Ringed seal
*Pusa hispida hispida*

Class: Mammalia
Order: Carnivora

### Conservation Status

**NatureServe:**

G Rank: G5

S Rank: S4

**USFWS:** Listed Threatened

**BLM:**

**ADFG:** Species of Greatest Conservation Need

<table>
<thead>
<tr>
<th>Agency</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN: Least Concern</td>
<td></td>
</tr>
<tr>
<td>Audubon AK:</td>
<td></td>
</tr>
</tbody>
</table>

### Final Rank

**Conservation category:** III. Orange

III = high status and low biological vulnerability and action need

<table>
<thead>
<tr>
<th>Category</th>
<th>Range</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status:</td>
<td>-20 to 20</td>
<td>0</td>
</tr>
<tr>
<td>Biological:</td>
<td>-50 to 50</td>
<td>-32</td>
</tr>
<tr>
<td>Action:</td>
<td>-40 to 40</td>
<td>-16</td>
</tr>
</tbody>
</table>

Higher numerical scores denote greater concern

### Status

- **Population Trend (-10 to 10)**

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).

**Score:** -6

### Distribution Trend (-10 to 10)

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).

**Score:** 6

**Status Total:** 0

### Biological

- **Population Size (-10 to 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).

**Score:** -10

- **Range Size (-10 to 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.

**Score:** -10

- **Population Concentration (-10 to 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).

**Score:** -10

### Reproductive Potential
**Age of First Reproduction (-5 to 5)**
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)**
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**

**Dietary (-5 to 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)**
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 to lack of knowledge or conservation action. Action scores range from -40 (lower needs) to 40 (greater needs).

<table>
<thead>
<tr>
<th>Score</th>
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<tbody>
<tr>
<td>Management Plans and Regulations (-10 to 10)</td>
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</table>
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 (-10 to 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 (-10 to 10) |
Population counts have been conducted (e.g. Frost et al. 2004; Bengston 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 (-10 to 10) |
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).

### Supplemental Information

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

<table>
<thead>
<tr>
<th>Harvest</th>
<th>Not substantial</th>
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<tbody>
<tr>
<td>Seasonal Occurrence</td>
<td>Year-round</td>
</tr>
<tr>
<td>Taxonomic Significance</td>
<td>Monotypic species</td>
</tr>
<tr>
<td>% Global Range in Alaska</td>
<td>&gt;10%</td>
</tr>
<tr>
<td>% Global Population in Alaska</td>
<td>&lt;25%</td>
</tr>
<tr>
<td>Peripheral</td>
<td>No</td>
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</tbody>
</table>

### References


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Alaska Natural Heritage Program
University of Alaska Anchorage
Anchorage, AK