Kittlitz's Murrelet

Brachyramphus brevirostris

Class: Aves
Order: Charadriiformes

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

Conservation Status

NatureServe:	*Agency:*		
G Rank: G2	ADF&G: Species of Greatest Conservation Need	IUCN: Near Threatened	Audubon AK: Red
S Rank: S2B,S2N	USFWS: Bird of Conservation Concern	BLM: Sensitive	

Final Rank

Conservation category: **IX. Blue**

low status and low biological vulnerability and action need

Category	Range	Score
Status	-20 to 20	-3
Biological	-50 to 50	-26
Action	-40 to 40	0

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) 2

Trends vary by region. In Prince William Sound (PWS), population declined from 1972 to the early 2000s, but is believed to have stabilized since then (Agler et al. 1999; Kuletz et al. 2011b). In Glacier Bay, where 37% of the global population breeds (USFWS 2013c), declined from 1991 to 2008 (Piatt et al. 2011). Trends unknown for the rest of southeast AK (Kissling et al. 2011). Population in northern Alaska is presumed stable, though only a small percentage of the population is thought to breed there (Day et al. 2011). Data are inadequate for determining trends for Cook Inlet (Kuletz et al. 2011a), the Alaska Peninsula (Madison et al. 2011), and the Aleutian Islands (Madison et al. 2011).

We note that there has been some controversy surrounding declines in PWS and Glacier Bay (reviewed in Day 2011; see also Hodges and Kirchhoff 2012 and response by Kuletz et al. 2013; Kirchhoff et al. 2014). Day (2011) concluded that all surveys contained methodological errors that precluded reliable trend estimation, but that statewide "catatrosphic" declines were unlikely to have occurred. Where data were available, analyses by USFWS (2013c) found that Kittlitz's murrelet had declined at a rate of 30% per year from 1989 to 2000, but have stabilized since then. We follow their assessment and rank this question as C- Past declines, now stable.

Distribution Trend in Alaska (-10 to 10) -5

Suspected stable (USFWS 2013c).

Status Total: -3

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. USFWS (2013c) estimated a minimum population size of 33,583 individuals, which included 1,000 individuals from Russia (Day et al. 2017). Population size is likely higher than this estimate because it does not include entirety of breeding range in Alaska (Day et al. 2017).	
Range Size in Alaska (-10 to 10)	-10
Widespread, though disjunct, breeding distribution throughout most of Alaska's coastline from southeast Alaska to Cape Lisburne in northwestern Alaska (see Fig. 2 in Day et al. 2017). Also breeds on the Kodiak Archipelago and some Aleutian Islands (Day et al. 2017). Usually forages in protected waters, but also forages on open water several kilometers from shore (Day et al. 2017). Estimated range size (with no consideration of habitat suitability) is >400,000 sq. km. (Felis et al. 2016). Non-breeding distribution includes open water areas in the Gulf of Alaska and the Bering and Chukchi Seas (Day et al. 2011; 2017). Not enough data are available to estimate range size during winter.	
Population Concentration in Alaska (-10 to 10)	-10
Solitary nester with a widespread distribution in Alaska. Can occur at high densities at sea during both breeding and non-breeding (Day et al. 2011). Areas of concentration during winter or migration are unknown (Day et al. 2017).	
Reproductive Potential in Alaska	
Age of First Reproduction (-5 to 5)	-3
3 years (Kissling et al. 2015b).	
Number of Young (-5 to 5)	5
Lays a single egg (Kaler et al. 2009). However, data on reproductive success suggest that Kittlitz's murrelets may not breed every year (USFWS 2013c; Kissling et al. 2015b).	
Ecological Specialization in Alaska	
Dietary (-5 to 5)	1
Pelagic feeder. Consumes large zooplankton e.g. copepods, euphausiids and small schooling fishes e.g. capelin, sand lance, and juvenile herring (Day and Nigro 2000; USFWS 2013c). A review by USFWS (2013c) considered this species to be a flexible forager that can likely adapt to changes in prey availability. At the same time, diet is specialized at certain times of the year: like many seabirds, Kittlitz's murrelets depend almost exclusively on forage fish as chicks and when nesting (Hatch 2011; USFWS 2013c; Lawonn et al. 2018b).	
Habitat (-5 to 5)	1
Nests on barren ground in scree fields, talus slopes, mountainsides, and cliff ledges (Day et al. 1983; Piatt et al. 1999; Lawonn et al. 2018a). In southcoastal and southwestern Alaska, often associated with glaciers (Day et al. 2000; Madison et al. 2011; USFWS 2013c). Also nests on rocks or in depressions on the ground in sparsely vegetated habitat typically consisting of non-vascular plants (lichens, mosses), dwarf-shrub, or short graminoids (Kaler et al. 2009; Day et al. 2011; Kissling and Lewis 2016; Lawonn et al. 2018a). Kittlitz's murrelet select for unvegetated or sparsely vegetated areas, though vegetation cover varies from none to >50% (Day et al. 1983; Kaler et al. 2009; Lawonn et al. 2018). Moreover, nests have been reported from a wide range of elevations (from ~130 m to >2,500m) and a wide range of distances from shore (from ~200m to	

>70 km inland), and habitat affiliations suggest that the choice of nesting habitat varies with availability (Felis et al. 2016) and is likely not limited (USFWS 2013c).

Typically forages nearshore in protected bays and fjords (Madison et al. 2011; Allyn et al. 2012), but in some areas forages in open water several kilometers from shore (Day et al. 2011; Day et al. 2017). Infrequently seen on freshwater lakes (qtd in USFWS 2013c; Ruden 2016). Wintering distribution and habitat associations are largely unknown, though this species likely overwinters offshore on open water (Day et al. 2017).

Biological Total: -26

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). This species was proposed for listing in the ESA but the listing was considered not warranted (USFWS 2013c).

Knowledge of Distribution and Habitat in Alaska (-10 to 10) 2

Distribution and habitat associations are known but not fully understood. Additional research is needed to determine extent of breeding distribution in southwest (Madison et al. 2011; Kenney and Kaler 2013) and northern Alaska (Day et al. 2011; Kissling and Lewis 2016). Birds have occasionally been observed on freshwater lakes (USFWS 2013c; Ruden 2016), but the use of this unusual habitat requires more study. Non-breeding range is not well-understood, but this species has been observed year-round in waters off the Kodiak Archipelago (Stenhouse et al. 2008) and in lower Cook Inlet and Prince William Sound (Agler et al. 1998; Kendall and Agler 1998). Large numbers migrate to open water in the Bering Sea and Chukchi Seas (Day et al. 2011; Day et al. 2017).

Nest site associations described in several parts of their range including the Aleutian Islands (Kaler et al. 2009; Kenney and Kaler 2013), Kodiak Island (Lawonn et al. 2018a), northern Alaska (Kissling and Lewis 2016), and southcoastal Alaska (Kissling et al. 2015b). A review of historical nest sites was given by Day et al. (1983). The at-sea distribution during breeding season, including foraging ecology, is well-studied in the Gulf of Alaska, especially where habitat is largely influenced by glaciers. Shipboard surveys have been conducted in Prince William Sound (Day and Nigro 2000; Day et al. 2000; Day et al. 2003; Allyn et al. 2012; Allyn et al. 2015; Stephensen et al. 2015; Cushing et al. 2018), Kenai Fjords (Arimitsu et al. 2011;2012), and southeast Alaska (Kissling et al. 2011; Piatt et al. 2011; Renner et al 2012b). To a lesser extent, surveys have been conducted in northern Alaska (Day et al. 2011) and southwest Alaska (including the Aleutian Islands; Byrd et al. 2005; Madison et al. 2011). Additional records are compiled in the USGS North Pacific Pelagic Seabird Database (Piatt and Drew 2015).

Knowledge of Population Trends in Alaska (-10 to 10) 2

Annual surveys have been conducted in Glacier Bay since 2009 (Sergeant and Johnson 2017), and sporadically elsewhere (reviewed in Day 2011), but this species is not consistently monitored across its range. Moreover, logistical and methodological limitations make it hard to determine trends. It is sometimes hard to differentiate Kittlitz's from marbled murrelets during 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 Day (2011), Hoekman et al. (2011) and Kirchhoff (2011).

Knowledge of Factors Limiting Populations in Alaska (-10 to 10) 6

Predation may be a limiting factor in parts of their range (USFWS 2013c), but few data are available for either adults or juveniles. A mark-recapture study in Icy Bay documented low adult survival during the breeding season, chiefly caused by predation from raptors (Kissling et al. 2015a). Annual survival could not be reliably estimated in this study, so rates of overwinter mortality are not known (Kissling et al. 2015a). Low nest survival has documented on Agattu Island (Kaler et al. 2009), Kodiak Island (Lawonn et al. 2018a; 2018b), northwestern Alaska (Kissling and Lewis 2016), and Icy Bay (Kissling et al. 2015b; 2016). Predation was the main cause of egg mortality on Agattu (Kaler et al. 2009) and Kodiak (Lawonn et al. 2018b), while inclement weather the main source of mortality for chicks (Kaler et al. 2009). Many of these studies had very low sample sizes or could not evaluate cause(s) of mortality.

Besides nest success, studies have also documented low rates of breeding (Day and Nigro 2004; Kissling et al. 2015b; 2016), even though in some cases individuals appeared to be in good condition (Kissling et al. 2016). The proportion of breeding individuals has been correlated to ocean climate variables, which may reflect changes in prey availability (Kissling et al. 2016). Other scientists have also suggested that population declines may have been related to climate-driven changes to murrelet's prey base (Agler et al. 1999; Kuletz et al. 2011b; Cushing et al. 2018). However, USFWS (2013c) questioned this idea for two reasons. First, Kittlitz's murrelet have a diverse and flexible diet during all times of the year except nesting, which should allow them to compensate for changes in prey availability. Second, the closely-related marbled murrelet exhibited much higher reproductive success (compared within the same year) even though the two species have a similar diet and would be expected to react similarly to declines in prey availability (USFWS 2013c; Kissling et al. 2015b). It remains unknown why many individuals do not breed annually if sufficient prey are available. Nesting habitat is not considered limiting (USFWS 2013c).

USFWS (2013c) concluded that human disturbance (i.e. from cruise ships), heavy metal contamination, harvest, and incidental take do not pose a threat to murrelet populations. Discussions of vessel traffic and its potential effects on behavior and energetics can be found in: Agness et al. 2008; Agness et al. 2013; Schoen et al. 2013; Marcella et al. 2017. See Kenney et al. 2018 for mercury concentrations.

Action Total: 0

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

Harvest:	None or Prohibited
Seasonal Occurrence:	Year-round
Taxonomic Significance:	Monotypic species
% Global Range in Alaska:	>10%
% Global Population in Alaska:	25-74%
Peripheral:	No

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