DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[FWS–R1–ES–2008–0095;13410–1113–0000–C5]

Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To Remove the Marbled Murrelet (*Brachyramphus marmoratus*) From the List of Endangered and Threatened Wildlife

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of 12-month petition finding.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service or USFWS), announce a 12-month finding on a petition to remove the Washington/Oregon/California population of the marbled murrelet (*Brachyramphus marmoratus*) (murrelet) from the Federal List of Endangered and Threatened Wildlife (List) pursuant to the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 *et seq.*). Based on a thorough review of the best scientific and commercial data available, we find that the Washington/Oregon/California population of the murrelet is a valid distinct population segment (DPS) in accordance with the discreteness and significance criteria in our 1996 DPS policy. Furthermore, we find that this DPS continues to be subject to a broad range of threats, such as nesting habitat loss, habitat fragmentation, and predation. Although some threats, such as gillnet bycatch and lack of regulatory mechanisms, have been reduced since the murrelet's 1992 listing, the primary threats to the species' persistence continue. Furthermore, the species faces newly identified threats, such as abandoned fishing gear, harmful algal blooms, and observed changes in the quality of the bird's marine food supply. Population surveys conducted from 2000 through 2008 from San Francisco Bay to the Canadian border document a population decline during this period. Given our current understanding of the species' population size and trajectory, and in light of the scope and magnitude of existing threats, we conclude that the species continues to meet the definition of a threatened species under the ESA. Therefore, we have determined that removing the murrelet from the List is not warranted.

DATES: The finding announced in this document was made on January 21, 2010.

ADDRESSES: This finding is available on the Internet at *http://www.regulations.gov* at Docket Number [FWS–R1–ES–2008–0095]. Supporting documentation we used in preparing this notice will be available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, 510 Desmond Drive, SE., Suite 102, Lacey, WA 98503, (360) 753–9440; (360) 753–9405 fax. New information, materials, comments, or questions concerning this species may be submitted to the Service at the above address.

FOR FURTHER INFORMATION CONTACT: Ken Berg, Field Supervisor, U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, (*see* **ADDRESSES** section). If you use a telecommunications device for the deaf (TDD), you may call the Federal Information Relay Service (FIRS) at (800) 877–8339.

SUPPLEMENTARY INFORMATION:

Background

Section 4 of the ESA (16 U.S.C. 1533 *et seq.*) and implementing regulations (50 CFR part 424) set forth procedures for adding species to, removing species from, or reclassifying species on the Federal List of Endangered and Threatened Wildlife. Section 4(b)(3)(A) of the ESA requires that, for any petition containing substantial scientific and commercial information that listing, delisting, or reclassification may be warranted, we make a finding within 12

months of receiving the petition (12-month finding), on whether the petitioned action is: (a) Not warranted; (b) warranted; or (c) warranted, but that immediate proposal of a regulation implementing the petitioned action is precluded by other pending proposals to determine whether other species are threatened or endangered. This document represents our 12-month finding on a May 28, 2008, petition by the American Forest Resources Council, the Carpenters Industrial Council, Douglas County, Oregon, and Ron Stuntzner to delist the Washington/Oregon/California population of the murrelet (*see* **Previous Federal Actions,** below).

Previous Federal Actions

The Washington/Oregon/California population of the murrelet was listed as a threatened species on October 1, 1992 (57 FR 45328).

On September 1, 2004, we issued a 5-year review of the Washington/Oregon/California population of the murrelet (USFWS 2004). This review found that the population was not a valid DPS, but that delisting should not be proposed until a rangewide status review was concluded. As noted below (*see* **Distinct Population Segment Analysis**), we now believe that our DPS analysis in that review was fundamentally flawed.

On May 28, 2008, we received a petition from the American Forest Resource Council; the Carpenters Industrial Council of Douglas County, Oregon; and Ron Stuntzner requesting that we delist the Washington/Oregon/California DPS of murrelet, primarily based on the DPS conclusion in our 2004 5-year review.

On October 2, 2008, we published a 90-day finding (73 FR 57314) on the May 28, 2008, petition and found that, although the petitioners based their arguments primarily on our flawed 2004 5-year review, a 12-month status review was nevertheless warranted because we had not formally revisited our DPS conclusion since then, and a reasonable person could find that the petitioned action may be warranted. Thus our 90-day finding initiated a 12-month status review.

On June 12, 2009, we issued a revised 5-year review of the Washington/Oregon/California murrelet population (USFWS 2009). This review found the murrelet population to be a valid DPS and recommended that the murrelet DPS remain listed as threatened.

Species Information

The murrelet is a small diving seabird of the Alcidae family. Murrelets spend most of their lives in the marine environment where they forage in near-shore areas and consume a diversity of prey species, including small fish and invertebrates. In their terrestrial environment, the presence of platforms in trees (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) and McShane *et al.* (2004).

Population Size and Trends

Our recent 5-year review (USFWS 2009, pp. 19–21), summarized below, analyzed the best available information on murrelet population size and trends in its listed range (Washington/Oregon/California). See this review (USFWS 2009, pp. 19–21, 26–68) for a more detailed analysis of population status, trends, and threats.

The best available data on murrelet population size for the area from San Francisco Bay, CA, to the Canadian border come from the results of the Effectiveness Monitoring Program of the Northwest Forest Plan (NWFP), which has conducted annual at-sea population surveys during the breeding season since 2000, using a uniform survey protocol (Huff 2006, p. 6; Miller *et al.* 2006, p. 31; Raphael *et al.* 2007b, pp. 44–45; Falxa *et al.* 2009, p. 2). The area surveyed includes five of the six murrelet conservation zones (Zones 1 through 5) established by the recovery plan for the murrelet (USFWS 1997, p. 114). (Zone 6 represents the areas south of San Francisco Bay, CA, and offshore breeding habitat between Half Moon Bay and Santa Cruz, CA.) As of 2008, the estimated population of murrelets in Zones 1–5 was 17,800 (95 percent confidence interval (CI): 14,600 to 21,000; Falxa *et al.* 2009, p. 2). The 2007 and 2008 population estimates represent the lowest estimates since monitoring began in 2000, and, as described below, the monitoring survey results indicate a statistically significant population decline since 2000.

Peery *et al.* (2008, p. 3) conducted at-sea population surveys for murrelets in Conservation Zone 6 in 2007 and 2008, following a method used previously to survey the same area during 1999 through 2003 (Peery *et al.* 2006a, pp. 1519–1522). No population estimates are available for 2005 and 2006 as surveys were not conducted. Using the same distance sampling estimation techniques applied to Conservation Zones 1–5, they estimated the 2007 Conservation Zone 6 population to be 367 birds (95 percent CI: 240–562) and the 2008 Conservation Zone 6 population to be 174 birds (95 percent CI: 91–256; Peery *et al.* 2008, p. 4).

Using the combined survey estimates from Conservation Zones 1–5 and Conservation Zone 6, the 2008 estimated population size within the listed range is approximately 18,000 birds (95 percent CI: 14,700–21,200, figures rounded to nearest 100) (USFWS 2009, p. 16).

Demographic models have predicted murrelet populations in the listed range to be declining at an estimated rate of 3 to 7 percent per year (USFWS 1997, p. 5; McShane *et al.* 2004, p. 3–15). Recent information, based on population size estimates conducted by standardized protocols for nearly a decade, provides empirical data with which to evaluate population trends in the listed range.

Trends were evaluated for two periods: (1) 2000 through 2008, and (2) 2001 through 2008. The latter was evaluated because inspection of the data set suggested that the 2000 estimate may have been unusually low, considering the pattern of estimates from subsequent years (Falxa *et al.* 2009, p. 6).

A significant population decline was detected for the combined 5-Conservation Zone area (Zones 1–5), both for the 2000–2008 and 2001–2008 periods (Falxa *et al.* 2009, p. 13). The 2000–2008 data represent an estimated 2.4 percent annual decline, while the 2001–2008 data represent an annual decline of about 4.3 percent (Falxa *et al.* 2009, p. 13). The 2.4 and 4.3 percent values represent two valid estimates for the annual rate of decline based on the best available information. The 2.4 and 4.3 percent annual decline rates represent overall declines of the population of 19 and 34 percent, respectively, in Conservation Zones 1 through 5. In terms of numbers of birds, the estimated average annual decline for this period was 490 birds per year (standard error: 241 birds) based on the 2000–2008 data, or about 870 birds per year (standard error: 129 birds) based on the 2001–2008 data (Falxa *et al.* 2009, p. 13).

The murrelet population in central California underwent a particularly significant and rapid decline between 2003 and 2008 (Peery *et al.* 2008, p. 4). The 2008 population estimate for Conservation Zone 6 represented a decline of about 55 percent since 2007, and a 75 percent decline since 2003

(Peery *et al.* 2008, p. 4). Compared to the 2003 Zone 6 estimate of 699 birds (95 percent CI: 567 to 680; Peery 2007), the 2008 estimate of 174 birds represents an average annual decline of about 15 percent, about 105 birds per year, between 2003 and 2008. The 2007 and 2008 population estimates in Zone 6 are the lowest since surveys began in 1999.

Productivity

McShane *et al.* (2004, p. 3–2) considered murrelet breeding success to be a function of nest predation, timing, foraging conditions, prey availability, and adult survival during the breeding season. Impacts to breeding success from predation are discussed under Factor C in the **Summary of Factors Affecting the Species** section, below. Data on nest success from radio telemetry studies and from adult:juvenile ratios at sea, as an index of breeding success, continue to confirm that murrelet reproduction in Washington, Oregon, and California is too low to sustain populations (USFWS 2009, p. 23). Recent information from studies in British Columbia and Conservation Zone 6 suggest that one potential cause for the observed poor reproductive success is related to changes in the marine environment that have resulted in murrelets eating prey at a lower trophic level—which is lower quality—particularly during the breeding season (USFWS 2009, pp. 22, 41–42). The trophic level shift is likely to have contributed to a decline in murrelet reproduction, at least in Conservation Zone 6, and perhaps elsewhere. The relative contributions of nest predation and trophic level shifts in prey consumption to reduced reproductive output are not well known, and probably change between years and areas. However, in combination, they are suspected to be largely responsible for current observations of poor reproductive success.

Distinct Population Segment Analysis

The petition to delist (AFRC *et al.* 2009) primarily cited the DPS conclusion in our 2004 5-year review (USFWS 2004, pp. 14–17) as sufficient reason to delist the Washington/Oregon/California DPS of murrelet. In our 2009 5-year review for the murrelet, we completed a thorough reevaluation of our previous DPS analysis of the murrelet (USFWS 2009, pp. 3–12). Below, we present the discreteness and significance analyses for the Washington/Oregon/California population of the murrelet based on our most recent 5-year review (USFWS 2009, pp. 3–12).

Under the ESA (section 3(16)), a species is defined to include "any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." The ESA does not further define what is meant by a distinct population segment. We, along with the National Marine Fisheries Service (now the National Oceanic and Atmospheric Administration–Fisheries), developed the Policy Regarding the Recognition of Distinct Vertebrate Population Segments (DPS Policy) (February 7, 1996; 61 FR 4722) to help us in determining what constitutes a DPS, and thus what may be considered a species for listing under the ESA. The policy identifies three elements that we are to consider in making a DPS determination. These elements include: (1) The discreteness of the population segment; (2) the significance of the population segment to the taxon to which it belongs; and (3) the population segment's conservation status in relation to the ESA's standards for listing. If we determine that a population segment is discrete and significant, it is evaluated for endangered or threatened status based on the ESA's definition of those terms and a review of the five listing factors established in section 4(a) of the ESA.

Discreteness

Discreteness refers to the separation of a population segment from other members of the taxon based on either: (1) Physical, physiological, ecological, or behavioral factors; or (2) international boundaries within which significant differences in control of exploitation, habitat management, conservation status, or regulatory mechanisms exist in light of section 4(a)(1)(D) of the ESA.

There is no evidence of marked genetic or morphological discontinuity between murrelet populations at the United States-Canada border, nor is there evidence of differences in the control of exploitation. However, we find that there are significant differences in management of habitat, conservation status, and regulatory mechanisms between the countries. In our analysis of discreteness at the international border, we compare existing regulatory mechanisms in Canada with non-ESA regulatory mechanisms in the United States. This approach ensures that our analyses for listing and delisting a species are the same with respect to the international border discreteness test per our 1996 DPS policy.

Management of Habitat: The management of habitat would be different across the United States–Canada border without the protections of the ESA because the two countries would rely on regulatory mechanisms that are not equally protective of the murrelet or its habitat (*see Regulatory Mechanisms,* below).

Conservation Status: There is a difference in conservation status between the United States and Canada. If the murrelet were not listed under the ESA, no Federal protections would be afforded it under the ESA. Under Canada's endangered species legislation (the Species at Risk Act (SARA), 2002), the murrelet would remain classified as "threatened," that is, "a wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction." SARA's prohibition of harm to the species and its residence would mean the species would have significantly greater legal protection on the Canadian side of the border. The murrelet is listed as threatened in Oregon and Washington, and endangered in California under the individual State endangered species acts. However, these statutes, individually and collectively, provide less protection to the species as compared to regulatory protections under SARA. Hence, in the absence of ESA protections there would be a significant difference in the conservation status of the murrelet across the United States and Canadian border from a legal standpoint. See the *Differences in Regulatory Mechanisms* section below for additional information.

There is also a significant difference in conservation status from a population standpoint. The continental United States has a substantially smaller population of murrelets (approximately 18,000; USFWS 2009, p. 16), than does Canada (approximately 66,000; Burger 2002, p. 25). In addition, based on at-sea surveys of juvenile to adult ratios, the productivity of murrelets in Washington, Oregon, and California (Cresent Coastal Research, 2008, p. 13; Beissinger and Peery 2007, p. 299; Raphael *et al.* 2007a, p. 16; Long *et al.* 2008, pp. 18–19) is considerably lower than in British Columbia (Bellefleur and others, 2005 as cited in Piatt *et al.* 2007, p. 18). British Columbia reports higher productivity values than anywhere outside of Kachemak Bay in Alaska.

In addition, estimates of loss of old-growth forests in the United States' Pacific Northwest since pre-industrial times (National Research Council 2000, pp. 67–73), compared to the amount of forests within the range of the murrelet in British Columbia that have become unsuitable due to anthropogenic causes (*e.g.,* industrial logging and

urbanization) (Demarchi and Button 2001a and Demarchi and Button 2001b as adapted by Burger 2002, Chapter 4), show a higher percentage of murrelet habitat has been lost historically in Washington, Oregon, and California than in Canada.

Finally, there are differences in the amount of nesting habitat remaining for murrelets between the United States and Canada. There are approximately 1.5 to 2 million hectares (3.7 to 4.9 million acres) of nesting habitat remaining in British Columbia (Piatt *et al.* 2007, p. 118), while there are only 890,000 to 1.6 million hectares (2.2 to 4.0 million acres) of suitable nesting habitat remaining in the contiguous United States (McShane *et al.* 2004, pp. 4–5; Raphael *et al.* 2006, pp. 117–118, 123). Furthermore, the contiguous U.S. estimate is likely an overestimate because some administrative units used northern spotted owl habitat as a surrogate for murrelet habitat, and owl habitat includes younger forest than typical murrelet habitat.

In conclusion, the conservation status of the murrelet is significantly different across the international border. Murrelet population numbers are lower in the United States (less than one-third of the Canadian population), productivity is lower, the loss of old-growth forests has been more severe, and there is probably less habitat remaining (although the habitat estimates overlap somewhat). This difference in conservation status is likely to be exacerbated when one compares status across the border without the ESA's protections in the United States.

Differences in Regulatory Mechanisms: Compared with protection in Canada, there would be significantly less regulatory protection for the murrelet in Washington, Oregon, and California if the species were not listed.

Regulatory Mechanisms in Canada: In 2003, Canada implemented its Federal endangered species legislation, the Species At Risk Act (SARA). Under SARA the murrelet is classified as a "threatened" species (Statutes of Canada (S.C.) Chapter (ch). 29, Schedule 1, Part 3 (2002)). SARA defines a "threatened" species as "a wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction" (S.C. ch. 29 § 2). It is illegal to kill, harm, harass, capture, or take an individual of a wildlife species that is listed as an extirpated species, an endangered species, or a threatened species, or to possess, collect, buy, sell, or trade an individual of a wildlife species that is listed as an extirpated species, an endangered species, or a threatened species, or any part or derivative of such an individual (S.C. ch. 29 § 32). SARA also prohibits any person from damaging or destroying the residence of a listed species, or from destroying any part of its critical habitat (S.C. ch. 29 §§ 33, 58). For many of the species listed under SARA, the prohibitions on harm to individuals and destruction of residences are limited to Federal lands, but this limitation does not apply to migratory birds protected under the Migratory Birds Convention Act, including the murrelet (S.C. ch. 29 § 34). Hence, SARA protects murrelets from harm and destruction of their residences, not only on Federal lands, but also on provincial and private lands, where most of the remaining habitat for the species occurs. (Because critical habitat has not yet been designated for the murrelet, SARA's provisions protecting critical habitat are not yet effective.) SARA defines the "residence" of a species to mean "a dwelling-place, such as a den, nest or other similar area or place, that is occupied or habitually occupied by one or more individuals during all or part of their life cycles, including breeding, rearing, staging, wintering, feeding or hibernating" (S.C. ch. 29, § 2). Hence, to receive SARA's protection, a "residence" need not be continuously occupied by the species. Thus, SARA protects the murrelet, not only from direct killing, but also from indirect harm through destruction of its residence. Moreover, SARA mandates development and implementation of a recovery strategy and action plans (S.C. ch. 29 §§ 37, 47).

Violations of SARA are punishable by a fine of up to $250,000 for an individual, or $1,000,000 for a corporation, or imprisonment for up to 5 years, or both (S.C. ch. 29 § 97). SARA provides that each day of a continuing violation constitutes a separate offense, and makes corporate officers and employers vicariously liable for actions of their agents and employees (S.C. ch. 29 §§ 97–99).

The murrelet is also protected under Canada's Federal Migratory Birds Convention Act, 1994 (MBCA) (S.C. ch 22), which is their domestic legislation similar to our Migratory Bird Treaty Act of 1918 (MBTA). The MBCA and its implementing regulations prohibit the hunting of migratory nongame birds and the possession or sale of "migratory birds, their nests, or eggs" (S.C. ch. 22 §§ 5, 12).

Although British Columbia has no stand-alone endangered species act, the provincial Wildlife Act protects virtually all vertebrate animals from direct harm, except as allowed by regulation (*e.g.,* hunting or trapping). Legal designation as endangered or threatened under this act increases the penalties for harming a species, and also enables the protection of habitat in a Critical Wildlife Management Area (British Columbia Wildlife Act 1996). The murrelet is not listed under this act as an endangered or threatened species.

The murrelet is designated as a "species at risk" and as an "identified wildlife species" under the British Columbia Forest and Range Practices Act (FRPA) (2002). Under this act, guidelines for murrelet management are contained in the Identified Wildlife Management Strategy (IWMS). Under the IWMS, murrelet habitat in British Columbia is divided into six conservation regions. Within each of these regions, a recommended maximum decline in population and habitat by 2032 has been identified. In four of the six regions, a limit of a 31 percent decline in population and habitat has been recommended. The other two regions have a zero to 10 and 15 percent recommended maximum decline. Management of habitat is implemented through several mechanisms, including wildlife habitat areas (WHAs) and strategic land use plans. The required size and characteristics of the WHAs (essentially protected suitable habitat) have been identified, yet "the amount of habitat to be established as WHAs remains constrained by existing policy," such as the 1 percent timber supply impact cap on the timber harvesting land base (British Columbia Ministry of Environment 1999, p. 1).

Under a directive issued pursuant to the FRPA, timber licensees on provincial lands must conserve all murrelet nesting habitat in the non-contributing land base (areas not economically viable to harvest) plus a small area in the timber harvesting land base (British Columbia Forest and Range Practices Board (BCFPB) 2008, p. 1). British Columbia has set a general objective under the FRPA to conserve sufficient habitat for the survival of all species at risk, without unduly reducing the timber supply (BCFPB 2008, p. 6). In 2004, British Columbia designated the murrelet as a species at risk, and issued a notice requiring the primary licensee on the southern coast to prepare a Forest Stewardship Plan (FSP) consistent with the murrelet conservation objective. The licensee met this requirement by preparing a strategy that avoids road-building and timber harvest in some murrelet nesting habitat. The BCFPB has determined that the effect of the FSP requirement will be to conserve 23,500 hectares (58,070 acres), or 67 percent, of remaining

suitable murrelet habitat on the southern coast of the province (BCFPB 2008, p. 13).

Murrelet habitat is also protected in British Columbia in several provincial and national parks. These designations, along with WHAs, protect about 490,000 hectares (1.2 million acres) of murrelet habitat, or about 25 percent of the total available in British Columbia in 2002 (Burger 2008, p. 6).

In accordance with SARA, the federally led Canadian Marbled Murrelet Recovery Team has developed a draft murrelet recovery strategy, which has been approved by the Province, but has not been posted on the SARA public registry. One of the three action plans identified by the Recovery Team has been drafted but has not yet been approved (Burger 2008, p. 4). Given that the murrelet is a migratory bird and, therefore, comes under Federal jurisdiction across all lands, including Provincial lands, the recovery and action plans will apply to the murrelet over its entire range in Canada (Bertram 2006). However, because it is unclear how the recovery and action plan elements (which are awaiting approval or are still being drafted) will interact with the IWMS, it is unclear how management of murrelet habitat in Canada will occur into the future.

Regulatory Mechanisms in Washington, Oregon, and California: If the murrelet were not federally listed in Washington, Oregon, and California, prohibitions under section 9 of the ESA would no longer apply. Thus, there would be no Federal prohibitions against take through habitat destruction or harassment of the murrelet. In addition, absent protection of the ESA, Federal agencies would have no duty under section 7 of the ESA to consult with the Service on the effects of their actions on the species, to avoid jeopardizing the species, or to avoid adversely modifying previously identified critical habitat.

The murrelet would continue to receive some protection under the MBTA (16 U.S.C. 703), which makes it unlawful to take migratory birds, including the murrelet. However, the MBTA's definition of "take" includes direct pursuit, killing, and capturing, but does not include harm through habitat destruction, nor harassment (16 U.S.C. 715n). The Ninth Circuit has held that the MBTA does not protect migratory birds from habitat destruction such as logging of old growth forest (*Seattle Audubon Society* v. *Evans,* 952 F.2d 297 (9th Cir. 1991)). SARA, by contrast, protects the murrelet from not only direct killing, but also harm, harassment, and destruction of the species' "residence". Moreover, the MBTA's sanctions for violations are significantly lighter than SARA's, imposing only misdemeanor penalties of 6 months imprisonment and $15,000 in fines (16 U.S.C. 707), compared with the felony-level sanctions under SARA.

The murrelet receives some protection under State laws in Washington, Oregon, and California, but these laws are less protective than SARA. Washington law prohibits "maliciously" killing or harassing murrelets or destroying their nests, but does not prohibit indirect harm through habitat modification (Revised Code of Washington (RCW) § 77.15.120; and Washington Administrative Code (WAC) § 232–12–011). Violation of this law is a gross misdemeanor, punishable by no more than 1 year of imprisonment or a fine of no more than $5,000. This law is less protective than SARA because, by limiting its reach to "malicious" conduct, it does not govern as broad a range of conduct as does SARA's strict liability standard, and because the penalties it imposes are substantially lighter. Washington forest practice regulations limit, but do not entirely prohibit, timber harvest that would constitute "take" under the ESA (WAC §§ 222–10–042, 222–16–080). Washington law (WAC 232–12–297) requires that recovery plans be written for species listed as endangered or threatened by the Washington Fish and Wildlife Commission; however, currently there is no State recovery plan for the murrelet. In order to delist the species, Washington Department of Fish and Wildlife would have to develop criteria for reclassifying to a species of concern and delisting and then show how the species has met these criteria.

In Washington, the State Forest Practices Rules (FPR) (Wash. Admin. Code Title 222, Chapt. 10 & 16) specifically establish murrelet suitable habitat definitions, survey requirements, and review processes for forest practices that may impact murrelet habitat. The FPRs provide protection to occupied (as defined by FPR) murrelet sites during the nesting season on private forest lands where the landowner owns more than 500 acres of land that are less than 50 miles from marine waters. For those lands that are presumed to have at least a 30 percent probability of occupancy, landowners are subject to survey requirements and those areas where occupancy is found are protected. The FPRs provide for protection of murrelets through minimization of take and jeopardy pursuant to the Washington Endangered Species Act and the Federal Endangered Species Act. However, the FPR definitions of suitable habitat, inland distance, and occupied site do not include all of the lands the Service considers to have features essential for conservation of murrelet. Therefore, some suitable habitat may be harvested without review. In addition, landowners have the option to go through the State Environmental Policy Act process and get approval to harvest; although this has not occurred to date. Current FPRs protect occupied (as defined by State) habitat and a 300-foot managed buffer around occupied habitat. However, there are no reasonable assurances that the maximum site size and managed buffers are adequate to protect and maintain complex-structured forest isolated from human development such that the risk of predation, windthrow, and changes in microclimate are reduced.

Oregon has listed the murrelet as a threatened species under State law (Oregon Administrative Regulations (OAR) 635–100–0125(3)(i)), but the Oregon Endangered Species Act (Oregon ESA) is less protective than SARA. It includes no take prohibition (ORS 496.182). In fact, the statute expressly exempts private landowners from any obligation to protect listed species (ORS 496.192(1)). The Oregon ESA provides some protection on State lands, but less than SARA provides on public lands in Canada. Under the Oregon ESA, each State agency is permitted to make its own determination as to how to balance the needs of listed species with the "social and economic impacts" that conservation would have on the State (ORS 496.182(8)(a)(B)). A State agency is permitted to take an action that would jeopardize a State-listed species, provided the agency determines that the public benefits of the action outweigh the harm to the species (ORS 496.182(4)(a)). Moreover, State lands comprise a relatively small proportion of occupied murrelet habitat in Oregon; the majority of known occupied habitat is on Federal land. Finally, the murrelet could lose any State protection in Oregon if it is delisted under the Federal ESA, because the Oregon ESA provides that the State may delist a species if it has been determined not to qualify for listing under the Federal ESA (ORS 496.176(6)(c)).

In Oregon, the Oregon Forest Practices Act (ORS 527.610 to 527.992 and OAR Chapter 629, Divisions 600 to 665) lists protection measures specific to private and State-owned forested lands in Oregon. These measures include specific rules for resource protection, including some threatened and endangered species such as the northern spotted owl, but the rules do not

address protection of murrelet habitat (OAR 629–665).

The murrelet is listed as endangered under California law (California Code of Regulations (CA Code of Regs), tit. 14, § 670.5(a)(5)(R)). The California Endangered Species Act (CESA) (CA Code of Regs, tit. 14, § 2080, *et seq.*) prohibits "take" of endangered species (CA Code of Regs, tit. 14, § 2080). "Take" is defined by California Fish and Game Code section 86. This definition includes capturing or killing or attempting to capture or kill, but not harming or harassing, which is prohibited under the Federal ESA and SARA. Therefore, some actions that would be prohibited under SARA would not be prohibited under CESA. Activities that may disrupt a bird's behavior such that it constitutes "harm" or "harassment" under SARA would not constitute "take" under CESA if the disruption does not result in mortality of the bird through nest abandonment or other means. Damaging or destroying a bird's residence is prohibited under SARA even without evidence that the bird died, while CESA would require at least circumstantial evidence showing that the bird died as a result of the action. Nothing in California State law requires recovery planning. Recovery actions can be voluntarily undertaken, however, pursuant to authorities such as the Natural Community Conservation Planning Act (CA Code of Regs, tit. 14, § 2080).

In California, the California Forest Practice Rules (CFPR) (CA Code of Regs., tit. 14, chapters 4, 4.5 and 10) were established to regulate timber harvest on non-Federal lands within the State of California. The CFPRs are implemented through the review and approval processes for the California Department of Forestry and Fire Protection (CALFIRE) individual Timber Harvest Plans (THP) and Nonindustrial Timber Management Plans (NTMP). With the exception of plans that are exempted from the preparation and submission requirements under the CFPRs, all commercial timber harvest must go through this process.

The CFPRs do not contain a definition of suitable murrelet nesting habitat. Consequently, each plan has a decision on habitat suitability on a stand-by-stand basis, and they may or may not disclose the presence of murrelet habitat. Under the CFPR's Special Conditions section 898.2, CALFIRE is required to disapprove a plan if implementation of the plan would result in take or jeopardy in violation of the Federal Endangered Species Act. When recommendations to avoid unauthorized take of murrelets are provided, they are typically included in THPs or NTMPs. However, because only some of these plans are reviewed by California Department of Fish and Game or the Service, suitable murrelet habitat and possibly even occupied nesting habitat likely has been lost due to this lack of oversight. In summary, the practical application of the CFPRs are only partially effective at protecting suitable habitat pursuant to the Federal ESA due to the lack of a detailed description of habitat suitability within the CFPRs and the lack of adequate resource agency staff to review THPs and NTMPs that may contain suitable murrelet nesting habitat.

The adoption of the Northwest Forest Plan (NWFP) by the U.S. Forest Service (Forest Service) and the Bureau of Land Management (BLM) has greatly reduced the annual rate of habitat loss on Federal land in the United States since 1994. Nonetheless, estimated potential total loss of suitable murrelet habitat since the 1992 listing of the species is about 10 percent of the current estimate of suitable habitat (USFWS 2004, p. 16). If the murrelet were delisted, the NWFP could be amended to reduce protection for the species. The murrelet would still derive some incidental benefit from continued protection of the reserve system under the NWFP, although conservation benefits would not likely extend to all areas currently protected for the murrelet. In addition, even if the NWFP were not amended, delisting would relieve the Forest Service and the BLM of any obligation to consult with the Service on site-specific actions that may adversely affect the murrelet. These agencies would also be relieved of their duty under section 7(a)(1) of the Federal ESA to carry out programs for the conservation of the species. The British Columbia murrelet conservation assessment, by comparison, states a central recovery goal is to downlist the species from Threatened to Special Concern, by creating conditions that will limit the decline of the British Columbia population and its nesting habitat to less than 30 percent over three generations (30 years) (Bertram *et al.* 2003, p. 5), roughly the same habitat loss in arithmetical terms as that experienced during the period 1992 to 2003 in the United States.

Absent listing under the Federal ESA, State laws would not necessarily protect murrelets on Federal lands. Other Federal laws governing management of Federal lands could preempt State law to the extent there is an irreconcilable conflict (*National Audubon Society* v. *Davis,* 307 F.3d 835, 854 (9th Cir. 2002)).

There appears to be a difference in management of marine habitat between Canada and the United States as well. In the United States there is a ban on exploitation of forage fishes and regulated take of protected species under the Magnuson-Stevens Fishery Conservation and Management Act. For regulation purposes, the National Marine Fisheries Service considers forage species to include the prey species important to murrelets; however, some important prey species (such as Pacific herring) are commercially fished. In British Columbia, there are no restrictions on exploitation of forage species (Piatt *et al.* 2007, p. 94). In the United States, murrelets are protected from commercial fisheries in California and Oregon through State laws. However in Washington State, protections afforded the commercial fishery are tied specifically to section 7 of the Federal ESA, and are implemented through interagency consultation with the National Oceanic and Atmospheric Administration (NOAA) and the Bureau of Indian Affairs. Without the ESA, murrelets in Washington do not appear to be protected from bycatch. In British Columbia, although the MBCA does afford them some protections, there have been limited direct efforts to reduce bycatch (Piatt *et al.* 2007, p. 92). SARA's take prohibitions, however, are applicable in the marine environment, and hence, commercial fishing operations that harm murrelets by ensnaring them in nets would violate the statute.

As described above, the differences in regulatory mechanisms that would exist on each side of the border would be significant in light of section 4(a)(1)(D) of the ESA and would result in differences in management of habitat. The loss of Federal protective measures afforded by the ESA is likely to place the species at greater risk of extirpation in the coterminous United States.

Significance

If we determine that a population meets the DPS discreteness element, we then consider whether it also meets the DPS significance element. The DPS policy (61 FR 4722) states that, if a population segment is considered discrete under one or more of the discreteness criteria, its biological and ecological significance will be considered in light of Congressional guidance that the authority to list DPSs be used "sparingly" while encouraging the conservation of genetic diversity. In making this determination, we consider available scientific evidence of the discrete population's importance to the

taxon to which it belongs. Since precise circumstances are likely to vary considerably from case to case, the DPS policy does not describe all the classes of information that might be used in determining the biological and ecological importance of a discrete population. However, the DPS policy does provide four possible reasons why a discrete population may be significant. As specified in the DPS policy (61 FR 4722), this consideration of significance may include, but is not limited to, the following:

(1) Persistence of the discrete population segment in a unique or unusual ecological setting;

(2) Evidence that loss of the discrete segment would result in a significant gap in the range of the taxon;

(3) Evidence that the discrete population segment represents the only surviving natural occurrence of the taxon that may be more abundant elsewhere as an introduced population outside of its historic range; or

(4) Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

Loss of the DPS would result in a significant gap in the range of the murrelet. This gap is significant because the Washington, Oregon, and California area accounts for roughly 18 percent of the total coastal distribution of the species, encompassing 17 degrees of latitude. In addition, the Washington, Oregon, and California area is located at the southern-most extent of the range. This DPS contains an ecologically distinct forest system, the coastal redwood zone. Moreover, peripheral and disjunct populations may play an important role in maintaining opportunities for speciation and future biodiversity (Fraser 1999, p. 50). Recovery of species without the conservation of these peripheral populations may be impossible if these populations are eliminated or severely damaged (Fraser 1999, p. 50).

Although there is no genetic distinction at the border, researchers have found significant genetic distinction throughout the range of the species. Friesen *et al.* (2005, pp. 611–612) reported significant differentiation of birds from peripheral sites (*i.e.,* California and the Aleutian Islands), with the Aleutian and California populations each having one or more private control region haplotypes that occurred at high frequency. Friesen *et al.* (2007, pp. 13–14) results indicate that genetic variation changes clinally in this species, and provided additional resolution showing that murrelets in western and central Aleutian Islands and central California differ significantly from murrelets in the rest of the species' range. They concluded that murrelets appear to comprise three genetic units: (1) Western and central Aleutian Islands; (2) eastern Aleutian Islands to northern California; and, (3) central California. Loss of any of these populations would result in the loss of a portion of the species' genetic resources and/or local adaptations, and may compromise its long-term viability (Piatt *et al.* 2007, p. 43). Since the currently listed population encompasses all of one genetic unit as mentioned above and a portion of another, loss of the population could compromise the long-term viability of the species as a whole.

DPS Conclusion

We consider the Washington/Oregon/California population of murrelets to be a valid distinct population segment under the 1996 DPS Policy. This population of murrelets is discrete at the international border because: (1) The coterminous United States has a substantially smaller population of murrelets (approximately 18,000) than does Canada (approximately 66,000); (2) breeding success of the murrelet in Washington, Oregon, and California is considerably lower than in British Columbia; and (3) there are differences in the amount of habitat, the rate of habitat loss, and regulatory mechanisms between the countries (USFWS 2009, pp. 4–5). The coterminous United States population of murrelets is also considered significant in accordance with the criteria of the DPS Policy, as the loss of this distinct population segment would result in a significant gap in the range of the taxon and the loss of unique genetic characteristics that are significant to the taxon (USFWS 2009).

Having found that the population of murrelets in Washington, Oregon, and California is a valid DPS, we next evaluate the status of the population based on the ESA's five listing factors to determine whether the DPS continues to warrant listing as a threatened species.

Summary of Factors Affecting the Species

Under section 4 of the ESA, a species may be determined to be endangered or threatened on the basis of any of the following five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We must consider these same five factors in delisting a species. We may delist a species according to 50 CFR 424.11(d) if the best available scientific and commercial data indicate that the species is neither endangered nor threatened for the following reasons: (1) The species is extinct; (2) the species has recovered and is no longer endangered or threatened; or (3) the original scientific data used at the time the species was classified were in error.

We are using the extensive evaluation undertaken in our 2009 5-year review as the foundation for our 12-month finding (USFWS 2009, pp. 26–68). Below, we present a summary of our recent 5-year review (USFWS 2009), which is available at: [*http://www.fws.gov/westwafwo/pdf/Mamu2009_5yr_review%20FINAL%2061209.pdf*]. The reader is referred to that document for a more detailed analysis of the threats to the murrelet.

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Terrestrial Habitat Modification

At the time the murrelet was listed in 1992, we determined that the species' decline was due in part to habitat removal across the DPS (57 FR 45328). In addition, we noted that, while modification of historical harvest practices could help decrease the amount of time it would take an area to again become suitable habitat for the murrelet, this was unlikely over the short-term. Historic and ongoing loss and fragmentation of remaining suitable nesting habitat for murrelets continues to be a threat throughout most of the forested range of the DPS.

In our 2004 5-year review (USFWS 2004, p. 19; citing McShane *et al.* 2004), we found that habitat loss and fragmentation were expected to continue in the near future, but at an uncertain rate. Information presented in our 2009 5-year review does not suggest this threat has abated (USFWS 2009, pp. 33–34). Raphael *et al.* (2006, p. 137) suggest that habitat losses in the past decade were likely greater than previously estimated, notably on non-Federal lands. Thus, nesting habitat loss continues to be a threat to the murrelet.

Climate Change in the Terrestrial Environment

Though considerable uncertainty exists with respect to any regional-scale impacts of climate change due to the differences in trajectories of climate change scenarios, modeling results

underscore the potentially large impacts on the Pacific Northwest and California ecosystems. Adverse consequences to forest ecosystems are likely to increase as a result of climate change (Kliejunas *et al.* 2008, p. 25), potentially negatively impacting habitat for many species, including the murrelet.

Climate change is likely to further exacerbate some existing threats such as the projected potential for increased habitat loss from drought-related fire, mortality, insects and disease, and increases in extreme flooding, landslides, and windthrow events in the next 10 to 30 years. While it appears likely that the murrelet will be negatively affected by these changes, we lack adequate information to quantify the magnitude of effects to the species from climate change projections.

Threats to the Marine Environment

Threats in the murrelet's marine environment include harmful algal blooms, dead zones, changes in prey availability and quality, and the potential exacerbation of these conditions from climate change.

Murrelets in the listed range are affected by changes in the California Current System, the Straits of Juan de Fuca, and Puget Sound. The California Current System is dominated by a southward surface current of colder water from the north Pacific (Miller *et al.* 1999, p. 1; Dailey *et al.* 1993, pp. 8–10) and is characterized by upwellings, particularly in the spring and summer. This system is affected by inter-annual El Niño-Southern Oscillation and inter-decadal (Pacific Decadal Oscillation) climatic processes, which result in warm and cool phases. The Strait of Juan de Fuca is where deep in-flowing oceanic waters mix with out-flowing Puget Sound and Georgia Basin surface waters. The marine conditions in the Straits are in response to upwelling and downwelling patterns generated by coastal winds and changes in coastal circulation. The Puget Sound is an estuary within which the subtidal circulation is largely driven by the differences in salinity between fresher waters within the Sound and the saltier waters in the Strait of Juan de Fuca. Shallow sills within Puget Sound restrict the entry of deep oceanic waters, reducing flushing of these inland marine and estuarine waters and resulting in hydrologic isolation that puts aquatic organisms at higher risk because toxic chemicals, nutrients, and pathogens remain in the system longer, resulting in increased exposure (Puget Sound Action Team 2007, p. 129).

Based on available information, murrelet prey species abundance appears to be in decline (USFWS 2009, pp. 39–41). There are commercial and recreational fisheries for some prey species stocks, and the Pacific herring in Puget Sound are carrying high body loads of PCBs (polychlorinated biphenyls) (Puget Sound Action Team (PSAT) 2007, p. 129). In addition, new information indicates prey quality has declined over the last decade and murrelets are now feeding at lower trophic levels in central California and Puget Sound (Becker and Beissinger 2006, p. 475; Norris *et al.* 2007, p. 879) and possibly throughout the 3-State area; however, prey quality has not been assessed in other portions of the murrelet's listed range.

Shifts to lower trophic-level food items may be compromising murrelet reproduction. Egg production is energetically costly and dependent on the availability of adequate prey, especially during egg development (Becker and Beissinger 2006, p. 477). In central California, a large proportion (50–90 percent) of murrelets forego breeding and may do so because they cannot find sufficient food resources during preparation for breeding (Peery *et al.* 2004, pp. 1094–1095). Norris *et al.* (2007, p. 879) found murrelet breeding success increased when their pre-breeding diet consisted of higher trophic-level prey (*i.e.,* they found a strong correlation between the pre-breeding diet and murrelet abundance 3–4 years later (the time lag for young-of-the-year to attain breeding age)).

Murrelets are exposed to harmful algal blooms (HABs) and dead zones throughout the DPS, although the potential effects may be more pronounced in specific areas, such as the Oregon coast, Monterey Bay, and Puget Sound (USFWS 2009, pp. 36–39). These events result in significant mortality of fish and invertebrates and may contribute to low food availability during the murrelet breeding season, thereby contributing to low murrelet reproductive success. In addition to the impacts to prey resources, HABs from certain algae species produce biotoxins that result in domoic acid poisoning or paralytic shellfish poisoning, causing murrelet mortality (Peery *et al.* 2006b, p. 83; McShane *et al.* 2004, pp. 3–67). HABs and dead zones may have been occurring all along and have just begun to be studied; however, scientists (Chan *et al.* 2008, p. 1; Rucklehaus and McClure 2007, p. 54) predict the scope and length of these events are likely to increase in the future.

Climate Change in the Marine Environment

Climate change is likely to result in changes to the murrelet's marine environment. While physical changes to the near-shore environment appear likely, much remains to be learned about the magnitude, geographic extent, and temporal and spatial patterns of change, and their effects on murrelets. Effects on the murrelet food supply (amount, distribution, quality) provide the most likely mechanism for climate change impacts to murrelets. However, limitations on our knowledge of murrelet prey, and how climate change could affect those prey, constrain our ability to forecast effects with confidence.

While the differing climate change predictions prevent a conclusive threat assessment, the predicted direction of change for most variables considered suggests that few changes are likely to benefit murrelets, with many more having the potential to negatively affect murrelets, through direct mortality, changes to food supply, or interactions with other threats. While seabirds such as the murrelet have life-history strategies adapted to variable marine environments, ongoing and future climate change could present changes of a rapidity and scope outside the adaptive range of murrelets. The ability of the species to respond to shifts in prey conditions is constrained by several factors. Nesting habitat distribution is limited, and nesting birds may be restricted to foraging in waters relatively near their inland nest sites (USFWS 2009, p. 14). Furthermore, the available information indicates substantial nest site fidelity, and does not suggest that individual murrelets will abandon a nesting area that becomes unsuitable, and move to a new, distant nest site (Nelson 1997, pp. 16–17; Meyer *et al.* 2002, pp. 112–113; Hebert and Golightly 2006, pp. 257–282).

We conclude that the information suggests there is an increase in the level of threats in the marine environment including HABs, dead zones, prey availability and quality, and the potential exacerbation of these conditions from climate change.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

We have no information or evidence that indicates that overutilization of murrelets for commercial, recreational, scientific or educational purposes is a threat to the persistence of the species.

Factor C. Disease or Predation

Disease

We did not identify disease as a threat to the murrelet in our 1992 listing (USFWS 1992, p. 45334). More recently, it has been reported that bacterial, fungal, parasitic, and viral diseases and biotoxins affect numerous populations of seabirds, but no information on the effects of these threats to alcids was available (McShane *et al.* 2004, pp. 6–12). West Nile virus has been identified as a potential threat as it has been detected in other marine bird species, such as cormorants and many species of gulls, and forest-dwelling species, such as spotted owls, goshawks, corvids, and many passerine species (information available on the Centers for Disease Control (*http://www.cdc.gov*) and National Wildlife Health Center (*http://www.nwhc.usgs.gov*) Web sites). However, West Nile virus has not been observed in murrelets (McShane *et al.* 2004, pp. 6–12).

In addition, the highly pathogenic avian influenza (HPAI) has also emerged since the murrelet's 1992 listing. However, no cases of this disease have been detected in wild birds anywhere in North America (U.S. Geological Survey 2007, p. 2; *http://www.nwhc.usgs.gov/map*), and, therefore, we have no information to indicate that HPAI is currently a threat to the murrelet.

Predation

Predation was identified in our original 1992 listing rule and our analysis for the 2004 5-year review as a significant threat to murrelet demographic rates (USFWS 1992, p. 45334; McShane *et al.* 2004, p. 19). New information supports these findings (USFWS 2009, pp. 47–49). Predation has two primary components: Losses of adults or fledged juveniles and nest predation (eggs or chicks). Adult/juvenile predation may occur at sea or inland. There is no significant new information concerning at-sea or terrestrial non-nest predation on murrelets. Corvids remain the predator with the greatest impact on murrelets (USFWS 2009, p. 46).

Nest failure rates of 68 to 100 percent (Hebert and Golightly 2003, p. 52; Peery *et al.* in prep as cited in McShane *et al.* 2004, p. 6–29) due to predation in real nests, and 81 to 95 percent in artificial nests (Luginbuhl *et al.* 2001, p. 563; Marzluff and Neatherlin 2006, p. 312) have been reported. The key elements affecting nest predation rates appeared to be proximity to humans, abundance of avian predators, and proximity to, and type of, forest edge. The best available information indicates that murrelets are highly vulnerable to nest predation and confirms the importance of nest predation in limiting murrelet nest success throughout the DPS, particularly in areas where murrelet habitat is in close proximity to humans (*e.g.,* parks) (USFWS 2009, p. 48).

Factor D. Inadequacy of Existing Regulatory Mechanisms

Information reviewed in the 2009 5-year review considered revisions of plans and regulations within the range of the murrelet that addressed increased or decreased regulatory protection with respect to murrelets (USFWS 2009, pp. 50–55). This analysis found that, while some regulatory mechanisms protecting the murrelet and its habitat have been enacted since listing, regulatory mechanisms would not be sufficiently protective of the murrelet or its habitats to ensure its long-term viability, without the continued protections of the ESA. See the discussion under the DPS discreteness factor above, as well as the 2009 5-year review (USFWS 2009, pp. 50–55 and Appendix B) for an expanded explanation of the non-ESA regulatory mechanisms currently in place. Therefore, the threat posed by the inadequacy of existing mechanisms has been reduced since listing but not removed.

Factor E. Other Natural or Manmade Factors Affecting the Species' Continued Existence

Oil Spills

Oil spills have resulted in observed or estimated mortality to marbled murrelets since the mid-1980s (USFWS 2009, p. 57). Individual spills have been estimated to kill anywhere from 6 to 350 murrelets from oiling (USFWS 2009, p. 57). Thus, localized impacts from oil spills can be severe and can result in direct mortality through oiling and impacts to reproductive success through changes in prey base, marine habitat, and disturbance.

Gill Net Bycatch

Gill nets may be responsible for direct mortality of murrelets, but the impacts continue to be localized to the Puget Sound area and northern Washington coast. This threat may be increasing in Puget Sound where there appears to be an increase in fishing effort (USFWS 2009, p. 59).

Derelict Fishing Gear

Entanglement in derelict fishing nets has recently been identified as a threat to marine mammals, seabirds, shellfish, and fish in Puget Sound and the Straits of Juan de Fuca. Derelict fishing gear consists of nets and crab pots that have been lost, abandoned, or discarded in the marine environment. This gear can persist in the marine environment and continue "fishing" (capturing sea life) for decades (Natural Resources Consultants, Inc. 2008, p. 3). Not only does derelict gear result in direct mortality of species, it destroys and degrades marine habitat by accumulating sediment, scouring bottom substrate, impeding plant and sessile animal growth, and blocking access to habitat used for foraging and escaping predators (June and Antonelis 2009, p. 3). Impacts from derelict fishing gear (nets and pots) are a newly identified threat since the murrelet's 1992 listing. While the scope and severity of the threat posed to murrelet prey from derelict pot fishing gear has yet to be determined, the threat posed by derelict fishing nets appears to be localized to the Puget Sound and Straits of Juan de Fuca. The severity of this threat in these areas is high due to the potential for significant and persistent direct mortality.

Wave and Tidal Energy Projects

The threat(s) these projects may pose to murrelets varies greatly, depending upon the proposed location and type of equipment. In some cases, such as tidal energy projects that will use underwater turbines, the threat may be direct mortality to diving birds. In other cases, the projects may degrade marine habitat through shading, collision or entanglement obstacles, night-lighting, changes in prey abundance, and/or increased human presence. The magnitude of threat to the murrelet from these types of activities is dependent upon their proximity to murrelet foraging and breeding habitat. There are new wave and/or tidal projects proposed in all three States within the murrelet's listed range (USFWS 2009, p. 61). However, at this time, it is uncertain how these projects will impact murrelets because the project plans are still under development and locations are undetermined at this time.

Wind Power Projects

The threat(s) that wind development projects may pose to murrelets varies greatly, depending upon the proposed location and type of equipment. We are aware of four new on-shore wind projects proposed in Washington and one in California, within the murrelet's listed range (USFWS 2009, pp. 61–62). However, at this time, it is uncertain how these projects will impact murrelets because the project plans are still under development and locations are not finalized at this time. In some

cases, the threats posed by on-shore wind energy projects may include direct mortality (*i.e.*, collisions) and habitat removal.

At this time we are unaware of any off-shore wind energy projects proposed along the coasts of Washington, Oregon, or California.

Liquefied Natural Gas Terminal and Pipeline Projects

Four liquefied natural gas terminals have been proposed in Oregon (USFWS 2009, p. 62), each with associated pipelines through murrelet nesting habitat. At this time, it is uncertain how these projects will impact murrelets in either the terrestrial or marine environments because the projects are still under development. In some cases, the threat posed by the pipelines may include loss or fragmentation of nesting habitat.

Disturbance in the Marine Environment

Little empirical data are available regarding the probability of lethal responses, sublethal injuries, physiological responses (particularly stress responses), behavioral responses, or social responses by murrelets to human activities in the marine environment. However, based on the best available information, murrelets may be affected by exposure to elevated underwater and above water sound levels, boat traffic, and reductions of prey or prey habitat. Most of these impacts occur in Puget Sound and Grays Harbor in Washington State (USFWS 2009, p. 63). Similar activities either do not take place along the outer coasts of Washington, Oregon, and California or have not yet been analyzed.

Elevated sound pressure levels can be generated underwater by such activities as underwater detonations and pile driving. Exposure to elevated sound pressure levels may result in injuries that lead to death or significant impairment of an individual's ability to carry out essential life functions (USFWS 2009, p. 63). Murrelets may also be exposed and respond to elevated sound pressure levels while at the water's surface. While there are no known studies or data available that evaluate the behavioral response of murrelets (or other alcids) to noise in the marine environment, behaviors that we believe could indicate disturbance of murrelets in the marine environment include: Aborted feeding attempts, multiple delayed feeding attempts within a single day or across multiple days, multiple interrupted resting attempts, and precluded access to suitable foraging habitat.

Boat traffic elicits behavioral responses in murrelets (McShane *et al.* 2004, pp. 5–36 through 5–37; Speckman *et al.* 2004, p. 33; Bellefleur *et al.* 2009, pp. 534–536) and may cause an energetic impact on murrelets due to the cost of flight compounded with being flushed off preferred feeding grounds (Bellefleur *et al.* 2009, p. 536). Murrelets may or may not habituate to boat traffic. While Bellefleur *et al.* (2009, p. 536) found the mean flushing distance decreased in areas with high boat density, suggesting murrelets may tolerate close encounters, they also found the percentage of murrelets that flushed in high boat density areas increased, suggesting murrelets are less committed to foraging in areas with many boats. Murrelet survival and reproduction are dependent upon an adequate quantity of high-quality food throughout the year, and human activities that limit access to select foraging sites may result in reduced reproduction or survival, especially if the human activities result in increased diving or relocation to a less favorable foraging area or a foraging area further from the nesting habitat (USFWS 2009, pp. 64–65). Although the relationship between disturbance in the marine environment and murrelet reproductive success or population abundance has not been sufficiently studied, it appears that within areas with high boat density or fast-moving boats, murrelets are more likely to move away, possibly to a less desirable foraging location. Within the DPS, there are areas (such as Puget Sound and Monterey Bay) where murrelets co-occur with substantial boat traffic, both recreational and commercial. Within these areas, boat traffic may be causing energetic impacts on murrelets that they are unable to compensate for, especially during the pre-breeding and breeding seasons.

Disturbance in the Terrestrial Environment

Hebert and Golightly (2006, pp. 34–35) and Golightly *et al.* (2009, p. 18) found vehicular traffic noise appeared to have little or no effect on murrelet nesting success. However, murrelets were more likely to nest further away from paved roads (Golightly *et al.* 2009, pp. 8–16), possibly due to noise disturbance or due to increased predation risk near roads regardless of sound levels (Golightly *et al.* 2009, p. 18).

Observations of incubating adult and chick responses to disturbance events (such as chainsaw operations) resulted in no flushing and no significant increase in corvid presence (Hebert and Golightly 2006, pp. 22, 28, 68). However, adults spent more time with their heads raised, and their bill up during the disturbances, compared to the pre- and post-disturbance periods. Chicks also spent more time with their heads raised, and their bill up during the disturbance trials, but the relevance of these behavioral changes is unknown (Hebert and Golightly 2006, pp. 35–36).

Conclusion

The petition to delist (AFRC *et al.* 2009) primarily cited the DPS conclusion in our 2004 5-year review (USFWS 2004, pp. 14–17) as sufficient reason to delist the Washington/Oregon/California DPS of murrelet. However, based on the analysis in our 2009 5-year review, we consider the Washington/Oregon/California population of murrelets to be a valid distinct population segment under the 1996 DPS Policy. The population is discrete due to differences in population size and breeding success, and differences in the amount of habitat, the rate of habitat loss, and regulatory mechanisms between the countries (USFWS 2009, pp. 4–5). The Washington/Oregon/California population of murrelets is also considered significant in accordance with the criteria of the DPS Policy, as the loss of this distinct population segment would result in a significant gap in the range of the taxon and the loss of unique genetic characteristics that are significant to the taxon (USFWS 2009, p. 12).

The Washington/Oregon/California population of murrelets was estimated to contain approximately 18,000 individuals in 2008, which represents a significant population decline since intensive monitoring efforts began in 2000, and a decline of approximately 26 percent compared to the population estimate in our 2004 5-year review (USFWS 2004, p. 18). Historical population declines have been largely caused by extensive removal of late-successional and old-growth coastal forest, which serve as nesting habitat for murrelets. Ongoing factors contributing to continued population declines include high nest-site predation rates and human-induced mortality in the marine environment from disturbance, gillnets, and oil spills. Murrelet reproductive success is strongly correlated with the abundance of mid-trophic-level prey. Overfishing or oceanographic variation from weather or climate events are likely to affect the marine environment, negatively impacting the availability of murrelet prey and ultimately, murrelet reproductive success.

Based on the evaluation of the threats and the murrelet's population status and

trends, we have determined that the murrelet is likely to become endangered in the foreseeable future unless the current population decline is arrested. Nothing in our assessment indicates that the currently observed population decline is transient. Rather, our threats assessment indicates that it is reasonable to expect that the species will continue to be exposed to a broad range of threats across its listed range. Although some threats have been reduced, most continue unabated and new threats now strain the ability of the murrelet to successfully reproduce. In summary, our analysis indicates that reproductive success is currently too low to sustain the population, manmade and natural threats are likely to continue at current or increased levels, and the population is likely to continue to decline such that the species is likely to become endangered in the foreseeable future and, therefore, continues to warrant threatened status.

Finding

On the basis of the best available scientific and commercial information, as discussed above, we find that the Washington/Oregon/California population of the murrelet is a valid DPS and is likely to become endangered within the foreseeable future (*i.e.*, it is threatened, as defined by the ESA). Therefore, removing this DPS of the murrelet from the List is not warranted.

References Cited

A complete list of all references cited herein is available upon request from the Washington Fish and Wildlife Office (*see* **ADDRESSES**).

Author

The primary authors of this document are the staff of the U.S. Fish and Wildlife Service (*see* **ADDRESSES**).

Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: December 22, 2009.

Daniel M. Ashe,

Deputy Director, Fish and Wildlife Service.

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