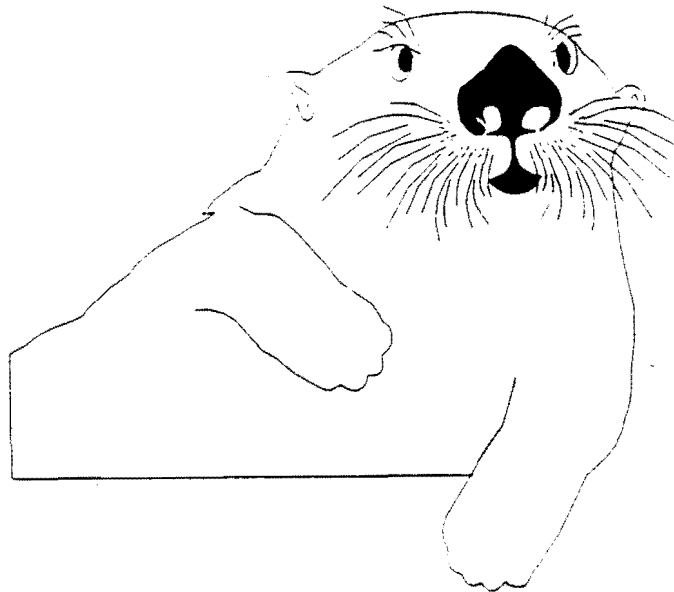


**STOCK ASSESSMENT
SEA OTTER (*Enhydra lutris*)
ALASKA STOCK**



**U.S. FISH AND WILDLIFE SERVICE
Marine Mammals Management
Anchorage, Alaska**

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SEA OTTER (*Enhydra lutris*): ALASKA STOCK

U.S. Fish and Wildlife Service, Marine Mammals Management, Anchorage, Alaska

A Conservation Plan for sea otters has been completed by the Fish and Wildlife Service (FWS 1994); all information contained in that plan is incorporated by reference in this stock assessment.

STOCK DEFINITION AND GEOGRAPHIC RANGE

Sea otters in North America occur from the Aleutian Islands to California. More than 90% of the world's sea otter population can be found in Alaska waters (Rotterman and Simon-Jackson 1988). Those animals which occur in Alaska are currently managed as a single stock. However, previous studies have suggested that sea otters can be separated into multiple stocks within Alaska based on the Dizon *et al* (1992) phylogeographic approach including distributional data (geographic separation) and genetic relationships (U.S. Departments of Commerce and Interior 1978; Rotterman and Simon-Jackson 1988; Cronin *et al.* in review). This information will be used when evaluating the separation of Alaska sea otters into multiple stocks in the future.

Sea otters are widely distributed throughout Alaska from the Aleutian Islands to southeast Alaska and have reoccupied most of their historic range. However, they may not have reached equilibrium density in several areas including certain parts of the Aleutian Islands, Kodiak Archipelago, northern Gulf of Alaska and southeast Alaska. It is expected that sea otters will continue to move into new areas within their range that they currently do not occupy or where they are currently present in low densities.

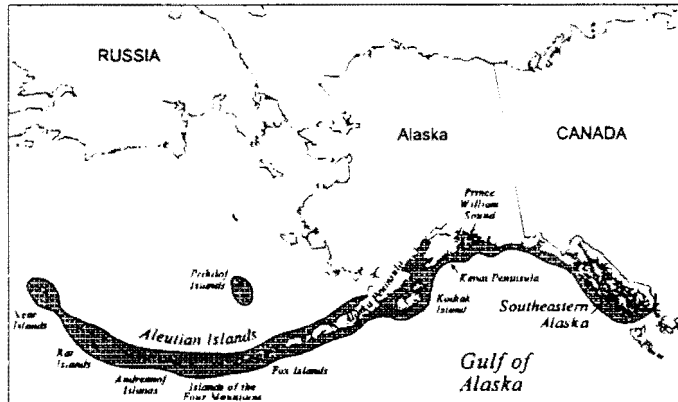


Figure 1. Sea otter distribution in Alaska.

POPULATION SIZE

Historically, sea otters occurred in nearshore waters around the North Pacific rim from Hokkaido, Japan, through the Kuril Islands, Kamchatka Peninsula, the Commander Islands, the Aleutian Islands, peninsular and south coastal Alaska, and southward to Baja California (Kenyon 1969). The worldwide population of sea otters in the early 1700s has been estimated at 150,000 (Kenyon 1969) to 300,000 (Johnson 1982). In Alaska, sea otters were commonly harvested by coastal Alaska Natives prior to the commercial exploitation of sea otters. Although this Native harvest may have caused local reductions of sea otters (Simenstad *et al.* 1978), the species was abundant throughout its range prior to commercial exploitation. Extensive commercial hunting of sea otters began following the arrival in Alaska of Russian explorers in 1741 and continued during the 18th and 19th century. This exploitation reduced the numbers of sea otters throughout the range, completely eliminating them in some areas. In 1911, international protection was given to the few remaining animals existing worldwide. At present, sea otters have made a remarkable recovery and have repopulated most of their range in Alaska.

Minimum Population Estimate

Calkins and Schneider (1985) estimated a 1976 Alaska sea otter population of 100,000 to 150,000 animals. Based on the best available data, the FWS believes the current population size is within that range and that 100,000 is the minimum population estimate for sea otters in Alaska (FWS 1994). Although the geographic coverage is incomplete, abundance information for certain geographic areas of Alaska is summarized in the table (DeGange and Bodkin in preparation). These surveys include a variety of techniques (direct counts or corrected counts) and platforms (boat, shore, fixed-wing and helicopter) with varying success. These numbers should be considered minimum counts or estimates for these areas. The FWS considers these estimates to be conservative and

acknowledges that there are uncertainties associated with establishing a minimum population estimate. However, as required by NMFS guidelines (NMFS 1994), the FWS is reasonably assured that the stock size is equal to or greater than this estimate.

The Aleutian Island survey results from 1992 (FWS unpubl. data) were from aerial surveys (91m elevation, 51.4 m/s) with correction factors determined from simultaneous air and ground counts. The Prince William Sound and Kodiak survey results from 1994 (FWS unpubl. data) were from aerial surveys (91m elevation, 26.8 m/s) with correction factors determined from systematic intensive search units along the transect lines to account for diving behavior.

Current Population Trend

The observed trend in virtually all areas with persisting subpopulations since 1911 has been one of growth, with declines observed only as subpopulations exceeded available resources (DeGange and Bodkin in preparation). The state-wide population of sea otters is expected to continue to grow due to unoccupied areas within their range and the many areas where they have yet to attain equilibrium densities.

Table 1. Survey results from selected areas in Alaska.

Location	Count/ Estimate	Survey Year	Reference
Near Islands	2,259	1992	USFWS unpubl. data
Rat Islands	3,470	1992	USFWS unpubl. data
Andreanof and Delarof Islands	9,752	1992	USFWS unpubl. data
Islands of Four Mts	171	1992	USFWS unpubl. data
Fox Islands	3,451	1992	USFWS unpubl. data
Pribilof Islands	30	1991	Stephensen (pers. comm.)
N. AK Peninsula	13,091	1986	Brueggeman et al 1987;
S. AK Peninsula	27,335	1986; 1989	Brueggeman et al 1987; USFWS unpubl. data
Kodiak Islands	6,100	1994	USFWS unpubl. data
Kenai Peninsula	2,300	1989	USFWS unpubl. data
Prince Wm. Sound	14,352	1994	Bodkin (pers comm)
N. Gulf of AK	2,830	1987; 1988	Simon-Jackson and Hodges 1987; Monnett and Rotterman 1989
Southeastern AK	7,480	1986- 1988	Pitcher 1989; DeGange and Bodkin in prep.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Estes (1990) estimated maximum net productivity for sea otters in certain areas of Alaska, British Columbia, and Washington State between 17 and 20% per year based on observed population changes. However, maximum net productivity rates have not been estimated throughout the sea otter's range in Alaska.

Maximum productivity rates throughout all areas of Alaska are unknown. In the absence of more detailed information for maximum net productivity rates throughout Alaska, the rate calculated by Estes (1990) of 20% was used for this stock assessment.

POTENTIAL BIOLOGICAL REMOVAL (PBR)

In the following calculation, $(N_{MIN})(1/2 R_{MAX})(F_R) = PBR$ the minimum population estimate (N_{MIN}) is 100,000; the maximum rate of increase (R_{MAX}) is 0.20; and the recovery factor (F_R) was chosen as 1.0 because the stock is believed to be within the Optimum Sustainable Population (OSP) range (FWS 1994). The PBR derived from this information is 10,000 sea otters per year. However, a removal of 10,000 sea otters per year from the state-wide population can only realistically result in a non-adverse impact if the removal is allocated throughout the state, not concentrated in any local areas, and considers sex and age of harvested animals.

ANNUAL HUMAN CAUSED MORTALITY

Oil and Gas Development

Activities associated with the exploration, development, and transportation of oil and gas have the potential for adversely impacting sea otters and their habitat in Alaska. The *Exxon Valdez* oil spill in March, 1989, illustrates the impact that oil spills can have on sea otters. It is estimated that approximately 2,650 sea otters (95% CI = 500-

5,000) in Prince William Sound (Garrott *et al.* 1993) or 3,905 sea otters (95 % CI = 1,904-11,157) spill-wide (DeGange *et al.* 1994) died in Alaska as a result of the spill. Ballachey *et al.* (1994) reported that by 1993 chronic damages to sea otters may have been subsiding and recovery of the affected sea otter population underway. Annual mortality due to oil and gas development activities including oil spills have not been estimated.

Subsistence Harvest

Hunting of sea otters, including hunting by Alaska Natives, was prohibited by the 1911 Fur Seal Treaty and later by Alaska State law. Between 1911 and 1972, relatively few sea otters are known to have been killed in Alaska. In 1972, the Marine Mammal Protection Act exempted Alaska Natives from the prohibition on hunting. Alaska Natives currently take sea otters for subsistence use or for creating and selling authentic Native articles of handicrafts. Between 1982 and 1986, a minimum of 1,049 sea otters was reported killed by Alaska Natives (Rotterman and Simon-Jackson 1988). The figure shows the harvest levels between 1989 and 1993 (Stephensen *et al.* 1994; FWS unpubl. data). This data is from a mandatory marking and tagging program implemented by the FWS since 1988. There is no evidence that the harvest by Alaska Natives has affected the Alaska population of sea otters or limited their distribution or productivity. However, it is necessary that harvest efforts be spread out throughout the stock to ensure that over-harvest does not occur within local areas of Alaska. The estimated annual take for 1993 due to Native hunting was approximately 1.2% of the estimated minimum state-wide population and 12% of the calculated PBR.

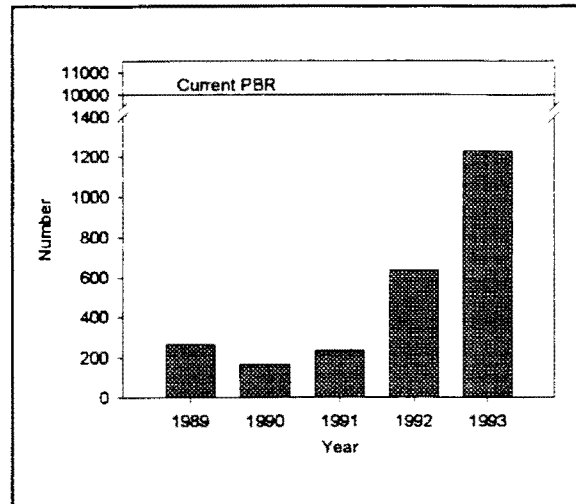


Figure 2. Sea otter harvest levels in Alaska, 1989-1993.

Research and Public Display

Between 1976 and 1994, nearly 150 sea otters were taken from Alaska waters for public display in aquaria including those that were deemed unreleasable after the *Exxon Valdez* oil spill. Hundreds more have been captured, handled, tagged and released as part of research projects. There have been no observed effects on sea otters populations from either of these activities.

Other Activities

Between 1968 and 1972, the Alaska Department of Fish and Game (ADFG) and the FWS took an average of 519 otters per year, with a peak of 1,088 in 1970 as part of an experimental harvest. This includes sea otters transplanted, harvested by ADFG and accidental mortalities. Additionally, in 1971 it is estimated that between 1,000 and 1,350 otters were killed in a nuclear bomb blast at Amchitka. (U.S. Departments of Commerce and Interior 1978)

Although specific data are lacking, it is likely that other human activities involving sea otters have resulted in negligible numbers of deaths.

FISHERIES INFORMATION

The NMFS program requiring certain fisheries to keep logbooks of marine mammal interactions and allow observers on vessels to track marine mammal interactions has provided data on sea otter interactions with certain Alaska fisheries. No sea otter kills were reported in 1990 or 1991 through the observer program. The observer program was discontinued after 1991. Logbook records are available from 1990 through 1992. The 1990 logbook records show 1 kill and 4 injuries due to gear interaction and 3 injuries due to deterrence in the Alaska Prince William Sound, Copper River and Bering River drift gillnet fishery. The 1991 logbook records show 1 kill due to gear interaction in the Alaska Kodiak salmon set gillnet fishery. No kills or injuries were reported in logbook

records in any fishery in 1992. A lethal interaction was also reported from the Aleutian Islands Black Cod Single Pot fishery (a fishery not required to report interactions) where 2 sea otters were killed in 1992. Prior to the implementation of the NMFS program, studies were conducted on sea otter interactions with the drift net fishery in western Prince William Sound 1988-1990 and no mortalities were observed. Annual mortality rates due to commercial fishing are probably insignificant to the overall Alaska sea otter population.

The Alaska Prince William Sound, Copper River, Bering River Drift Gillnet Fishery had the following number of vessels registered: 1990-618, 1991-590, 1992-548. The Alaska Kodiak Salmon Set Gillnet fishery had the following number of vessels registered: 1990-115, 1991-117, 1992-115. (NMFS 1993)

Although lethal take was reported from the NMFS commercial fishery logbook data, the NMFS Observer Program estimated an overall zero kill rate based on observed kills and the total fishery effort (NMFS 1993). However, logbook data can only be considered as a minimum estimate of mortality (NMFS 1994). Because of the lack of data, seasonal or area differences in the fishery's incidental mortality rate and trends in mortality rate due to fishing are not possible to determine. However, based on the available data, sea otter populations in Alaska are not likely to be significantly affected due to commercial fishery interactions. The total fishery mortality and serious injury for the Alaska sea otter stock is less than 10% of the calculated PBR and, therefore, can be considered to be insignificant and approaching zero mortality and serious injury rate (NMFS 1994).

STATUS OF STOCK

The Alaska sea otter population is currently managed as one stock and is estimated to be within its OSP range. Sea otters in Alaska are not listed as threatened or endangered under the Endangered Species Act. Sea otters have reoccupied the majority of their former range and the population is approaching carrying capacity in some regions. The Potential Biological Removal calculated for the stock is 10,000 sea otters annually. The known incidental take of sea otters in commercial fishing is less than 10% of the PBR, and therefore, can be considered to be insignificant and approaching zero mortality and serious injury rate. At this time, sea otters in Alaska are not considered a Strategic Stock as defined by the MMPA.

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