

Ringed seal

Class: Mammalia
Order: Carnivora

Pusa hispida hispida

Note: Only one subspecies of ringed seal, *Pusa hispida hispida*, occurs in Alaska. *Phoca hispida* is an invalid synonym.

Review Status: Peer-reviewed

Version Date: 12 March 2018

Conservation Status

NatureServe:

Agency:

G Rank: G5

ADF&G: Species of Greatest Conservation Need

IUCN: Least Concern

Audubon AK:

S Rank: S4

USFWS: Listed Threatened

BLM:

Final Rank		
Conservation category: III. Orange		
high status and low biological vulnerability and action need		
Category	Range	Score
Status	-20 to 20	0
Biological	-50 to 50	-32
Action	-40 to 40	-16
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)

-6

Although reliable trend data are unavailable (Muto et al. 2019), vital rates in the Bering and Chukchi Seas suggest that this population is growing. Compared to historical data (1975-1984), a greater proportion of the harvested population is comprised of pups and seals are in better body condition, are growing longer, and are attaining sexual maturity earlier (Crawford et al. 2015).

Distribution Trend in Alaska (-10 to 10)

6

Habitat is suspected to be declining as a result of decreasing sea ice (Ferguson et al. 2005; Kelly et al. 2010; Chambellant et al. 2012b).

Status Total: 0

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

A reliable population estimate is not available, but the minimum estimated population size in Alaska is >100,000 (Conn et al. 2014a; Muto et al. 2019).

Range Size in Alaska (-10 to 10)

-10

In Alaska, ringed seals are distributed in the Beaufort, Chukchi, and Bering Seas. During late April

through June, they are distributed throughout their range from the southern ice edge northward (Muto et al. 2019). During the winter, ringed seals move into the southern Chukchi Sea and northern Bering Sea along the continental shelf (Citta et al. 2018). Estimated range size is >400,000 sq. km.

Population Concentration in Alaska (-10 to 10) -10

Does not concentrate. Ringed seals are dispersed throughout their range and occur singly or in small groups (Harwood and Stirling 1992; Kelly et al. 2010; Crawford et al. 2012).

Reproductive Potential in Alaska

Age of First Reproduction (-5 to 5) -1

Variable. From 1975 to 1984, female seals in the Bering and Chukchi Seas became sexually mature at 4.2 years (Crawford et al. 2015). From 2003 to 2012, average age at sexual maturity declined to 2.6 years (Crawford et al. 2015). To account for this variation, we rank this question as $0.5 * B + 0.5 * C$.

Number of Young (-5 to 5) 3

Females can bear up to one pup per year (Kelly et al. 2010). Pregnancy rates for Alaska range from 78% to 85% (Crawford et al. 2015).

Ecological Specialization in Alaska

Dietary (-5 to 5) -5

Eat a variety of small fish and invertebrates, such as herring, cod, crustaceans, bivalves, and euphausiids (Kelly et al. 2010; Crawford et al. 2015). The percentage of different prey items in the diet changes over space and time, likely in response to changes in prey availability (Quakenbush et al. 2011).

Habitat (-5 to 5) 1

Ringed seals are highly associated with sea ice and rarely haul out on land (Laidre et al. 2008; Kelly et al. 2010). During the summer, they forage in open water along the ice edge, though some individuals and juveniles may move to ice-free habitats (Kelly et al. 2010). During winter, adults inhabit areas of continuous ice cover. Meanwhile, there is some evidence from satellite telemetry that subadults winter near the ice edge where they do not need to maintain breathing holes (Crawford et al. 2012). Pups are usually born in subnivean dens, either natural or constructed by females, which provide thermoregulatory shelter and protection from predators (Stirling and Smith 2004; Laidre et al. 2008). Several important ecological functions require sea ice, including thermoregulation, nursing, and resting (reviewed in Kelly et al. 2010).

Biological Total: -32

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 through the Marine Mammal Protection Act (NMFS 2015), and actively managed by NOAA's National Marine Fisheries Service (NMFS; <https://alaskafisheries.noaa.gov/pr>). Subsistence harvest is permitted for Native Alaskans and harvest regulations are co-managed by the Ice Seal Committee and NOAA Fisheries (www.fakr.noaa.gov/protectedresources/seals/ice.htm).

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

Habitat relationships, seasonal movements and distribution patterns are well-studied and understood (e.g. Kelly and Quakenbush 1990; Frost et al. 2004; Bengston et al. 2005; Crawford et al. 2012; Citta et al. 2018; Crawford et al. 2019).

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

Population counts have been conducted (e.g. Frost et al. 2004; Bengtson et al. 2005; Kelly et al. 2005; Conn et al. 2014a), but data are currently inadequate for determining population trends (Muto et al. 2019). The Alaska Department of Fish and Game has been monitoring the health and status of bearded seals in Alaska since 1960, and annually collects tissue samples and measurements to evaluate indices of population status and health (Quakenbush et al. 2011; Crawford et al. 2015).

Knowledge of Factors Limiting Populations in Alaska (-10 to 10) 2

Population dynamics are not fully understood. Mortality related to by-catch, subsistence harvest, and disease is low (Quakenbush et al. 2011; Muto et al. 2019). Some researchers have proposed that ringed seal populations will be vulnerable to losses in sea ice (Ferguson et al. 2005; Laidre et al. 2008; Kelly et al. 2010; Ferguson et al. 2017). In western Hudson Bay, low snow cover and long periods of open water negatively affected vital rates including body condition, pregnancy rates, and pup survival (Ferguson et al. 2005; Ferguson et al. 2017). However, studies have also found that current, low levels of sea ice are more favourable to growth and recruitment rates than periods of heavy ice and severe winters (Chambellant et al. 2012a; Crawford et al. 2015). Authors have suggested that there may be an optimal range of sea ice concentrations above or below which populations are negatively affected (Crawford et al. 2015) and that populations respond cyclically to natural, decadal variations in ice regimes (Chambellant et al. 2012b). Additional research is needed to further our understanding of this species' resilience to changes in sea ice, and to study the effects of algal toxins, ocean acidification, and shipping (Kelly et al. 2010; Lefebvre et al. 2016; Hauser et al. 2018).

Action Total: -16

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

Harvest:	Not substantial
Seasonal Occurrence:	Year-round
Taxonomic Significance:	Monotypic species
% Global Range in Alaska:	>10%
% Global Population in Alaska:	<25%
Peripheral:	No

References

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