NORTHERN SEA OTTER (*Enhydra lutris kenyoni*): Southcentral Alaska Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Sea otters occur in nearshore coastal waters of the U.S. along the North Pacific Rim from the Aleutian Islands to California. The species is most commonly observed within the 40-meter depth contour since animals require frequent access to benthic foraging habitat in subtidal and intertidal zones (Reidman and Estes 1990). Sea otters in Alaska are not migratory and generally do not disperse over long distances, although movements of tens of kilometers are normal (Garshelis and Garshelis 1984). Individuals are capable of long distance movements of over100 km (Garshelis et al. 1984); however, movements of sea otters are likely limited by geographic barriers, high energy requirements of animals, and social behavior.

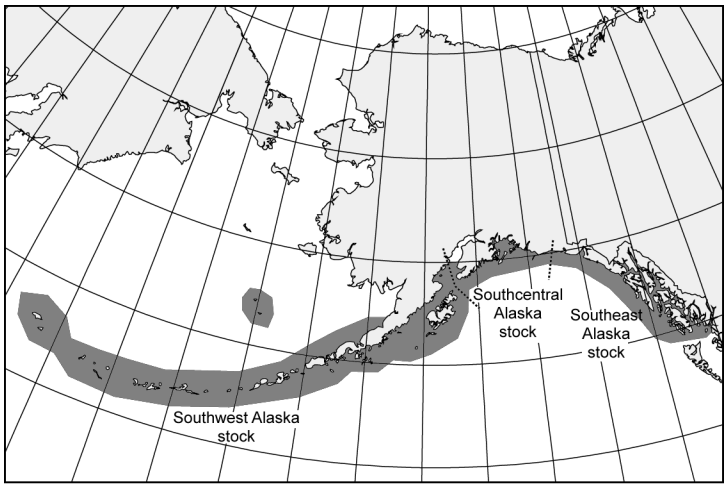

Figure 1. Approximate distribution of northern sea otters in Alaska waters (shaded area)

Applying the phylogeographic approach of Dizon et al. (1992), Gorbics and Bodkin (2001) identified three sea otter stocks in Alaska: southeast, southcentral,and southwest. The ranges of these stocks are defined as follows: (1) Southeast Alaska stock extends from Dixon Entrance to Cape Yakataga; (2) Southcentral Alaska stock extends from Cape Yakataga to Cook Inlet including Prince William Sound, the Kenai Peninsula coast, and Kachemak Bay; and (3) Southwest Alaska stock includes the Alaska Peninsula and Bristol Bay coasts, the Aleutian, Barren, Kodiak, and Pribilof Islands (Figure 1).

POPULATION SIZE

Historically, sea otters occurred across the North Pacific Rim, ranging from Hokkaido, Japan through the Kuril Islands, the Kamchatka Peninsula, the Commander Islands, the Aleutian Islands, peninsular and south coastal Alaska and south to Baja California, Mexico (Kenyon 1969). In the early 1700s, the worldwide population was estimated to be between 150,000 (Kenyon 1969) and 300,000 individuals (Johnson 1982). Prior to large-scale commercial exploitation, indigenous people of the North Pacific hunted sea otters. Although it appears that harvests periodically led to local reductions of sea otters (Simenstad et al. 1978), the species remained abundant throughout its range until the mid-1700s. Following the arrival in Alaska of Russian explorers in 1741, extensive commercial harvest of sea otters over the next 150 years resulted in the near extirpation of the species. When sea otters were afforded protection by the International Fur Seal Treaty in 1911, probably fewer than 2,000 animals remained in thirteen remnant colonies (Kenyon 1969). Population regrowth began following legal protection, and sea otters have since recolonized much of their historic range in Alaska.

In 2003, an aerial survey of Prince William Sound resulted in an abundance estimate of 11,989 (CV = 0.18) animals (Bodkin et al. 2003a). This survey used methods described in Bodkin and Udevitz (1999) and included a survey-specific correction factor to account for undetected animals.

A survey of lower Cook Inlet and the Kenai Fiords area conducted in June and August 2002 also followed the methods of Bodkin and Udevitz (1999) and produced an abundance estimate of 2,673 (CV = 0.271) (Bodkin et al. 2003b).

Finally, an aerial survey of the northern Gulf of Alaska coastline flown in 2000 provided a minimum uncorrected count of 198 sea otters between Cape Hinchinbrook and Cape Yakataga (USGS Unpublished data). Applying a correction factor of 2.16 (CV = 0.378) for this observer conducting sea otter aerial surveys produces an adjusted estimate of 428 (CV = 0.378).

The most recent population estimates for survey areas within the southcentral Alaska stock are presented in Table 1. Combining the adjusted estimates for these three areas results in a total estimate of 15,090 sea otters for the southcentral Alaska stock.

Table 1. Population estimates for the southcentral Alaska stock of northern sea otters. Previous stock assessment report (SAR) total is from August 2002.

Survey Area	Year	Unadjusted Estimate	Adjusted Estimate	CV	N_{MIN}	Reference
North Gulf of Alaska	2000	198	428	0.378	314	USGS unpublished data
Cook Inlet/Kenai Fiords	2002		2,673	0.271	2,136	Bodkin *et al*. (2003b)
Prince William Sound	2003		11,989	0.179	10,324	Bodkin *et al*. (2003a)
Current Total			**15,090**		**12,774**	
Previous SAR Total			16,552		13,955	

Minimum Population Estimate

The minimum population estimate (N_{MIN}) for this stock is calculated using Equation 1 from the PBR Guidelines (Wade and Angliss 1997): $N_{MIN} = N/\exp(0.842 \times [\ln(1+[CV(N)]^2)]^{½})$. The N_{MIN} for each survey area is presented in Table 1. The estimated N_{MIN} for the southcentral Alaska stock is 12,774 sea otters.

Current Population Trend

Prior to the most recent survey results, the trend for this stock of sea otters had generally been one of growth (Irons et al. 1988, Bodkin and Udevitz 1999).

Sea otter abundance in Prince William Sound has not increased appreciably since 1994 (Bodkin et al. 2002). Although the current population estimate for the entire stock is slightly lower (approximately 8%) than the 2002 stock assessment, there is anecdotal evidence that this change may be due to emigration of sea otters from Orca Inlet in eastern Prince William Sound into areas that have not been surveyed recently, most likely Copper River Flats and Kayak Island. Our best assessment is that the overall trend for this stock appears to be stable at this time.

MAXIMUM NET PRODUCTIVITY RATE

Estes (1990) estimated a population growth rate of 17 to 20% per year for four northern sea otter populations expanding into unoccupied habitat. Although maximum productivity rates have not been measured through much of the sea otter's range in Alaska, in the absence of more detailed information, the rate of 20% calculated by Estes (1990) is considered the best available estimate of R_{MAX}. There is insufficient information available to estimate the current net productivity rate for this population stock.

POTENTIAL BIOLOGICAL REMOVAL

Under the 1994 reauthorized Marine Mammal Protection Act of 1972 (MMPA), the potential biological removal (PBR) is defined as the product of the minimum population estimate, one-half the maximum theoretical net productivity rate, and a recovery factor: $PBR = N_{MIN} \times 0.5\ R_{MAX} \times F_R$. The recovery factor ($F_R$) for this stock is 1.0 (Wade and Angliss 1997) as population levels have remained stable with a known human take. Thus, for the southcentral stock of sea otters, PBR = 1,277 animals (12,774 x 0.5 (0.2) x 1.0)

ANNUAL HUMAN CAUSED MORTALITY

Fisheries Information

A complete list of fisheries and marine mammal interactions is published annually by NOAA-Fisheries, the most recent of which was published on November 27, 2007 (72 FR 66048). Although numerous fisheries exist within the range of the southcentral Alaska stock of northern sea otters, none have been identified as interacting with this stock.

The estimated level of incidental mortality and serious injury of this stock can be estimated from fishery observer programs that monitor a portion of commercial fisheries in Alaska and report injury and mortality of marine mammals incidental to those operations. No incidents of sea otter incidental take have been observed in trawl, longline, or pot

groundfish fisheries in southcentral Alaska from 1989-2006 (Perez 2003; Perez 2006; Perez 2007). In addition to these fisheries, observers monitored the Cook Inlet set gillnet and drift gillnet fisheries from 1999-2000 (Fadely and Merklein 2001). The observer coverage during both years was approximately 2-5%. No mortalities or injuries of sea otters were reported by fisheries observers for the Cook Inlet set gillnet and drift gillnet fisheries for this period. On several occasions, sea otters were observed within 10 meters of the gillnet gear, but did not become entangled. No other fisheries operating in the region of the southcentral Alaska stock were monitored by observer programs from 1992 through 2006. From 1990 to 1991, fisheries observers in the southcentral Alaska region reported no mortalities or injuries of sea otters. Prior to the implementation of the NOAA-Fisheries observer program, studies were conducted on sea otter interactions with the drift net fisheries in western Prince William Sound from 1988 to1990 and no mortalities were observed (Wynne 1990, Wynne et al. 1991).

An additional source of information on the number of sea otters killed or injured incidental to commercial fishery operations in Alaska are fisher self-reports required of vessel owners by NOAA-Fisheries. In 1990, fisher self-report records show one mortality and four injuries due to gear interaction and three injuries due to deterrence in the Prince William Sound drift gillnet fishery. Self-reports were not available for 1994 and 1995. Between 2000 and 2004, there were no records of incidental take of sea otters by commercial fisheries in this region; thus, the estimated mean annual mortality reported for the 5-year period from 2000-2004 is zero. Credle et al. (1994) considered fisher self-reports to be a minimum estimate of incidental take as these data are most likely negatively biased.

The total fishery mortality and serious injury for the southcentral Alaska stock of the northern sea otter has achieved a zero mortality and serious injury rate.

Oil and Gas Development

Exploration, development and transport of oil and gas resources can adversely impact sea otters and nearshore coastal ecosystems in Alaska. Sea otters rely on air trapped in their fur for warmth and buoyancy. Contamination with oil drastically reduces the insulative value of the pelage, and consequently, sea otters are among the marine mammals most likely to be detrimentally affected by contact with oil. It is believed that sea otters can survive low levels of oil contamination (< 10% of body surface), but that greater levels (>25%) will lead to death (Costa and Kooyman 1981, Siniff et al. 1982). Vulnerability of sea otters to oiling was demonstrated by the 1989 Exxon Valdez oil spill in Prince William Sound. Total estimates of mortality for the Prince William Sound area vary from 750 (range 600 - 1,000) (Garshelis 1997) to 2,650 (range 500 - 5,000) otters (Garrot et al. 1993). Statewide, it is estimated that 3,905 sea otters (range 1,904 - 11,257) died in Alaska as a result of the spill (DeGange et al.1994). At present, abundance of sea otters in some oiled areas of Prince William Sound remains below pre-spill estimates, and evidence from ongoing studies suggests that sea otters and the nearshore ecosystem have not yet fully recovered from the 1989 oil spill (Bodkin et al. 2002, Stephensen et al. 2001).

Within the proximity of the southcentral Alaska sea otter stock, oil and gas development and production occurs only in Cook Inlet. In addition to existing offshore platforms, there was a Federal lease sale in Cook Inlet in 2004 but no tracts were purchased. Tankering of North Slope crude oil occurs regularly through the waters of Prince William Sound with no major oil spills since the Exxon Valdez. While the catastrophic release of oil has the potential to take large numbers of sea otters, there is no evidence that routine oil and gas development and transport has had a direct impact on the Southcentral Alaska sea otter stock.

Subsistence/Native Harvest Information

The MMPA exempted Native Alaskans from the prohibition on hunting marine mammals, provided such taking was not wasteful. Alaska Natives are legally permitted to take sea otters for subsistence use or for creating and selling authentic handicrafts or clothing. Data for subsistence harvest of sea otters in southcentral Alaska are collected by a mandatory Marking, Tagging and Reporting Program administered by the U.S. Fish and Wildlife Service (Service) since 1988. Figure 2 provides a summary of harvest information for the southcentral stock from 1989-2006. The mean reported annual subsistence take during the past five complete calendar years (2002-2006) was 346 animals. Reported age composition during this period was 92% adults, 7% subadults, and 1% pups. Sex composition during the past five years was 72% males, 23% females, and 5% of unknown sex. The majority of the harvest over the past 5 years has occurred in northern and eastern Prince William Sound.

Research and Public Display

During the past five years there have been no live captures of sea otters for public display from the southcentral Alaska stock. Between 2002-2006, 127 sea otters were captured and released for scientific research in Prince William

Sound. There were no reported injuries and/or mortalities related to these activities.

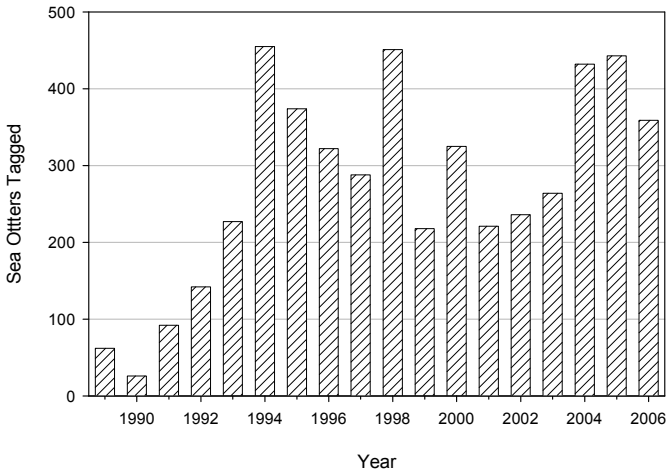

Figure 2. Reported subsistence harvest of northern sea otters from the southcentral Alaska stock, 1989-2006.

Other Factors

In August 2006, the Working Group on Marine Mammal Unusual Mortality Events (WGMMUME) reviewed information provided by the Service, and declared that a dramatic increase in sea otter strandings since 2002 constitutes an Unusual Mortality Event (UME) in accordance with Section 404 of the MMPA. The disease that typifies this UME is caused by a Streptococcus infantarius infection and has been observed over a broad geographic range in Alaska, with the majority of cases having come from Kachemak Bay in the southcentral Alaska stock. Although not considered to be human-caused mortality at the present time, the impacts of this UME on the southcentral Alaska population have yet to be determined. The Service and the WGMMUME have formed an investigative team to conduct additional studies into the causes and effects of the UME.

STATUS OF STOCK

The level of direct human-caused mortality within the southcentral Alaska stock does not exceed the PBR level, and the stock is neither listed as "depleted" under the MMPA or listed as "threatened" or "endangered" under the U.S. Endangered Species Act of 1973, as amended, nor is it likely to be listed as such in the foreseeable future. In addition, the level of human-caused mortality and serious injury is not likely to cause the stock to be reduced below its optimum sustainable population level. Therefore, the southcentral Alaska stock of the northern sea otter is classified as non-strategic.

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