Thinning of buffer habitat may also affect murrelets by impacting the buffering habitat's ability to provide for windthrow during storms, provide a microclimate that supports moss growth, and/or provides a stands with low usage by murrelet nest predators. These effects are expected to be minimal if treatments are designed to: 1) minimize potential windthrow; 2) microclimate changes; and 3) minimize change that would increase stand usage by murrelet predators.

Predation by jays may increase when berry production and, potentially, insects increase in adjacent lands. The increase is likely due to the increased forage time spent by Steller's jays, (*Cyanocitta stelleri*) in the open areas. The following is from Zharikov et al. (2006, p. 117):

> "Populations of potential nest predators rarely increase in forest landscapes managed for timber, in contrast to forests adjacent to human settlements or agricultural fields (Henske et al. 2001). This is because local predator populations will increase only if fragmentation produces a concurrent increase in the amount of their staple food supply (*e.g.*, berries) and/or breeding habitat (Marzluff and Restani 1999; Raphael et al. 2002). In this study area clear-cutting is not associated with development of human habitation or agricultural fields. It is thus unlikely that recent forest fragmentation could create anthropogenic sources of food. At the same time, clear-cutting may have decreased the amount of nesting habitat for such known adult and nest predators of murrelets as the northern goshawk (*Accipiter gentilis*), common raven (*Corvus corax*) and gray jay (*Perisores canadiensis*) and thus lower their abundance in recently logged areas (Raphael et al.2002). However, as clearcuts overgrow and berry producing shrubs become established there (Nielsen et al. 2004), their usage by nest predators may increase Steller's jay, *Cyanocitta stelleri*, (Raphael et al. 2002), explaining the lower breeding success closer to old (fuzzy-edge) clearcuts."

**Disturbance**

The effects to murrelets from disturbance are largely unknown, although effects such as increased energetic expenditure, elevated stress levels, and susceptibility to predation have been documented in other wildlife and are assumed to effect murrelets, as well. For these reasons disturbance is considered a threat to the species (McShane et al. 2004) although summary studies on effects of disturbance have not documented any nest failure, abandonment, or chick mortality directly attributed to noise disturbance (Singer et al. 1995, Hamer and Nelson 1998, Golightly et al. 2002).

During the critical nesting period (Table MAMU 10), noise and visual disturbance associated with habitat modification projects may disturb adult or juvenile murrelets. Murrelet reactions to noise, smoke and/or temporary increases in predation due to human presence at or in the immediate vicinity of murrelets could potentially include one or more of the following: a nesting adult flushes and leaves the eggs exposed to predation, an adult aborts a feeding attempt potentially reducing the fitness of the young, or a juvenile prematurely fledges potentially reducing the fitness due to having sub-optimal energy reserves or flight ability before leaving the nest. A murrelet that may be disturbed when it flies into the stands for other reasons than nest exchange or feeding young is presumably capable of moving away from disturbance without a significant disruption of its behavior. Murrelets feed at sea and only rely on forest habitat for nesting.

**Table MAMU 10.** Breeding period used to determine potential effects in this consultation.

| Species | Breeding Period | Critical Breeding Period |
|---|---|---|
| Murrelet | April 1 – September 15 | April 1 – August 5 |

Therefore, forest management or other forest activities during the murrelet breeding season (April 1 – September 15) may affect murrelets that are nesting. Current disturbance and disruption distances by common sources have been summarized in Table MAMU 9. Disruption is a subset of disturbance, to indicate the subset of disturbance that may adversely affect murrelets due to the greater impacts when closer to nesting murrelets.

In the late breeding period (August 6 – September 15), potential effects from disturbance decline because all breeding murrelets have establishing a nest, most are finished incubating and either have completed nesting (about half of the chicks have fledged) (Hamer et al. 2003) or adult murrelets are still feeding the chick. Adults still tending their young in the late breeding period are heavily invested in chick-rearing, and it is during the crepuscular periods, which we define as two hours after sunrise and two hours before sunset, when most food deliveries to the young are made. When disruption events are limited to during the day and outside the crepuscular periods (which will be referred to as daily timing restrictions), the likelihood of nest abandonment or significant alteration of breeding success in the late breeding period is minimized because disruption will not occur during the periods of the majority of food deliveries to the chick plus the percent of young that have fledge is increasing every day. Therefore, the likelihood of injury by annoying the adult murrelets to such an extent as to significantly disrupt normal behavior patterns, which includes, but are not limited to, breeding, feeding or sheltering is not reasonably certain to occur in the late breeding period with daily timing restrictions and are considered insignificant effects (excluding activities that cause physical injury or mortality; *e.g.*, blasting and helicopter hovering, Table MAMU 11).

Although disruption distances in Table MAMU 11 are based on the interpretation of the best available information, the exact distance where different types of noise, smoke and/or temporary increases in predation due to human presence may disrupt breeding, including feeding young, are difficult to predict and can be influenced by a multitude of factors. Site-specific information (*e.g.*, topographic features, project length or frequency of disturbance to an area) could factor into the severity of anticipated effects. The potential for noise or human intrusion activities to create the likelihood of injury to murrelets is also dependent on the background or baseline levels in the environment. In areas that are continually exposed to higher ambient noise or human presence levels (*e.g.*, areas near well-traveled roads, Campgrounds), murrelets are likely less susceptible to small potential increases in disturbances because they are acclimated to such activities. Murrelets do occur in areas near human activities and may habituate to certain levels of noise or human presence.

For disruption of murrelet behavior to occur as a result of disturbance (noise, smoke and/or temporary increases in predation due to human presence) caused by a proposed action, the effects and the murrelet(s) must be in proximity to one another during the murrelet nesting season (see Table MAMU 11).

**Table MAMU 11.** Disturbance and disruption distances for murrelets during the breeding period from the edge of unsurveyed or known occupied stand or nest structure in younger stands.

| Disturbance Source | Disturbance Distances During the Breeding Period (Apr 1 – Sep 15) | Disruption Distances During the Breeding Period<br><br>(Apr 1 – Sep 15) | Disruption Distances with daily timing restrictions *, unless noted otherwise<br><br>(Aug 6 – Sep 15) |
|---|---|---|---|
| Light maintenance of roads, Campgrounds, and administrative facilities | ≤ 0.25 mile | N/A[1] | N/A[1]<br><br>no daily timing restrictions required |
| Log hauling on open roads | ≤ 0.25 mile | N/A[1] | N/A[1]<br><br>no daily timing restrictions required |
| Chainsaws (includes felling hazard/danger trees) | ≤ 0.25 mile | ≤ 110 yards[2] | N/A |
| Heavy equipment for road construction, road repairs, bridge construction, culvert replacements, etc. | ≤ 0.25 mile | ≤ 110 yards[2] | N/A |
| Pile-driving (steel H piles, pipe piles)<br><br>Rock Crushing and Screening Equipment | ≤ 0.25 mile | ≤ 120 yards[3] | N/A |
| Blasting | ≤ 1 mile | ≤ 0.25 mile[3] | ≤ 0.25 mile[3] |
| ** Helicopter: Chinook 47d (described as a large helicopter in the rest of this document) | ≤ 0.5 mile | ≤ 265 yards[5] | ≤ 100 yards[6]<br><br>(hovering only) |
| ** Helicopter: Boeing Vertol 107, Sikorsky S-64 (SkyCrane) | ≤ 0.25 mile | ≤ 150 yards[7] | ≤ 50 yards[6]<br><br>(hovering only) |
| ** Helicopters: K-MAX, Bell 206 L4, Hughes 500 | ≤ 0.25 mile | ≤ 110 yards[8] | ≤ 50 yards[6]<br><br>(hovering only) |
| ** Small fixed-wing aircraft (Cessna 185, etc.) | ≤ 0.25 mile | ≤ 110 yards | N/A |
| Tree Climbing | ≤ 110 yards | ≤ 110 yards[9] | N/A |
| Burning (prescribed fires, pile burning) | ≤ 1 mile | ≤ 0.25 mile[10] | N/A |
| Example: Chainsaws are being used adjacent to a murrelet occupied stand during the period of April 1 to September 15, less than 110 yards from the stand. In this scenario (within the disruption distance), murrelets could be disrupted to the point of likely adversely affecting the murrelets or their young. However if the chainsaws were being used further than 110 yards away from the occupied stand during the same time period (within the .25 mile disturbance distance, but beyond the 110 yard disruption distance), this chainsaw use would only slightly disturb murrelets, not disrupt their normal behavior. In this case, the chainsaw use is not likely to adversely affect the murrelets because of the further distance the chainsaw use is away from them. | | | |

Table MAMU 11 Footnotes:

1. N/A = not applicable. We anticipate that the few murrelets that select nest sites in close proximity to open roads either are undisturbed by or habituate to the normal range of sounds and activities associated with these roads (Hamer and Nelson 1998, p. 21).
2. Based on recommendations from murrelet researchers that advised buffers of greater than 100 meters to reduce potential noise and visual disturbance to murrelets (Hamer and Nelson 1998, p. 13, USDI FWS 2012, p. 10).
3. Impulsive sound associated with blasts and pile-driving is highly variable and potentially injurious at close distances. We selected a 0.25-mile radius around blast sites as a disruption distance based on observed prairie falcon flush responses to blasting noise at distances of 0.3 – 0.6 miles from blast sites (Holthuijzen et al. 1990, p. 273). We have conservatively chosen a distance threshold of 120 yards for impact pile-driving and rock-crushing operations to avoid potential hearing loss effects and to account for significant behavioral responses (*e.g.*, flushing) from exposure to continuous sounds from impact pile driving.
4. Exposure to peak sound levels that are >140 dBA are likely to cause injury in the form of hearing loss in birds (Dooling and Popper 2007, pp. 23-24). We have conservatively selected 100 yards as an injury threshold distance based on sound levels from experimental blasts reported by Holthuijzen et al. (1990, p. 272), which documented peak sound levels from small blasts at 138 – 146 dBA at a distance of 100 m (110 yards).
5. Based on an estimated 92 dBA sound-contour (approximately 265 yards) for the Chinook 47d (Newman et al. 1984, Table D.1).
6. Because murrelet chicks are present at the nest until they fledge, they are vulnerable to direct injury or mortality from flying debris caused by intense rotor wash directly under a hovering helicopter. Rotor-wash from large helicopters is expected to be disruptive at any time during the nesting season due the potential for flying debris and shaking of trees located directly under a hovering helicopter. Hovering rotor-wash distance is based on a 300-ft radius rotor-wash zone for large helicopters hovering at < 500 above ground level (from WCB 2005, p. 2 – logging safety guidelines). We reduced the hovering helicopter rotor-wash zone to a 50-yard radius for all other helicopters based on the smaller rotor-span for all other ships.
7. Based on an estimated 92 dBA sound contour from sound data for the Boeing Vertol 107 the presented in the San Dimas Helicopter Logging Noise Report (USFS 2008, chapters 5, 6).
8. Based on Delaney et al. (1999, p. 74), which concluded that a buffer of 105 m (115) yards for helicopter overflights would eliminate flush responses from military helicopter overflights. The estimated 92 dBA sound contours for these helicopters is less than 110 yards (*e.g.*, K-MAX (100 feet) (USFS 2008, chapters 5, 6), and Bell 206 (85-89 dBA at 100 m)(Grubb et al. 2010, p. 1277).
9. Based on recommendations from murrelet researchers that advised buffers of greater than 100 meters to reduce potential noise and visual disturbance to murrelets (Hamer and Nelson 1998, p. 13, USDI FWS 2012, p. 10).
10. Based on recommendations presented in Smoke Effects to Northern Spotted Owls (USDI FWS 2008, p. 4).

* Daily timing restrictions: Activities would not begin until two hours after sunrise and would end two hours before sunset.

**Aircraft normally use above ground level (AGL) as a unit of measure. For instance, to not cause a disruption by medium and small helicopters during the late breeding season, the AGL would be 350 feet. 350 feet AGL would account for 200 foot tall trees that murrelets would be occupying plus the 50 yards disruption distance.

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