

The Occurrence of California Sea Lions (*Zalophus californianus*) in Alaska

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Abstract

A total of 52 (25 male, 5 female, and 22 undetermined) California sea lions (*Zalophus californianus*) have been reported in Alaska during the past three decades, with an increasing presence in recent years. They have been observed during all seasons of the year, although most often during the spring. The presence of California sea lions in Alaska was correlated with increasing populations within their southern breeding range. There was no correlation between the number of sightings in Alaska and El Niño years. This compilation includes the northernmost (60° 46' N, $n = 1$) and westernmost (170° 07' W, $n = 2$) sightings for this species.

Key Words: Alaska, California sea lion, *Zalophus californianus*, vagrants, range extension

Introduction

The California sea lion (*Zalophus californianus californianus*) currently breeds from the southern Baja Peninsula north to Año Nuevo Island, California, and has a nonbreeding range extending northward into British Columbia and beyond. Other subspecific populations also occur in the Galapagos Islands (*Zalophus californianus wollebaeki*) and the Sea of Japan (*Zalophus californianus japonicus*), although the latter is believed to be extinct (Mate, 1982).

The abundance of California sea lions in North America prior to the 1900s is unknown (Stewart et al., 1993); however, archaeological evidence suggests that rookeries existed as far north as central Oregon during the past 3,000 years (Lyman, 1988), and they probably traveled well to the north of their breeding range as indicated by a skull of this species found on the Pacific coast of

Canada in the late 1800s (Guiguet, 1971). By the late 1920s, only a few thousand animals existed because extensive hunting during the 1800s and early 1900s greatly reduced the breeding population (Cass, 1985). Before the late 1950s, there were no confirmed sightings of this animal in Canada (Bigg, 1988; Guiguet, 1971). They now occur routinely in southern British Columbia (Bigg, 1988; Keple et al., 2001) and appear to be extending their feeding range farther north.

Guiguet (1971) stated that there have been documented reports of California sea lions as far north as southeast Alaska prior to 1960, but offers no details. Yet, the presence of California sea lions in Alaskan waters is not generally acknowledged nor documented in most marine mammal texts and field guides, excepting Calkins (1986) and Wynne (1997). There also is a widely held opinion that female California sea lions remain relatively close to their rookeries year-round and only males move farther north to feed and haul out during the non-breeding season (Baraff, 1999; Bigg, 1988; Melin et al., 1997). Here, we summarize sightings of both male and female California sea lions in Alaska and briefly discuss factors such as observer effort, changes in the marine environment, and sea lion population trends which may have influenced the number of sightings or led to an increased movement of these animals into Alaskan waters.

Materials and Methods

We reviewed scores of Alaska Department of Fish and Game (ADF&G) field notebooks dating back to 1963; consulted with field biologists, tour vessel operators, naturalists, and native Alaskan hunting groups; and checked databases such as Platforms of Opportunity Program (National Marine Mammal Laboratory, Seattle, Washington) and marine mammal strandings to compile a list

of *Zalophus* sightings in Alaska. Our own observations throughout the state also are included in this compilation. Sightings were considered to be unique if there were obvious differences in size or gender or if > 3 days elapsed between sightings. As a relative gauge of observer effort, we summed the number of days of observations written in ADF&G notebooks and days of our own field observations for each year up to 2001 for every location studied.

Results

The first documented sighting of a California sea lion in Alaska was in 1973 when an adult male was photographed on a Steller sea lion (*Eumetopias jubatus*) haulout at Point Elrington in the northern Gulf of Alaska (Figure 1). Since then, 51 additional animals have been recorded in Alaska, usually alone, but sometimes in groups of two or three (Table 1). They have been observed from Forrester Island in southeast Alaska (54° 50' N, 133° 32' W) to as far north as St. Matthews Bay, Prince William Sound (60° 46' N, 146° 18' W, $n = 1$) and as far west as St. Paul Island (57° 15' N, 170° 07' W, $n = 2$), taken by native Alaskan subsistence hunters in different years; Table 1). Sex was determined in 30 of the 52 sightings; and of those, 25 were males and 5 were females, including one of the western-most sightings.

The number of sightings has increased in recent years with about half of them occurring since 2000 and with a maximum of 14 seen during 2003 (Table 1). Although our sample size was relatively small, the increase was correlated positively with population index counts of California sea lions within their breeding range (*Spearman rho* = 0.60, $p = 0.001$; Figure 2); however, the number of California sea lions seen in Alaska was not dependent on the warmer ocean temperatures associated with El Niño years within the past three decades ($\chi^2 = 2.80$, $p > 0.10$).

The number of California sea lions seen in Alaska also may be linked to observer effort which has increased dramatically since the mid-1990s (Figure 2); however, observer effort by experienced biologists was high in the late 1970s when there were no reports of this species. Furthermore, there have been no sightings along the Alaska Peninsula/Kodiak Island region (Figure 1) where 31% of observer effort was concentrated between 1970 and 2001. Over the same time period, the Aleutian Island/Bering Sea, southcentral, and southeast regions accounted for 3%, 41%, and 25% of our efforts, respectively.

Most California sea lions (24) were sighted in Alaska during the spring months (March, April, and May). There was only one confirmed sighting

during December, zero in January, and only three in February, all at Cape St. Elias. The December sighting was of a male found dead near the head of Resurrection Bay. A necropsy was performed, but the cause of death was not determined (Alaska SeaLife Center, unpublished data). The number of confirmed sightings in Alaska during summer and fall were 18 and 6, respectively.

Discussion

California sea lions can and do travel quite far from their natal rookeries. The primary California sea lion breeding rookeries in the United States occur on the Channel Islands of southern California (NMFS, 1997), and travel distances from there to Alaskan waters are a minimum of 2,500 km to Forrester Island and a maximum of 4,600 km to St. Paul Island. Furthermore, the distribution of California sea lion sightings within Alaska and the lack of them along the Alaskan Peninsula/Kodiak Island region (Figure 1) suggest that they may travel either along a coastal route or across a pelagic route. The few sightings in western Alaska which may have arrived via an oceanic route can be considered vagrants; however, the greater numbers seen in southeast Alaska during recent years may indicate a foraging range extension for this species.

California sea lions in Alaska most often were seen alone and only occasionally in small groups of two or more (Table 1), although hundreds have been found to haul out together along the Washington coast and in southern British Columbia in recent decades (Bigg, 1988; Gearin et al., 2001). The relatively few California sea lions found in Alaska usually have been associated with Steller sea lions at their haulouts and rookeries, and the increased research (observer) efforts on Steller sea lions since they were listed as endangered over part of their range in 1997 has likely helped contribute to the greater number of sightings of California sea lions in Alaska in recent years. This does not explain the lack of California sea lions reported during extensive efforts of the Outer Continental Shelf Research Program (Minerals Management Service, 1982) in the late 1970s, however (Figure 2).

More likely, density-dependent factors can be forcing the extension of their foraging range northward. The population of California sea lions has increased greatly since the passage of the Marine Mammal Protection Act in 1972 at an annual rate of at least 5.4% to an estimated total of about 240,000 animals in 2001 (Carretta et al., 2003). This increase was correlated positively with the number of California sea lions observed in Alaska. A more rapid, tenfold increase was

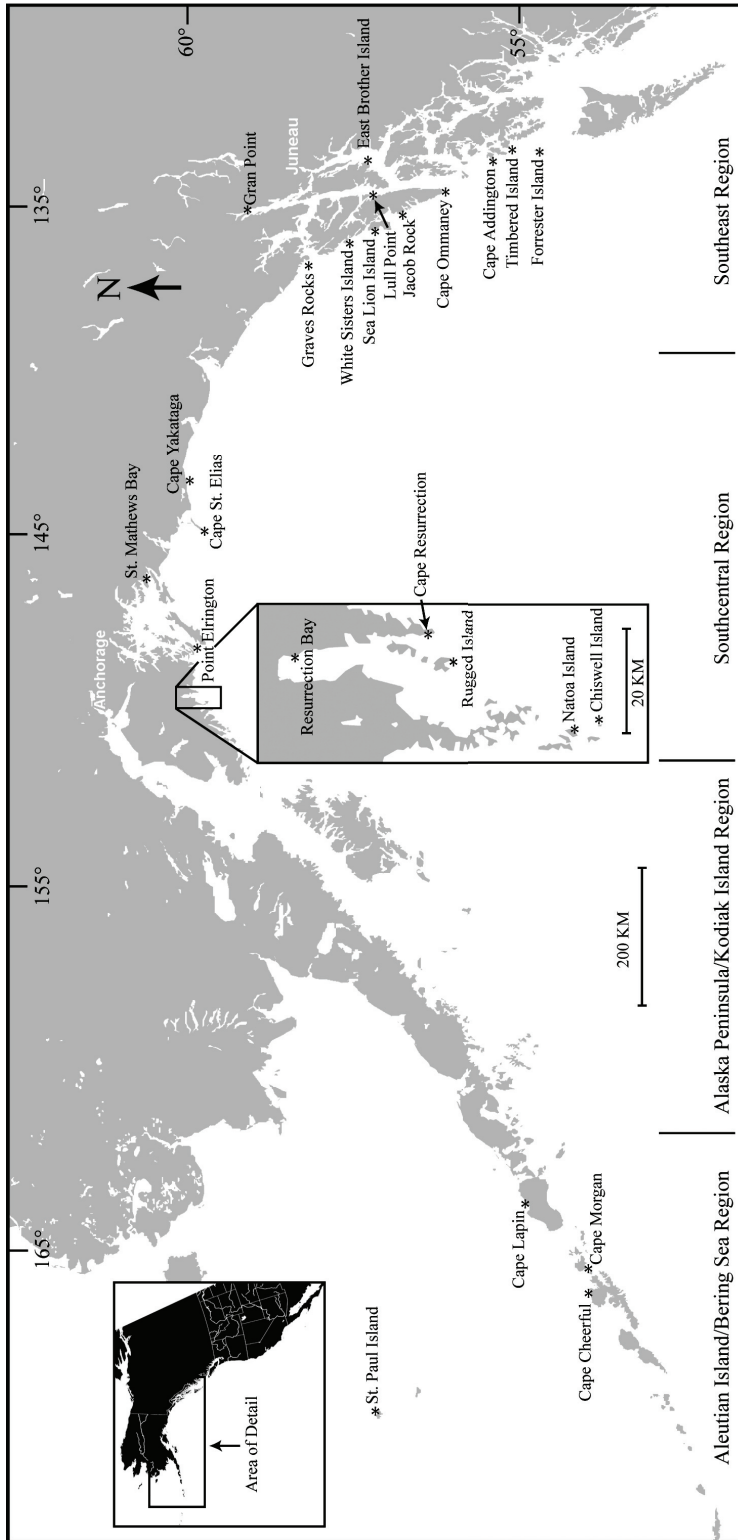


Figure 1. Locations of California sea lion sightings in Alaska 1963-2003; refer to Table 1 for details.

Table 1. Details of California sea lion sightings in Alaska by date

Date(s) (month/day/year)	Location	Latitude/Longitude	Group size	Sex	Observer or source of data
27/6/73	Point Elrington	59° 56'N/148° 15'W	1	Male	K.W.P.
30/4/82	Lull Point	57° 18'N/134° 48'W	1	Undetermined	ADF&G ¹
5/8/84	Cape Cheerful	54° 01'N/166° 38'W	1	Undetermined	POP ²
15/8/84	East Brother Island	57° 18'N/133° 50'W	1	Undetermined	POP ²
29/8/90	Cape Yakataga	60° 03'N/142° 42'W	1	Female – tagged rehab.	K.W.
22/9 – 24/9/92	Forrester Island	54° 50'N/133° 32'W	1	Male – subadult	ADF&G ¹
5/94	St. Paul Island	57° 15'N/170° 07'W	1	Female – native harvest	M.B.H.
28/11/94	Forrester Island	54° 50'N/133° 32'W	1	Undetermined	ADF&G ¹
11/2/95	Cape St. Elias	59° 47'N/144° 36'W	1	Male	ADF&G ¹
25/2/95	Cape St. Elias	59° 47'N/144° 36'W	2	Males	ADF&G ¹
2/3/95	Cape St. Elias	59° 47'N/144° 36'W	2	Undetermined	ADF&G ¹
13/3/95	Cape St. Elias	59° 47'N/144° 36'W	2	Undetermined	ADF&G ¹
17/7 & 19/7/95	Forrester Island	54° 50'N/133° 32'W	1	Male	ADF&G ¹
15/3/96	Timbered Island	55° 42'N/133° 48'W	1	Undetermined	ADF&G ¹
21/3/96	Timbered Island	55° 42'N/133° 48'W	1	Undetermined	ADF&G ¹
31/3/96	Timbered Island	55° 42'N/133° 48'W	1	Undetermined	ADF&G ¹
3/7/96	Timbered Island	55° 42'N/133° 48'W	1	Female	ADF&G ¹
21/7/96	St. Mathews Bay	60° 46'N/146° 18'W	1	Undetermined	USFWS ³
15/10/96	Cape Lapin	54° 58'N/164° 06'W	1	Undetermined	POP ²
29/4/98	Timbered Island	55° 42'N/133° 48'W	1	Male – branded 7-year-old	ADF&G ¹
7/5/99	Chiswell Island	59° 36'N/149° 34'W	1	Male	ASLC ⁵
16/11/99	St. Paul Island	57° 15'N/170° 07'W	1	Undetermined – harvest	ATTAP ⁴
27/5/00	Natoa Island	59° 38'N/149° 36'W	1	Undetermined	KFT ⁶
5/6/00	Cape Resurrection	59° 53'N/149° 18'W	1	Undetermined	KFT ⁶
7/00	Jacob Rock	56° 47'N/135° 30'W	2	Undetermined	AMT ⁷
31/10/00	Chiswell Island	59° 36'N/149° 34'W	1	Female	J.M.M.
27/3 & 28/3/01	Rugged Island	59° 50'N/149° 23'W	1	Male – subadult	J.M.M.
30/4 & 2/5/01	Chiswell Island	59° 36'N/149° 34'W	1	Male	J.M.M.
16/6/01	Sea Lion Island	57° 17'N/135° 53'W	1	Male – subadult	K.W.P.
2/8/01	Chiswell Island	59° 36'N/149° 34'W	1	Female	J.M.M.
17/9/01	Cape Morgan	54° 03'N/166° 00'W	1	Male – subadult	K.W.P.
18/6/02	Cape Ommaney	56° 10'N/134° 40'W	1	Male – subadult	ADF&G ¹
3/7/02	Graves Rocks	58° 14'N/136° 45'W	1	Male – subadult	K.W.P.
1/12/02	Resurrection Bay	60° 05'N/149° 21'W	1	Male – subadult, dead	ASLC ⁵
30/4/03	Gran Point	59° 08'N/135° 14'W	1	Undetermined	ASLC ⁵
6/5/03	Cape Resurrection	59° 53'N/149° 18'W	1	Male	KFT ⁶
13/5 – 21/5/03	Chiswell Island	59° 36'N/149° 34'W	1	Male	J.M.M.
16/5/03	Cape Addington	55° 26'N/133° 49'W	2	Males	ADF&G ¹
19/5/03	White Sisters Is	57° 38'N/136° 15'W	1	Undetermined	K.W.P.
19/5 – 20/5/03	Graves Rocks	58° 14'N/136° 45'W	4	Males	ADF&G ¹
30/6/03	White Sisters Is	57° 38'N/136° 15'W	1	Undetermined	ADF&G ¹
1/7 – 2/7/03	Graves Rocks	58° 14'N/136° 45'W	1	Male	ADF&G ¹
28/8 – 29/8/03	Whites Sisters Is	57° 38'N/136° 15'W	1	Undetermined	ADF&G ¹
29/8 – 30/8/03	Graves Rocks	58° 14'N/136° 45'W	1	Male	ADF&G ¹

¹Alaska Department of Fish & Game²Platforms of Opportunity Program, National Marine Mammal Laboratory³U.S. Fish and Wildlife Service, Office of Migratory Bird Management, Anchorage, Alaska⁴Tanalix Amgignax Program, Aleut Community of St. Paul, Tribal Government⁵Alaska Sealife Center, Seward, Alaska⁶Kenai Fjords Tours, Seward, Alaska⁷Allen Marine Tours, Sitka, Alaska

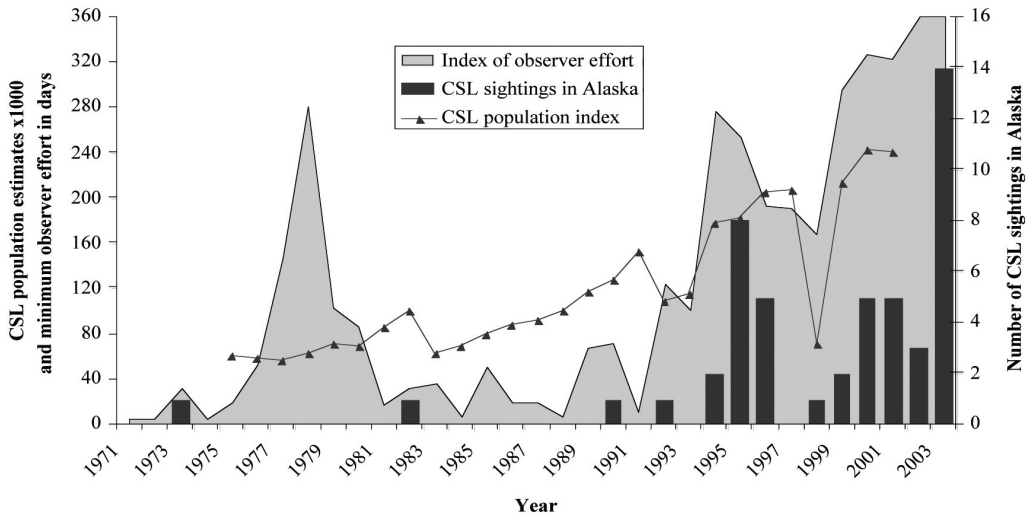


Figure 2. Number of California sea lions (CSL) seen in Alaska compared to CSL population estimates based on an index of pup counts (Carretta et al., 2003) and the minimum number of days that experienced observers were conducting field research

observed in British Columbia between 1972 and 1984 (Bigg, 1988) and in Washington between 1979 and 1995 (NMFS, 1997).

Another explanation for the apparent increase of California sea lions in Alaskan waters could be warming ocean temperatures. Overall, world ocean temperatures have increased during the past 30 years, with the Pacific Ocean reaching a maximum heat content in 1997 (Levitus et al., 2000). In addition, the eastern North Pacific was in the warm phase of the Pacific Decadal Oscillation between 1977 and 1998, resulting in major physical and biological alterations in the marine environment (Francis et al., 1998). North Pacific Ocean temperatures increase more dramatically during El Niño years, and it is generally believed that sea lions range more broadly to the north in search of forage during such events (Sydeman & Allen, 1999). Huber (1991) noticed a shift of male and female California sea lions to the north along the coast of California, which she associated with the 1982-1983 El Niño; however, we found that the number of California sea lions that were seen in Alaska during the El Niño years was not different than in other years, although our sample size was relatively small. These data suggest that the apparent increase of California sea lions in Alaskan waters may be a result of long-term changes as opposed to interannual variations in the physical conditions of the North Pacific Ocean.

Concurrent with warming ocean temperatures, there has been an obvious change in fish abundances in the Gulf of Alaska. Over the past 30 years, species such as walleye pollock (*Theragra*

chalcogramma), Pacific cod (*Gadus macrocephalus*), salmon (*Oncorhynchus* spp.), and flatfishes have increased while species such as herring (*Clupea harengus*), capelin (*Mallotus villosus*), and shrimp have decreased (Anderson & Piatt, 1999; Anderson et al., 1997). We do not know if those changes in prey abundance have provided an impetus for California sea lions to range farther north; however, California sea lions opportunistically feed upon similar prey in coastal Washington (NMFS, 1997), so it is noteworthy that their greater presence in Alaska coincided with a change in their prey base.

It is of some interest that we observed female California sea lions in Alaska, although they do not normally travel far from their breeding range and have not previously been reported as far north as Canada (Bigg, 1988). Their presence in more northern waters may have previously gone unnoticed because female California sea lions are more likely to be confused with Steller sea lions than the males. Adult male California sea lions are easily distinguished from Steller sea lions due to their darker color, smaller size, tapered snout, and distinct sagittal crest. Female California sea lions are lighter in color and look more similar to juvenile Steller sea lions, although the female California sea lion's snout is more tapered and its body profile is generally thinner. No attempt was made to estimate the ratio of male to female California sea lions observed in Alaska because of the high proportion of sightings in which sex was not determined. Our data does suggest, however,

that males are much more likely to travel so far to the north.

Male California sea lions typically migrate northward from California and Mexico after the May to July breeding season (Mate, 1975; NMFS, 1997; Peterson & Bartholomew, 1967) and return south during spring (Brown, 1988; NMFS, 1997). Bigg (1988) found midwinter abundances around Vancouver Island to be greater than other seasons; however, we observed the most California sea lions in Alaska during the spring months. The reduced number of sightings during winter in Alaska may be due to lack of observer effort, which typically is very low during midwinter because of minimal daylight and severe weather conditions. The December sighting was of a male found dead near the head of Resurrection Bay, while most of the summer and fall sightings were of subadult males or females, apparently nonbreeding individuals.

In summary, both male and female California sea lions venture into Alaskan waters during all seasons of the year, and their numbers appear to be increasing. Although observer effort has increased, we believe the apparent increase in Alaskan sightings is most likely due to growing populations in their breeding range. Continued monitoring of the presence of California sea lions in Alaska will provide additional evidence of changing marine ecosystems.

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