

**Marbled Murrelet***Brachyramphus marmoratus*

Class: Aves

Order: Charadriiformes

**Review Status:** Peer-reviewed**Version Date:** 08 January 2019**Conservation Status***NatureServe:**Agency:*

G Rank: G3

ADF&amp;G: Species of Greatest Conservation Need

IUCN: Endangered

Audubon AK: Red

S Rank: S3

USFWS: Bird of Conservation Concern

BLM:

**Final Rank**Conservation category: **IX. Blue**

low status and low biological vulnerability and action need

<u>Category</u>	<u>Range</u>	<u>Score</u>
Status	-20 to 20	-5
Biological	-50 to 50	-34
Action	-40 to 40	-4

**Higher numerical scores denote greater concern**

**Status** - variables measure the trend in a taxon's population status or distribution. Higher status scores denote taxa with known declining trends. Status scores range from -20 (increasing) to 20 (decreasing).

**Score***Population Trend in Alaska (-10 to 10)*

0

Unknown. Piatt et al. (2007) concluded that marbled murrelets were declining, especially in Glacier Bay and Icy Strait (southeast Alaska) and in Prince William Sound (see also Kuletz et al. 2011b). However, USFWS (2013c) re-analysed long-term datasets from 1989 to 2012 and instead suggested that the population was stable. Recent, short-term data (2010-2017) suggest stable populations in Glacier Bay (Sergeant and Johnson 2017). We discuss some of the limitations to detecting trends under "Knowledge of Population Trends".

*Distribution Trend in Alaska (-10 to 10)*

-5

Unknown, but likely stable. An assessment for Kittlitz's murrelet, whose range overlaps extensively with marbled murrelet, concluded that habitat has likely remained stable (USFWS 2013c). Old-growth forests, which provide nesting habitat for marbled murrelet, are likely not limiting in Alaska (Barbaree et al. 2014).

Status Total: -5

**Biological** - variables measure aspects of a taxon's distribution, abundance and life history. Higher biological scores suggest greater vulnerability to extirpation. Biological scores range from -50 (least vulnerable) to 50 (most vulnerable).

**Score***Population Size in Alaska (-10 to 10)*

-10

Unknown, but >25,000. Population counts from five sites conducted between 1996 and 2006 totaled 109,510 individuals (Piatt et al. 2007).

<i>Range Size in Alaska (-10 to 10)</i>	-10
Breeds along the coast and on islands from southeast Alaska to Bristol Bay and west to the Aleutian Islands (Piatt et al. 2007). Estimated range size during breeding is ~400,000 sq. km., based on range maps from ACCS (2017a) and assuming an offshore foraging distance of 50 km (Nelson 1997). Non-breeding range is not well-known, but includes nearshore and offshore waters of the Gulf of Alaska and the Bering Sea (Piatt et al. 2007).	
<i>Population Concentration in Alaska (-10 to 10)</i>	-10
Although >90% of the Alaskan population occurs in three general areas (the Kodiak Archipelago, Prince William Sound, and the Alexander Archipelago), collectively these areas are quite large, encompassing >160,000 sq. km. (Piatt and Ford 1993). Marbled murrelets are solitary nesters and typically do not forage in large groups (Nelson 1997). Given the size of their "concentration areas", their population size, and their ecological traits, we have ranked this question as D) "Does not concentrate".	
<i>Reproductive Potential in Alaska</i>	
<u>Age of First Reproduction (-5 to 5)</u>	-3
At least 2 years (Nelson 1997). The minimum breeding age for the closely-related Kittlitz's murrelet is thought to be 3 years old (USFWS 2013c; Kissling et al. 2015b).	
<u>Number of Young (-5 to 5)</u>	3
One egg per year (Nelson 1997).	
<i>Ecological Specialization in Alaska</i>	
<u>Dietary (-5 to 5)</u>	1
Consumes a variety of prey species including large zooplankton, benthic crustaceans (e.g. mysids, amphipods), and small schooling fishes e.g. capelin, sand lance, and juvenile herring (Sanger 1987; Ostrand et al. 1998; Day and Nigro 2000; Janssen et al. 2011), though the proportion of these items varies seasonally and spatially (Sanger 1987; Burkett 1995; Piatt et al. 2007). Adults have a flexible diet that is responsive to changes in prey availability (Burkett 1995; Ostrand et al. 2004; Piatt et al. 2007), but chicks rely heavily on high-quality, energy-rich prey such as sand lance (Piatt et al. 2007; Janssen et al. 2011).	
<u>Habitat (-5 to 5)</u>	-5
Nests on large tree branches and other adequate tree "platforms" (Raphael et al. 2018), typically in old-growth coniferous forests (Day et al. 1983; Piatt and Ford 1993; Naslund et al. 1995; Barbaree et al. 2014). Also nests on the ground in a variety of habitat types, including rocky or sparsely vegetated slopes, cliffs, mossy ledges, and cavities (Day et al. 1983; Johnston and Carter 1985; Willson et al. 2010; Barbaree et al. 2014). Nest sites have been reported from a range of elevations (max: 1,100 m) and distances from the coast (max: 52.0 km; Barbaree et al. 2014). Nesting habitat is not limiting in Alaska (Barbaree et al. 2014)	
Forages in shallow waters in bays and fjords where prey are abundant (Piatt and Ford 1993; Ostrand et al. 1998; Haynes et al. 2011), though also observed in deep water hundreds of kilometers from shore (Nelson 1997). Also seen on freshwater lakes, though not much is known about this behavior (Carter and Sealy 1986). Little is known about habitat associations during non-breeding, but the marbled murrelet likely overwinters in nearshore and offshore waters in the Gulf of Alaska and the Bering Sea (Nelson 1997; Piatt et al. 2007; Dawson et al. 2015).	
<b>Biological Total:</b>	<b>-34</b>

**Action** - variables measure current state of knowledge or extent of conservation efforts directed toward a given taxon. Higher action scores denote greater information needs due of lack of knowledge or conservation action. Action scores range from -40 (lower needs) to 40 (greater needs). **Score**

*Management Plans and Regulations in Alaska (-10 to 10)*

-10

Protected under the Migratory Bird Treaty Act (MBTA 1918). Subsistence and recreational harvest is not permitted (AMBCC 2017). The population that breeds in Washington, Oregon, and California ("Pacific population") is listed as Threatened under the U.S. Endangered Species Act. This listing does not apply to the Alaskan population.

*Knowledge of Distribution and Habitat in Alaska (-10 to 10)*

2

Nest site associations described in several parts of their range (e.g. Day et al. 1983; Kuletz et al. 1995; Naslund et al. 1995; Barbaree et al. 2014). Reviews of nest site characteristics are provided by DeGange (1996) and Piatt et al. (2007). The at-sea distribution during breeding season is well-studied in southeast and southcoastal Alaska and records are compiled in the USGS North Pacific Pelagic Seabird Database (Piatt and Drew 2015). Marine habitat associations have been described in Prince William Sound (Day and Nigro 2000; Day et al. 2003; Stephensen et al. 2015) and southeast Alaska (Brown et al. 1999; Speckman et al. 2000; Whitworth et al. 2000; Haynes et al. 2010; Haynes et al. 2011; Renner et al. 2012b; Barbaree et al. 2015).

Non-breeding range is not well-understood, though a few surveys have been conducted (Agler et al. 1998; Brown et al. 1999; reviewed in Piatt et al. 2007; Dawson et al. 2015). Little is known about the distribution and habitat associations of marbled murrelets in the Aleutian Islands (Byrd et al. 2005; Gibson and Byrd 2007) or in southwest Alaska during both breeding and non-breeding. Birds have been observed on freshwater lakes (Carter and Sealy 1986), but the use of this unusual habitat requires more study.

*Knowledge of Population Trends in Alaska (-10 to 10)*

2

Annual surveys have been conducted in Glacier Bay since 2009 (Sergeant and Johnson 2017), but this species is not consistently monitored across its entire range. Moreover, logistical and methodological limitations make it hard to determine trends. For instance, Kittlitz's and marbled murrelets can be hard to differentiate during at-sea surveys and inter-annual variations in count numbers can indicate changes in distribution rather than population declines. Comparisons between years or between areas are further muddled by the fact that surveys vary with respect to protocols and timing. Additional discussions of survey limitations can be found in McShane et al. (2004), Piatt et al. (2007), and references therein.

*Knowledge of Factors Limiting Populations in Alaska (-10 to 10)*

2

The "Pacific population" (ex-Alaska) seems to be limited by nest predation and food availability. Although few data are available for Alaska, scientists think that these two factors are also operating to reduce reproductive success and egg/chick survival. In Alaska, studies have reported variables levels of nesting success, ranging from low (<0.30; Naslund et al. 1995; Barbaree et al. 2014) to high (0.83 for one year in Icy Bay; Kissling et al. 2015b). However, small sample sizes and the inaccessibility of nest sites makes it difficult to determine why nests fail. Predation, especially from corvids, has been suggested as the main cause for nest failure both for Alaska (Naslund et al. 1995; Nelson and Hamer 1995) and elsewhere in its range, where stronger datasets exist (Nelson and Hamer 1995; Peery et al. 2004; USFWS 2010a; ODFW 2018). Besides predation, scientists have suggested that population declines in Prince William Sound are related to climate-driven changes to the murrelet's prey base, affecting both prey availability and prey quality (Agler et al. 1999; Kuletz et al. 2011b; Cushing et al. 2018). Studies elsewhere in this species' range have linked reproductive success and population size to changes in food availability (Peery et al. 2004; Becker et al. 2007; Norris et al. 2007; Ronconi and Burger 2008; Gutowsky et al. 2009), but similar data do not exist in Alaska. The availability of nest sites is not of concern in Alaska, where habitat is abundant and

where this species is not restricted to nesting in large trees (Barbaree et al. 2014).

USFWS (2013c) reviewed threats for the Kittlitz's murrelet in Alaska, whose range overlaps extensively with the marbled murrelet, and concluded that human disturbance (i.e. from cruise ships), heavy metal contamination, harvest, and incidental take are not a threat to populations. Given the lack of data available for Alaska, we rank this question as (B).

Action Total:           
-4

**Supplemental Information** - variables do not receive numerical scores. Instead, they are used to sort taxa to answer specific biological or management questions.

<b>Harvest:</b>	None or Prohibited
<b>Seasonal Occurrence:</b>	Year-round
<b>Taxonomic Significance:</b>	Monotypic species
<b>% Global Range in Alaska:</b>	>10%
<b>% Global Population in Alaska:</b>	≥75%
<b>Peripheral:</b>	No

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