

Pinnipeds

Arctic ice seals: Bearded seal, ribbon seal, ringed seal, spotted seal **Last updated: October 2007**

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Stock definitions and geographic ranges

The four species of ice associated seals (i.e., bearded, spotted, ribbon, and ringed seals), often referred to collectively as “ice seals”, are important resources for northern coastal Alaska Native communities, and are likely to be key ecological components of arctic marine ecosystems.

Bearded seals (*Erignathus barbatus*) have a circumpolar distribution from approximately 45°N to 85°N. In Alaskan waters they are distributed over the shallow (less than 200 m) continental shelf of the Bering, Chukchi, and Beaufort Seas. Recent spring surveys indicated that in many areas bearded seals may be more abundant 20-100 nmi offshore than within 20 nmi of shore (Bengtson et al. 2000). Some seals migrate through the Bering Strait from April to June and spend the summer along the ice edge in the Chukchi; while others appear to remain in the open ocean during this time.

Ribbon seals (*Histiophoca fasciata*) inhabit the North Pacific Ocean and southern parts of the Arctic Ocean. In Alaska waters, they range northward from Bristol Bay, in the Bering Sea, into the Chukchi and Western Beaufort Seas. Ribbon seals are usually found on or near pack ice in the open sea, and rarely along the coast or on fast ice. From March to May they inhabit the Bering Sea ice front and are most abundant in the central and western Bering Sea. As the ice recedes in summer they move north with the ice edge. Little is known about ribbon seal distribution the rest of the year. Some migrate north through the Bering Strait while others may remain pelagic in the central Bering Sea.

Ringed seals (*Phoca hispida*) have a circumpolar distribution in the arctic and sub-arctic. In Alaska waters, and depending on ice cover, they are found as far south as the southern Bering Sea. Ringed seals have an affinity for ice-covered waters and tend to prefer areas within 20 nmi of shore (Bengtson et al. 2005). Recent spring surveys suggest that the density of ringed seals is higher in the eastern part of the Alaskan Beaufort Sea than in the west. Ringed seals are believed to follow the ice edge north as it melts in summer, but the details of this migration are unknown.

Spotted seals (*Phoca largha*) are distributed along the continental shelf of the Beaufort, Chukchi, Bering, and Okhotsk Seas, and south into the northern Yellow and western Sea of Japan. In Alaskan waters, they are known to occur as far south at the Pribilof Islands, Bristol Bay, and the eastern Aleutian Islands. Spotted seals are easily mistaken for harbor seals. There is little morphological difference between the two species and their geographic ranges overlap in the southern Bering Sea. However, only the spotted seal is regularly associated with pack ice.

A lack of significant genetic, phenotypic and population response data does not warrant subdividing the bearded, ribbon, ringed or spotted seals stocks. As such, in U.S. waters, only the Alaska stocks are recognized.

Population sizes, status and trends

Reliable estimates for the current minimum population size, abundance and trend of the Alaska stocks of bearded, ribbon, ringed or spotted seals are considered unavailable. However, there are crude estimates available in the historical literature. For example, early estimates of the Bering- Chukchi Sea population

of bearded seals range from 250,000 to 300,000 (Popov 1976, Burns 1981a). Burns (1981b) estimated the worldwide population of ribbon seals at 240,000 in the mid 1970s, with an estimate for the Bering Sea at 90,000-100,000. Similarly rough estimates for the numbers of ringed seals in Alaska include 1-1.5 million (Frost 1985) or 3.3-3.6 million (Frost et al. 1988); about 230,000 are estimated to inhabit the Alaska coastal regions of the Chukchi Sea (Bengtson et al. 2005). The worldwide population of spotted seals was estimated by Burns (1973) to be in the range of 335,000-450,000, with an estimate for the Bering Sea of 200,000-450,000.

Bearded, ribbon, ringed or spotted seals are not listed as “depleted” under the MMPA or listed as “threatened” or “endangered” under the Endangered Species Act. Current and reliable estimates of the minimum population size, total abundance, PBR (potential biological removal) and human-caused injury or mortality are not available. There is also a lack of information suggesting that subsistence hunting is adversely affecting these stocks and because of minimal evidence of interactions with U.S. fisheries the Alaska stocks of bearded, ribbon, ringed or spotted seals are not classified as strategic stocks.

Issues

The distributions and densities of ice-dwelling seals are highly sensitive to suitable sea ice conditions, and as such, these seals may be particularly vulnerable to climatic change. Changes in sea ice extent have been non-uniform; therefore, the effects on seals are likely to occur on regional scales, emphasizing the need for quality data throughout their range.

Abundance, population discreteness, annual survival and reproductive rates (together with information on food habits, seasonal movements and distribution), are essential to making sound management and conservation decisions. Unfortunately, current knowledge and monitoring programs are insufficient to allow for the timely detection of changes in population trend.

Ecological data is also important and future studies should focus on assessing the natural causes of fluctuations in the numbers and distribution of ice seals. For example, it is unknown how many ribbon seals remain in the Bering Sea and to what extent they compete with the pollock fishery in summer. Information on the specific habitat requirements for breeding, molting, feeding, etc. of these species is also lacking. This is particularly important with regards to the future effects of global warming. A reduction or change in ice cover would likely directly affect the survival of these species, particularly ringed seals which are so well adapted to occupying seasonal and permanent ice.

Finally, the extent to which these populations are affected by human caused mortality is also poorly known. Their interactions with commercial fisheries (e.g., entanglement in nets) are not well described as these data are collected voluntarily and are self-reported by each vessel. In addition, the physical similarities between spotted and harbor seals makes interpreting any data from these species problematic. Bearded and ringed seals are actively targeted in the Alaska Native subsistence harvest, with an average of 6,788 and 9,567 taken each year (ADF&G 2000a, b). There is significant annual variation in these numbers however, and without reliable estimates of the minimum population of these species PBRs can not be calculated and the resulting effects on the populations can not be estimated or managed for.

Recent projects by the National Marine Mammal Laboratory are beginning to address some of these knowledge gaps. Current satellite-tagging studies are providing some of the first information on the seasonal movements, habitat use, and foraging ecology of bearded, ribbon and spotted seals (Cameron 2005, Cameron 2006, Cameron 2007, Boveng et al. 2007). Similarly, recent abundance surveys will provide estimates of the different ice seal populations inhabiting U.S. waters (Bengtson et al. 2000, Cameron 2006, Cameron and Boveng, 2007).