NORTHERN SEA OTTER (*Enhydra lutris kenyoni*): Southeast 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 longer distance movements of over 100 km (Garshelis et al. 1984); however, movements of sea otters are likely limited by geographic barriers, high energy requirements of the animals, and social behavior.

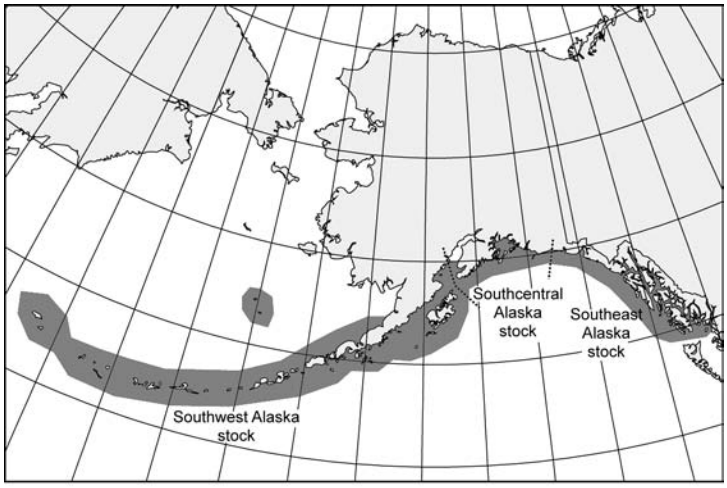

Figure 1. Approximate distribution of northern sea otters in Alaska waters (shaded area)

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, and 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 13 remnant colonies (Kenyon 1969).

Although population regrowth began following legal protection, no remnant colonies of sea otters existed in southeast Alaska. As part of efforts to re-establish sea otters in portions of their historical range, otters from Amchitka Island and Prince William Sound were translocated to other areas (Jameson et al. 1982). These translocation efforts met with varying degrees of success. From 1965 to 1969, 412 otters (89 percent from Amchitka Island in southwest Alaska, and 11 percent from Prince William Sound in southcentral Alaska) were translocated to 6 sites in southeast Alaska (Jameson et al. 1982). In the first 20 years following translocation, these populations grew in numbers and expanded their range (Pitcher 1989).

Nearly all of the current population estimates for the southeast Alaska stock were developed using the aerial survey methods of Bodkin and Udevitz (1999). The lone exception was a survey of the outer coastline from the western boundary of the stock at Cape Yakataga to Cape Spencer conducted by U.S. Geological Survey (USGS) in 2000 (N=32, CV=0.378). In 2002, USGS also surveyed Glacier Bay (N=1,266, CV=0.15) and the northern half of the southeast Alaska (N=1,838, CV=0.17; Bodkin and Esslinger 2006). The southern half was surveyed by USGS in 2003 (N=5,845; CV=0.14). In 2005, the U.S. Fish and Wildlife Service (Service) surveyed Yakutat Bay using the same

Table 1. Population estimates for the southeast 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	15	32	0.378	24	USGS unpublished data
Glacier Bay	2002		1,266	0.15	1,117	Bodkin and Esslinger (2006)
Northern Southeast Alaska	2002		1,838	0.17	1,594	Bodkin and Esslinger (2006)
Southern Southeast Alaska	2003		5,845	0.14	5,198	Bodkin and Esslinger (2006)
Yakutat Bay	2005		1,582	0.334	1,203	Gill and Burn (2007)
Current Total			**10,563**		**9,136**	
Previous SAR Total			12,632		9,266	

methods (N=1,582; CV=0.33; Gill and Burn 2007). The most recent population estimates for the southeast Alaska stock are presented in Table 1.

Glacier Bay was also surveyed as recently as 2006, with a resulting estimate of 2,785 sea otters (Bodkin and Esslinger 2006). The increase in sea otter abundance in Glacier Bay cannot be explained by reproduction alone, indicating that there has been substantial redistribution of sea otters in the past several years (Bodkin and Esslinger 2006). Therefore, to avoid double-counting of animals in both the Glacier Bay and northern southeast Alaska survey areas, we used the 2002 estimate for Glacier Bay, combined with adjusted estimates for the remainder of the stock, which results in a total estimate of 10,563 sea otters for the southeast Alaska stock.

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): $N_{MIN} = N/\exp(0.842 * [\ln(1+[CV(N)]^2)]^{½})$. The N_{MIN} for each survey area is presented in Table 1. The estimated N_{MIN} for the southeast Alaska stock is 9,136 sea otters.

Current Population Trend

Prior to the most recent aerial surveys, the trend for this stock of sea otters had been one of growth (Pitcher 1989, Agler et al. 1995). Comparing the current population estimate with that of the previous stock assessment report suggests that the southeast Alaska stock may not have continued to increase in abundance (USGS unpublished data). The comparison of abundance estimates is complicated by substantial differences in methods between the 1994 skiff survey of Agler et al. (1995) and the USGS aerial surveys; however, GIS analysis of the most recent surveys compared with original data from Pitcher (1989) indicates that range expansion from the outer coast to inner, protected waters has not occurred. The distribution of sea otters has changed; however, with substantial immigration into Glacier Bay in the past decade. In addition, residents of southeast Alaska also report changes in sea otter distribution, and consider the population to be healthy in their local areas.

Sea otter abundance in Yakutat Bay has also increased over the last decade, likely through reproduction, although some amount of immigration cannot be ruled out (Gill and Burn 2007). During this process, otters appear to have expanded their range to include the western shores of Yakutat Bay.

Although the estimated population size of this stock is lower than in the previous stock assessment report, due to improved precision in some of the estimates, the value for N_{MIN} is comparable. Therefore, the current population trend for the southeast Alaska stock is believed to be stable.

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 Marine Mammal Protection Act (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 Anglis 1997) as population levels have remained stable with a known human take. Thus, for the southeast stock of sea otters, PBR = 914 animals (9,136 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 southeast Alaska stock of northern sea otters, none have been identified as interacting with this stock. Other types of fisheries that have been known to interact with sea otters in the southwest and southcentral Alaska stocks do occur in southeast Alaska, specifically the southeast Alaska salmon drift gillnet (481 vessels) and the Yakutat salmon set gillnet (170 participants) fisheries. However, available information suggests that fisheries using other types of gear, such as trawl, longline, pot, and purse seine, appear to be less likely to have interactions with sea otters due to either the areas where such fisheries operate, or the specific gear used, or both. Thus, this may explain the lack of fishery interaction with the southeast Alaska 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 southeast Alaska from 1989-2006 (Perez 2003; Perez 2006; Perez 2007).

An additional source of information on the number of sea otters killed or injured incidental to commercial fishery operations in Alaska is found in fisher self-reports required of vessel-owners by NOAA-Fisheries. From 1990 to 1993, self-reported fisheries data reflected no sea otter kills or injuries in southeast Alaska. Self-reports were incomplete for 1994 and not available for 1995 or 1996. Between 1997 and 2005, there were no records of incidental take of sea otters by commercial fisheries in this region. Credle et al. (1994) considered fisher self-reports to be a minimum estimate of incidental take as these data are most likely negatively biased.

Information is insufficient to determine if the total fishery mortality and serious injury for the southeast Alaska stock of the northern sea otter is insignificant and is approaching a zero mortality and serious injury rate (i.e., 10% of PBR) because observer coverage is not adequate.

Oil Spills

Activities associated with 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) (Garrot et al. 1993) otters. 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 spill (Bodkin et al. 2002, Stephensen et al. 2001).

There is currently no oil and gas development in southeast Alaska. Tankers carrying oil south from the Trans-Alaska Pipeline typically travel offshore and, therefore, pose a minimal risk to sea otters in southeast Alaska. Information on oil spills compiled by the Alaska Department of Environmental Conservation from 2002-2006 indicate

that there were no reported spills of crude oil in southeast Alaska. In addition to spills that may occur in association with the development, production, and transport of crude oil, each year numerous spills of non-crude oil products in the marine environment occur from ships and shore facilities throughout southeast Alaska. During that same time period, there was an average of 167 spills occur each year, ranging in size from less than 1 and up to 6,000 gallons. The vast majority of these spills are small, with a median size of 2 gallons, and there is no indication that these small-scale spills have an impact on the southeast Alaska stock of northern sea otters

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 southeast Alaska are collected by a mandatory Marking, Tagging and Reporting Program administered by the Service since 1988. Figure 2 provides a summary of harvest information for the southeast stock from 1989-2006. The mean reported annual subsistence take during the past five complete calendar years (2002-2006) was 322 animals. Reported age composition during this period was 84% adults, 12% subadults, and 4% pups. Sex composition during the past five years was 70% males, 28% females, and 2% of unknown sex.

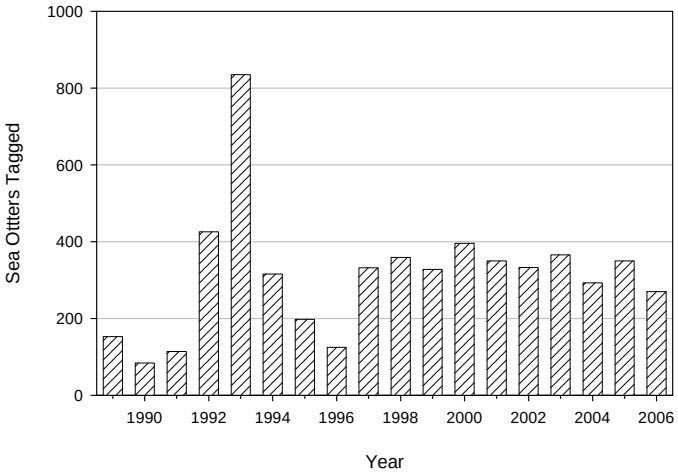

Figure 2. Reported subsistence harvest of northern sea otters from the southeast Alaska stock, 1989-2006.

Research and Public Display

In the past five years, no sea otters were removed from the southeast Alaska stock for public display, nor were any sea otters captured and released for scientific research.

Other Factors

In August 2006, the Working Group on Marine Mammal Unusual Mortality Events 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, including a few cases from southeast Alaska; however, the majority of cases have come from Kachemak Bay in the southcentral Alaska stock. It is not clear if the observed stranding pattern is representative of overall sea otter mortality, or an artifact of having a well-developed stranding network in the Kachemak Bay area. The Service will continue to work with the NOAA-Fisheries and Alaska SeaLife Center to develop the infrastructure for a statewide marine mammal stranding network in Alaska.

STATUS OF STOCK

The level of direct human-caused mortality within the southeast Alaska stock does not exceed the PBR level, and the southeast Alaska stock is neither listed as "depleted" under the MMPA or listed as "threatened" or "endangered" under the Endangered Species Act, nor is it likely to be listed as such in the foreseeable future. The known level of direct human-cause mortality is 322 otters per year. It would require an annual rate of fishery mortality and serious injury of nearly 600 otters per year for the total amount of direct human-caused mortality to exceed PBR for this stock. Despite uncertainties regarding fishery mortality and serious injury, we believe that it is unlikely this level is occurring at present. Therefore, the southeast Alaska stock of the northern sea otter is classified as non-strategic.

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