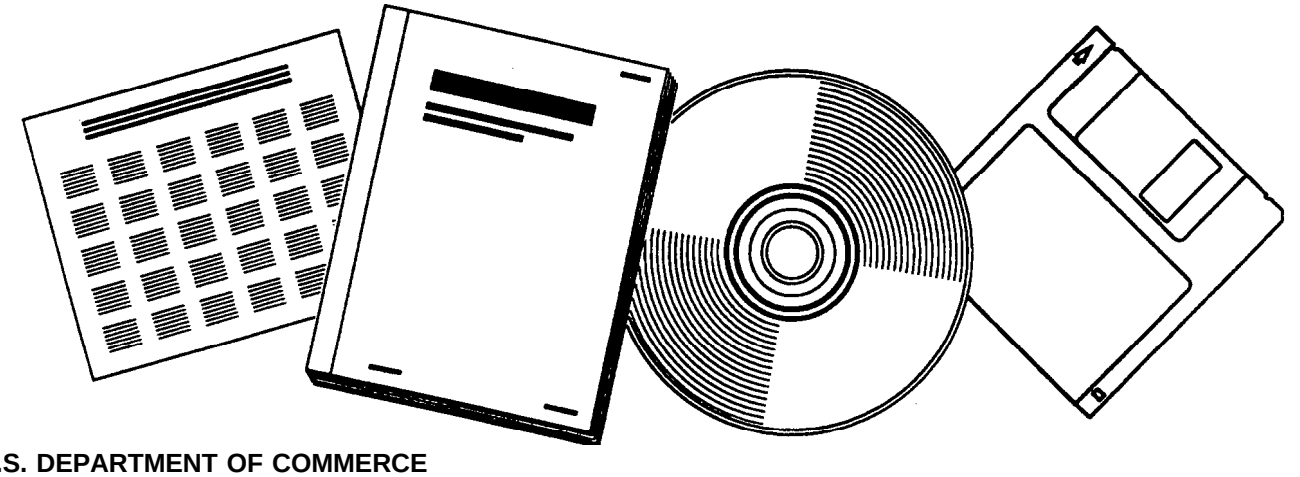
# AERIAL AND SHIP-BASED SURVEYS OF STELLER SEA LIONS ('EUMETOPIAS JUBATUS') IN SOUTHEAST ALASKA, THE GULF OF ALASKA, AND ALEUTIAN ISLANDS DURING JUNE AND JULY 1991

(U.S.) NATIONAL MARINE MAMMAL LAB.,
SEATTLE, WA

JUN 92



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by
Richard L. Merrick', Donald G. Calkinsf
and Dennis C. McAllister[2]

'Alaska Fisheries Science Center
7600 Sand Point Way NE., BIN C-15700
Seattle, WA 981150070

[2]Alaska Department of Fish and Game
333 Raspberry Road
Anchorage, AK 99518-1599

**U.S. DEPARTMENT OF COMMERCE**
Barbara Hackman Franklin, Secretary
**National Oceanic and Atmospheric Administration**
John A. Knauss, Administrator
**National Marine Fisheries Service**
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Richard L. Merrick', Donald G. Calkins',

and Dennis C. McAllister'

'National Marine Mammal Laboratory
Alaska Fisheries Science Center
National Marine Fisheries Service
7600 Sand Point Way NE, Bin Cl5700
Seattle, WA 98115-0070

'Alaska Department of Fish and Game
333 Raspberry Road
Anchorage, AK 99518-1599

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ABSTRACT

Aerial and ship-based surveys of Steller sea lions (Eumetopias jubatus) were conducted during June and July 1991 from Forrester Island in Southeast Alaska to Attu Island in the Aleutian Islands. A total of 36,459 adult and juvenile sea lions were counted at 103 trend sites in this area; this is 4.4% less than in 1990 (38,154) and represents a 68.8% decrease from 1979 (116,804). In the Kenai to Kiska index area, 21,737 sea lions were counted at trend sites, 4.5% less than in 1990 (22,754), and a 75.7% decrease from the 1970s count (89,364). In the past year, trend site numbers increased in Southeast Alaska (from 7,629 to 7,715), the eastern Aleutian Islands (from 3,801 to 4,231), and the western Aleutian Islands (from 2,327 to 2,411). Numbers decreased in the central Aleutian Islands (from 7,988 to 7,499). Decreases also occurred in the eastern (from 5,444 to 4,596), central (from 7,050 to 6,273), and western (from 3,915 to 3,734) Gulf of Alaska. Statistically significant declining trends in Alaskan adult and juvenile numbers have occurred since the late 1970s, except in the eastern Gulf of Alaska and Southeast Alaska, since 1985 in all of the Kenai to Kiska area except the eastern Aleutian Islands, and since 1989 in the central and eastern Gulf of Alaska. Differences between 1990 and 1991 were not statistically significant. From 1990 to 1991, pup numbers declined 13.1% at seven Kenai to Kiska rookeries (from 4,977 to 4,327) but increased 13.2% at four rookeries in Southeast Alaska and the eastern Gulf (from 4,258 to 4,821).

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# INTRODUCTION

Summer surveys of Steller sea lion (Eumetonias jubatus) numbers in Alaska have been conducted since the late 1950s. Numbers of animals in most areas have shown a relatively continuous decline from the 1970s through at least 1989. The severity of these declines resulted in the listing of Steller sea lions as threatened under the Endangered Species Act in November 1990 (55 FR 49204). As a result of this listing, a Steller sea lion Recovery Team was formed with a primary mission of preparing a plan for the recovery of the species.

One recommendation of the draft Steller Sea Lion Recovery Plan was that the population in Alaska be counted on an annual basis. We present results of the 1991 annual survey in this document. Counts were made of adult and juvenile Steller sea lions at rookeries and haul-out sites in Southeast Alaska, Prince William Sound, the coastal Gulf of Alaska, and throughout the Aleutian Islands. Pups were counted at 13 rookeries in this area. These 1991 surveys repeat previous surveys by the National Marine Mammal Laboratory (NMML) of the National Marine Fisheries Service (NMFS) and the Alaska Department of Fish and Game (ADF&G) (Calkins and Pitcher 1982, Loughlin et al. 1986, Merrick et al. 1987, Loughlin et al. 1990, Merrick et al. 1991, ADF&G unpublished data).

Significant changes have been made in the format of this document compared to previous survey reports. First, this report includes counts from all of Alaska, from Forrester Island in Southeast Alaska to Attu Island in the western Aleutian Islands.

Secondly, we have focused discussion on counts from rookeries and haul-out areas (trend sites) selected for population trend analysis. Only counts collected from the mid-1970s to 1991 are presented here. While we believe that earlier counts are correct in indicating that abundance was high during the 1950s and 196Os, those data were collected prior to standardization of the survey protocol in the mid-1970s. Thus we have excluded those earlier counts from discussion in this document. Finally, we have designated trend sites for areas outside of the Kenai Peninsula to Kiska Island area (the Kenai to Kiska Index area). As a result, all discussion of changes in numbers included in this document pertains to trend sites.

## METHODS

Protocols for the 1991 surveys followed the rationale and methods of earlier aerial- and ship-supported on-land surveys (Braham et al. 1980, Calkins and Pitcher 1982, Withrow 1982). Adult and juvenile Steller sea lions were counted and photographed from an aircraft overflying rookeries and haul-out locations from Forrester Island (Southeast Alaska) to Attu Island (western Aleutian Islands) during 11-23 June 1991 (Fig. 1, Table l-2). While flights were designed to visit traditional sea lion rookeries and haul-out areas (Calkins and Pitcher 1982, Loughlin et al. 1984), potential haul-out sites along the flight path were examined in route to the trend sites. Under ideal conditions flights were conducted at approximately 200 m altitude, air speed

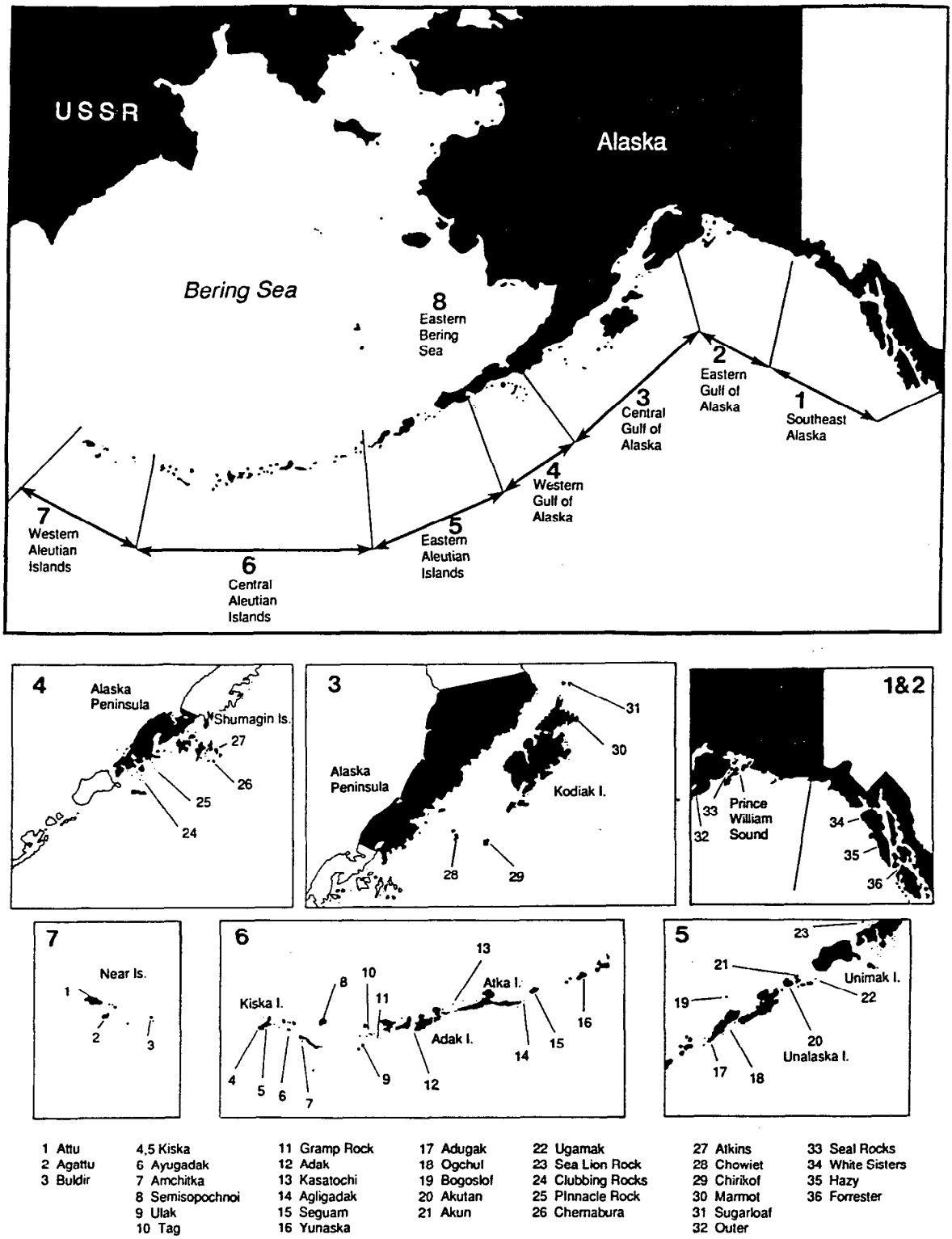


Figure 1.--The eight Alaskan subareas and Steller sea lion rookeries as modified from Merrick et al. (1987).

at l00-120 knots, and approximately 500 m offshore. Strong winds required flights to be at higher altitudes and farther offshore, while fog required flights to be at lower altitude and closer inshore. Initial counts of animals were visually estimated and immediately recorded in field books or on plastic covered charts of the area. Animals were photographed using a 35-mm autofocus camera with a motor drive and 70-210 mm zoom lens. Photographs were usually not taken if there were less than 100 animals on the site. Later in the laboratory, the processed slides were projected onto a white background and the animals counted.

Pup counts were obtained between 25 June and 16 July at 13 rookeries from Forrester Island to Walrus Island (central Bering Sea). Pup counts were made in the area from Forrester Island to Marmot Island by a survey team transported by helicopter to the beaches. Surveys in the area from Chirikof Island to Ugamak Island were supported by a charter vessel (MV Glorita). This vessel delivered the survey team to within 2-4 km of a site, and the survey team then went ashore using a small inflatable boat. Pup counts were made at Bogoslof and Walrus Islands using the Japanese research vessel Shunvo Maru for support. Protocol was similar in all surveys. Pups were counted by first clearing the rookery of all sea lions other than pups. After these adults and juvenile animals retreated to the water, biologists made independent counts of the live pups on the beach and in the water. The final count for a site represents the arithmetic mean of the counts taken.

To determine trends in relative abundance we divided coastal Alaska into eight regions (Fig. 1). All regions except the eighth (Bering Sea) were completely surveyed. The Bering Sea region contains few haul-out areas and one rookery (Walrus Island in the Pribilof Islands). The remaining seven regions included 243 sites surveyed in 1991. Of these sites, 103 have been counted consistently in all recent surveys, and those sites included the majority of animals observed (78.4% in 1991). We defined those sites as "trend sites" (Table 2). Most of the remainder were small haul-out sites. The only significant exceptions were the Outer, Amchitka (Column Rocks and East Cape), Semisopochnoi, Agattu (Gillon Point), and Attu Island rookeries.

Trend analysis was performed for the sum of the rookery and haul-out trend sites in a subarea (Tables 3 and 4) using ordinary linear regression of survey year versus log of the count. The hypothesis of no trend during a period was evaluated by testing the significance of the slope of the regression at $P < 0.10$ (two-tailed). Because there was but one independent variable, this was essentially the same as testing the significance of the correlation between year and log count (Pearson's correlation coefficient; Tables 3 and 4).

Statistical tests were performed to identify whether there was a trend but not whether the trend was of some magnitude. With our present survey protocol, we were unable to test the statistical significance of small interannual trends (e.g., < 5%) over short time frames (e.g., 3 years) with reasonable

statistical power. We expect that a new survey protocol to be implemented in 1992 will provide the power to test the significance of such trends. Until then, it is inappropriate for us to test for the statistical significance of a trend between two years, such as 1990-91.

Annual instantaneous rates of change were calculated for subareas as follows:

$$N_t = N_0 d^t,$$

where

$N_t$ = count in year t (1991);

$N_0$ = count in base year (e.g., 1976);

t = number of years between base year and year t; and

d = rate of change, with the percent annual change calculated as (d-l) x 100.

Rates of change were calculated between 1976-79 and 1985-1991.

## RESULTS

### Adult and Juvenile Surveys

#### Alaska Statewide

A total of 36,459 adult and juvenile sea lions were counted in 1991 at the 103 trend sites in the area from Southeast Alaska through the western Aleutian Islands (Tables 2 and 3). This is a decrease of 4.4% from the 38,154 animals counted in the same area in 1990 and a 68.7% decrease from the 116,804 animals counted in 1976-79 (Fig. 2). Trends from ca. 1976 through 1991 were significant ($r = 0.999$, $P = 0.026$).

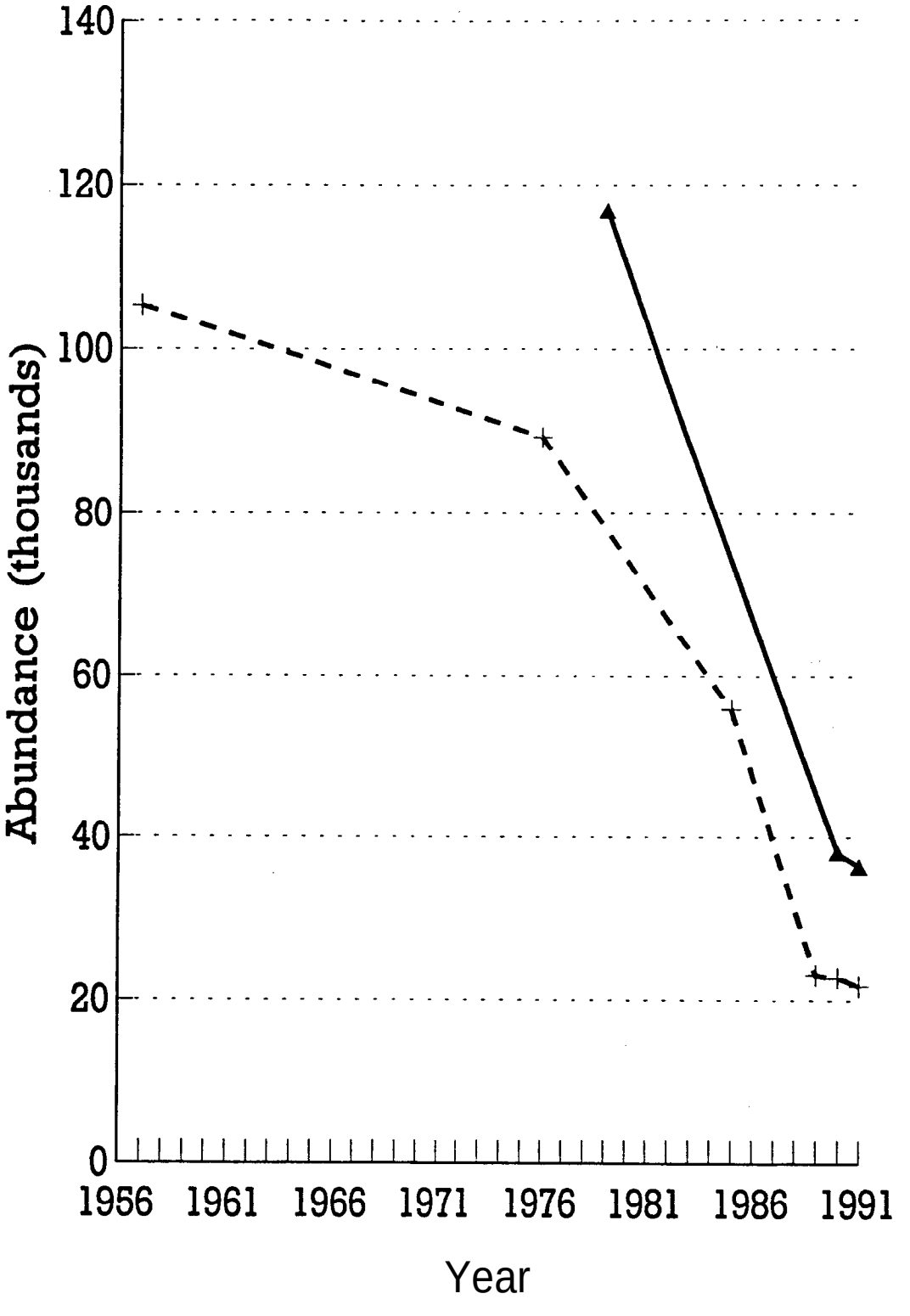


Figure 2.--Overall trend in Steller sea lion abundance for Alaska (solid line) and the Kenai to Kiska index area (dashed line).

The 103 trend sites included 32 rookeries (an additional 6 are not included in the trend sites). Surveys found 90,821 adults and juveniles at these sites in 1976-79, 27,563 in 1990, and 26,099 in 1991 (Table 3). These results indicate a decline of 5.3% has occurred since 1990 and 71.2% since 1976-79.

Kenai to Kiska Index Area

The Kenai to Kiska index area includes the major component of the Steller sea lion population in Alaska. A total of 21,737 animals (59.6% of the total Alaska population) were counted at the 77 trend sites in 1991, a 4.5% decrease from 1990 (22,754, Table 3). This 61.1% decrease (14:5% per year) from the 55,824 animals counted in 1985 was statistically significant ($r = 0.966$, $P = 0.034$). This was also a significant decline of 75.7% ($r = 0.998$, $P = 0.000$) from the 89,364 animals counted at the sites in 1975-79 (-9.0% per year; Fig. 2, Table 3).

We counted 6,273 sea lions (29% of the total) in the central Gulf of Alaska, 3,734 (17%) in the western Gulf of Alaska, 4,231 (19%) in the eastern Aleutian Islands, and 7,499 (35%) in the central Aleutian Islands (Table 4). Statistically significant downward trends (Table 4) have been observed:

1. Between 1989 and 1991 in the central Gulf of Alaska,
2. Between 1985 and 1990 in all subareas other than the eastern Aleutian Islands, and
3. Since 1976-79 in all subareas (Table 4).

It appears that declines are continuing in much of the Gulf of Alaska (see next section's discussion of eastern Gulf of Alaska).

However, numbers in the Aleutian Islands did not show a downward trend during 1989-91.

The extent of the declines in adult numbers is also apparent from the number of nonpups observed on rookeries (mostly breeding males and females). Twenty-five of the 27 rookeries in the Kenai to Kiska area (excluding Outer and Amchitka Islands) were used in trend analysis (Tables 3, 5, and 6). The number of animals counted at the 25 rookeries declined from 71,455 in 1976-79 to 39,634 in 1985 to 17,080 in 1991 (Table 3). Large declines have been observed in all subareas since the 197Os, with the largest declines occurring in the western Aleutian Islands (-83%, Table 5). Rates of decline increased after 1985, reaching -16% per year in the central Gulf of Alaska and -15% in the central Aleutian Islands through 1989. Of the four Kenai to Kiska subareas, only the eastern Aleutian Island's rookeries have not shown a relatively continuous decline since 1985; numbers there may have increased since 1989.

Individual rookeries generally followed the pattern of the subarea to which they belong (Table 6). The only group of rookeries showing a pattern of increase were those in the eastern Aleutian Islands. Three of the seven rookeries there increased by more than 10% (Ugamak Island increased by 118 animals, Akun Island by 38, and Adugak Island by 45). Three rookeries remained relatively unchanged (Sea Lion Rock, Akutan Island, and Ogchul Island), and one rookery declined by more than 10% (Bogoslof Island by 155 animals). The only other increases greater than

10% in the Kenai to Kiska area were at Chernabura Island (+47% or 208 animals), Adak Island (+25% or 149 animals), and Column Rocks (+18% or 36 animals). Elsewhere, most rookeries either remained unchanged or decreased by 10% or more. It is difficult, however, to assess the meaning of such small numerical changes.

We analyzed the proportion of the total number of animals that were observed on rookeries for the 1970s through 1991, and found the percentage in 1991 (78.6%) to be about the same as in 1975-79 (80.0%). However, between 1975 and 1985, the proportion of the population on rookeries decreased at all subareas except the eastern Aleutian Islands (Table 7). From 1985 to 1989, the rookery proportion increased sharply in all subareas other than the eastern Aleutian Islands. Finally, the proportion on rookeries in all areas has declined each year since 1989. The result is that the net population loss since 1989 has all been from rookeries. Haul-out numbers in the Kenai to Kiska area have increased by 5.4% since 1989 (from 4,417 to 4,657).

Subareas Outside of the Kenai to Kiska Index Area

In 1991 we surveyed trend sites in three other subareas outside of the Kenai to Kiska area--Southeast Alaska, eastern Gulf of Alaska, and western Aleutian Islands (Tables 2, 4, and 5). From 1990 to 1991, numbers in Southeast Alaska and the western Aleutian Islands remained relatively constant (Table 4); however, numbers dropped by 15.6% in the eastern Gulf of Alaska. Since 1979, Southeast Alaska numbers have increased by 21.0% (from 6,376 to 7,715), although the trend was not significant.

Numbers in the eastern Gulf of Alaska decreased by 15.6% from 1990 to 1991 (from 5,444 to 4,596) and by 34.8% since 1976 (7,053). The trend from 1976 to 1991 was not significant ($r = .602$, $P = 0.398$); however, the trend from the 7,241 animals counted in 1989 was significant ($r = 0.990$, $P = 0.092$).

Western Aleutian Island numbers increased slightly in the past year but decreased 82.8% (14,011 to 2,411) from 1979 to 1991. The western Aleutian Islands decreasing trend since 1979 was significant ($r = 0.996$, $P = 0.059$). This pattern follows that of the other of the Aleutian Island subareas.

Most of the changes in these three subareas' numbers have been driven by changes in sea lion numbers on rookeries. A new rookery has been formed in Southeast Alaska at White Sisters where at least 95 pups were born in 1991 (despite a 12.2% drop in adult numbers). Adult and juvenile counts at the other two Southeast Alaska rookeries, Forrester and Hazy Islands, increased 9.7% and 7.7%, respectively, in the past year (Table 6). Numbers at the single rookery in the eastern Gulf of Alaska (Seal Rocks) continue to decline (-17.1% between 1990 and 1991), while numbers on rookeries in the western Aleutian Islands have shown little net change overall.

A smaller proportion of the population was observed on rookeries in Southeast Alaska and in the eastern Gulf of Alaska rookeries in 1990-91 than in previous years (Table 7). The eastern Gulf of Alaska has consistently had the lowest proportion of animals on rookeries (around 25%) compared to all other

subareas (which all have two-thirds or more of their populations on rookeries).

### Pup Surveys

We counted 10,043 live pups at 13 rookeries in 1991 (Table 8). Pup numbers decreased 0.9% (from 9,235 to 9,148) at the 11 rookeries counted in both 1990 and 1991. Numbers dropped 13.1% at the seven Kenai to Kiska rookeries counted in 1990 and 1991 (from 4,977 to 4,327) and increased by 13.2% at rookeries in Southeast Alaska and the eastern Gulf of Alaska (from 4,258 to 4,821). Trends in pup numbers generally followed those of adult numbers. The only significant exception was in the eastern Gulf of Alaska at Seal Rocks, where pup numbers increased (+ 15%) while adult numbers declined (- 17%).

## DISCUSSION

Now that virtually all of coastal Alaska has been integrated into one survey, it is apparent that the declines of Steller sea lions in the Aleutian Islands and Gulf of Alaska have followed different paths. All of the Aleutian Islands have declined a similar amount (around 80%) since the mid-1970s; since 1989 the declines there have abated. Except for the central subarea, declines in the Gulf of Alaska have been less precipitous than in the Aleutian Islands. However, the declines in the eastern and central subareas are continuing. Southeast Alaska remains the one area which has shown continual stability since the 197Os,

although the decline in adult and juvenile numbers between 1989 and 1991 is worrisome.

Still, the moderation of the previous rapid decline in the Aleutian Island sea lion population declines is an encouraging sign. Increases in the numbers and proportions of animals at haul-out sites can also be interpreted as a good sign. We have been concerned that much of the cause of the decline is due to declining juvenile survival. Thus, an increase in numbers on haul-out sites, where many juveniles occur in summer, may be an indicator of increases in juvenile numbers. Conversely, the decreases in haul-out populations observed during 1985-89 could have been the result of increased juvenile mortality.

Another cause of increased numbers at haul-out sites could be a shift of adult females from rookeries. This is probably not the case in the eastern Aleutian Islands, where the population on rookeries and the number of pups born is either stable or increasing.

Some of the differences between 1990 and 1991 may have been due to survey scheduling. During 1991, we surveyed the western Gulf of Alaska and parts of the central Aleutian Islands 1 to 2 weeks earlier than in 1990 (although the 1991 schedule was similar to that of 1989). This is of concern because the number of animals ashore increases throughout the l0-30 June survey period (Withrow 1982, Merrick et al. 1987). As a result, some of the decline observed in the western Gulf of Alaska and central Aleutian Islands between 1990 and 1991 may be due to differences

in timing. In the future, we expect to conduct repetitive surveys during the survey period to address this problem.

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Table 1.--Steller sea lion aerial survey schedule, June 1991.

| Date | Departure | Destination | Areas surveyed |
|---|---|---|---|
| National Marine Fisheries Service surveys | | | |
| 6/11 | Anchorage | Kodiak | Kenai Peninsula, Barren and NE Kodiak Islands |
| 6/13 | Kodiak | Kodiak | W. Kodiak, Trinity, Chirikof, Semidi Islands |
| 6/14 | Kodiak | Cold Bay | Alaska Peninsula, E. Kodiak, Shumagin Islands |
| 6/15 | Cold Bay | Dutch Hbr. | Sea Lion Rock, Sandman Reef, Unimak, Sanak Islands. |
| 6/16 | Dutch Hbr. | Dutch Hbr. | Krenitzen, Unalaska, Umnak, Bogoslof Islands |
| 6/17 | Dutch Hbr. | Adak | Islands of Four Mountains |
| 6/19 | Adak | Adak | Andreanof Islands |
| 6/21 | Adak | Adak | Adak, Atka, Andreanof, Seguam, Islands of Four Mountains |
| 6/22 | Adak | Shemya | Kanaga, Tanaga, Delarof, Amchitka, Rat, Buldir, and Near Islands |
| 6/23 | Shemya | Kodiak | Near, Semisopochnoi Islands |

Table 1. --Continued.

| Date | Departure | Destination | Areas surveyed |
|---|---|---|---|
| Alaska Department of Fish and Game surveys | | | |
| 6/20 | | | Southeast Alaska |
| 6/21 | | | Southeast Alaska |
| 6/22 | | | Eastern Gulf of Alaska |
| 6/23 | | | Prince William Sound, Kenai |

Table 2.--Counts of Steller sea lions at rookeries (*) and haul-out locations in Alaska during June and July 1991. A (+) indicates a site used for trend count analysis.

| Location | Adult and juvenile | | | | Pup, count | |
|---|---|---|---|---|---|---|
| | Date | Time | Type[a] | Count | Date | Count |
| Southeast Alaska | | | | | | |
| Gran/Ledge Point | 6/21 | | P | 101 | | |
| Pinta Rocks | 6/20 | | V | 11 | | |
| Stevens Pass | 6/20 | | V | 0 | | |
| The Sisters | 6/21 | | V | 0 | | |
| Inian | 6/21 | | V | 0 | | |
| St. Lazaria | 6121 | | V | 0 | | |
| Sunset | 6/20 | | V | 1 | | |
| Sea Lion+ | 6/21 | | V | 0 | | |
| Cape Cross+ | 6/21 | | P | 141 | | |
| Lull Point | 6/21 | | V | 0 | | |
| Tanake Cannery Point | 6/21 | | V | 0 | | |
| Biorka | 6/20 | | V | 0 | | |
| Forrester+* | 6/20 | | P | 3,648 | 7/07 | 3,261 |
| Turnabout+ | 6/20 | | V | 0 | | |
| Jacob Rock+ | 6/20 | | P | 144 | | |
| Biali Rock+ | 6/20 | | P | 417 | | |
| Coronation+ | 6/20 | | P | 438 | | |
| Grindle | 6/20 | | V | 0 | | |
| Cape Addington | 6/20 | | P | 827 | | |

Table 2. --Continued.

| Location | Adult and juvenile Date | Time | Type[a] | Count | Pup count Date | Count |
|---|---|---|---|---|---|---|
| Timbered | 6/20 | | P | 126 | | |
| Hazy+* | 6/20 | | P | 1,278 | 7/06 | 808 |
| Cape Omaney | 6/20 | | P | 661 | | |
| Yasha | 6/20 | | V | 0 | | |
| Round Rock | 6/20 | | V | 0 | | |
| Brothers+ | 6/20 | | P | 73 | | |
| White Sisters+* | 6120 | | P | 860 | 7/08 | 95 |
| Benjamin | 6/21 | | V | 0 | | |
| Cape Bingham | 6121 | | V | 0 | | |
| Graves Rock+ | 6/21 | | P | 470 | | |
| Cape Fairweather+ | 6122 | | V | 3 | | |
| Harbor Point+ | 6/22 | | P | 250 | | |
| Total | | | | 9,449 | | 4,164 |
| Eastern Gulf of Alaska | | | | | | |
| Sitkagi Bluffs+ | 6122 | | V | 0 | | |
| Cape St. Elias+ | 6122 | | P | 744 | | |
| Cape Hinchenbrook | 6/23 | | P | 163 | | |
| Seal Rocks+* | 6123 | | P | 1,220 | 6/28 | 657 |
| Fish (Wooded)+ | 6123 | | P | 1,350 | | |
| Pleiades | 6123 | | V | 0 | | |

Table 2.--Continued.

| Location | Adult and juvenile | | | | Puo count | |
|---|---|---|---|---|---|---|
| | Date | Time | Type[a] | Count | Date | Count |
| Glacier+ | 6/23 | | V | 0 | | |
| Perry | 6123 | | V | 0 | | |
| Point Eleanor | 6123 | | V | 0 | | |
| The Needle+ | 6123 | | P | 430 | | |
| Point Elrington+ | 6123 | | P | 316 | | |
| Cape Puget | 6/23 | | V | 1 | | |
| Cape Junken | 6/23 | | V | 0 | | |
| Cape Fairfield | 6123 | | P | 52 | | |
| Aialik Cape | 6123 | | V | 0 | | |
| Rugged+ | 6123 | | P | 128 | | |
| Chiswell+ | 6/23 | | P | 383 | | |
| Seal Rock+ | 6/23 | | P | 25 | | |
| Total | | | | 4,812 | | 657 |
| Central Gulf of Alaska | | | | | | |
| Outer* | 6/11 | 1140 | P | 334 | 6129 | 180 |
| Nuka Point | 6/11 | 1145 | V | 0 | | |
| Gore Point | 6/11 | 1152 | P | 43 | | |
| E. Chugach | 6/11 | 1200 | P | 13 | | |
| Per1 | 6111 | 1210 | P | 66 | | |
| Nagahut Rocks | 6/11 | 1211 | V | 0 | | |
| Cape Elizabeth | 6/11 | 1214 | P | 51 | | |
| Sugarloaf+* | 6/11 | 1228 | P | 1,216 | | |

Table 2.--Continued.

| Location | Adult and juvenile | | | | Pun count | |
|---|---|---|---|---|---|---|
| | Date | Time | Type[a] | Count | Date | Count |
| Sud | 6111 | 1232 | V | 0 | | |
| Rocks South of Ushagat+ | 6111 | 1234 | P | 51 | | |
| Ushagat Southwest+ | 6/11 | 1238 | P | 231 | | |
| Ushagat Northwest+ | 6/11 | 1240 | V | 2 | | |
| W. Amatoli | 6/11 | 1245 | | nd | | |
| North Kodiak Island | | | | | | |
| Latax Rocks+ | 6114 | 1244 | P | 280 | | |
| Sea Otter | 6/11 | 1306 | P | 123 | | |
| Tonki Cape | 6/11 | 1313 | V | 5 | | |
| Sea Lion Rocks+ | 6/11 | 1316 | P | 88 | | |
| Marmot+* | 6111 | 1320 | P | 1,459 | 7/03 | 1,611 |
| Eastern Kodiak Island | | | | | | |
| Long+ | 6/11 | 1337 | P | 131 | | |
| Cape Chiniak+ | 6/11 | 1343 | P | 231 | | |
| Ugak | 6/13 | 1423 | V | 0 | | |
| Gull Point | 6113 | 1429 | P | 81 | | |
| Cape Barnabas+ | 6113 | 1438 | V | 0 | | |
| Two-headed+ | 6113 | 1450 | P | 382 | | |
| Sundstrom | 6113 | 1506 | V | 0 | | |
| Cape Sitkinak+ | 6113 | 1512 | P | 334 | | |

Table 2. --Continued.

| Location | Adult and juvenile | | | | Pup count | |
|---|---|---|---|---|---|---|
| | Date | Time | Type[1] | Count | Date | Count |
| Tugidak | 6113 | 1536 | V | 0 | | |
| Chirikof+* | 6/13 | 1615 | P | 946 | 6128 | 656 |
| Nagai Rocks | 6113 | 1621 | P | 245 | | |
| Chowiet+* | 6113 | 1705 | P | 716 | | |
| Sutwik+ | 6/14 | 1440 | P | 139 | | |
| Ugauishik+ | 6114 | 1457 | P | 67 | | |
| Western Kodiak Island | | | | | | |
| Cape Ikolik | 6113 | 1815 | V | nd | | |
| Cape Sturgeon | 6/13 | 1830 | V | 0 | | |
| Cape Ugat | 6114 | 1210 | V | 0 | | |
| Noisy | 6114 | 1216 | V | 0 | | |
| Maleena Point | 6114 | 1224 | V | 0 | | |
| Steep Cape | 6114 | 1229 | P | 23 | | |
| Cape Paramanof | 6/14 | 1232 | V | 0 | | |
| Dark Island | 6/14 | 1242 | V | 0 | | |
| Cape Douglas | 6114 | 1302 | V | 0 | | |
| Shakun Rocks | 6/14 | 1316 | P | 123 | | |
| Cape Nakshak | 6/14 | 1324 | V | 0 | | |
| Cape Ugiak | 6/14 | 1327 | V | 0 | | |
| Cape Gull | 6/14 | 1330 | V | 0 | | |
| Cape Kuliak | 6114 | 1332 | V | 0 | | |
| Takli area | 6114 | 1337 | P | 38 | | |

Table 2. --Continued.

| Location | Adult and juvenile | | | | Pup count | |
|---|---|---|---|---|---|---|
| | Date | Time | Type[a] | Count | Date | Count |
| Puale Bay | 6114 | 1357 | P | 297 | | |
| Total | | | | 7,715 | | 2,447 |
| Western Gulf of Alaska | | | | | | |
| Lighthouse Rock | 6/13 | 1650 | P | 168 | | |
| Atkulik | 6114 | 1450 | V | 0 | | |
| Kak | 6/14 | 1453 | P | 172 | | |
| Seal Cape | 6114 | 1505 | V | 0 | | |
| Mitrofania | 6114 | 1514 | P | 148 | | |
| Spitz+ | 6114 | 1519 | P | 88 | | |
| Kupreanof Point | 6114 | 1535 | P | 54 | | |
| Haystacks | 6114 | 1549 | V | 0 | | |
| Whaleback | 6/14 | 1551 | P | 411 | | |
| Castle Rock+ | 6/14 | 1603 | P | 56 | | |
| Atkins+* | 6114 | 1612 | P | 616 | 7/01 | 505 |
| Chernabura+* | 6114 | 1627 | P | 650 | | |
| Twins | 6114 | 1638 | V | 0 | | |
| Nagai Island+ | 6/14 | 1646 | V | 0 | | |
| Sea Lion Rocks+ | 6114 | 1656 | P | 138 | | |
| Cape Unga | 6/14 | 1658 | V | 0 | | |
| Jude | 6/14 | 1737 | P | 363 | | |
| Wosenoski | 6/14 | 1744 | V | 0 | | |
| Pinnacle Rock+* | 6/15 | 1716 | P | 1,049 | 7/02 | 845 |

Table 2. --Continued.

| Location | Adult and juvenile | | | | Pun count | |
|---|---|---|---|---|---|---|
| | Date | Time | Type[a] | Count | Date | Count |
| Clubbing Rocks+* | 6/15 | 1734 | P | 920 | | |
| Cherni | 6115 | 1734 | V | 0 | | |
| South Rock | 6/15 | 1752 | P | 291 | | |
| Bird+ | 6115 | 1808 | P | 217 | | |
| Rock | 6115 | 1815 | P | 0 | | |
| Total | | | | 5,341 | | 1,350 |
| Eastern Aleutian Islands | | | | | | |
| Amak+ | 6/15 | 1640 | P | 556 | | |
| Sea Lion Rocks+* | 6/15 | 1648 | P | 300 | | |
| Rocks between Amak and Sea Lion Rocks+ | 6/15 | 1642 | P | 54 | | |
| Unimak | | | | | | |
| Cape Lutke | 6/15 | 1829 | V | 0 | | |
| Cape Serichef | 6/15 | 1845 | P | 13 | | |
| Akutan | | | | | | |
| Reef Point+ | 6/16 | 1010 | V | 18 | | |
| Lava Bight | 6/16 | 1013 | V | 0 | | |
| North Point | 6/16 | 1015 | V | 0 | | |
| Battery Point | 6/16 | 1118 | V | 0 | | |
| Cape Morgan+* | 6/16 | 1122 | P | 818 | | |

Table 2. --Continued.

| Location | Adult and juvenile | | | | Pup, count | |
|---|---|---|---|---|---|---|
| | Date | Time | Type[a] | Count | Date | Count |
| Akun | | | | | | |
| Akun Head | 6/16 | 1018 | V | 0 | | |
| Billings Head+* | 6/16 | 1021 | P | 156 | 7/05 | 63 |
| Jackass Point | 6/16 | 1102 | V | 0 | | |
| Tanginak | 6/16 | 1026 | P | 61 | | |
| Tigalda | | | | | | |
| NE rocks | 6/16 | 1034 | P | 132 | | |
| South side | 6/16 | 1052 | V | 50 | | |
| Kaligigan | 6/16 | 1035 | V | 1 | | |
| Round Island+ | 6/16 | 1041 | V | 38 | | |
| Ugamak+* | 6/16 | 1041 | P | 1,025 | 7/04 | 811 |
| Aiktak | 6/16 | 1046 | V | 60 | | |
| Rootok | 6/16 | 1105 | P | 55 | | |
| Baby | 6/16 | 1128 | V | 1 | | |
| Old Man Rocks | 6/16 | 1133 | P | 126 | | |
| Egg | 6/16 | 1134 | V | 0 | | |
| Unalaska | | | | | | |
| Sedanka Point | 6/16 | 1135 | V | 0 | | |
| Whalebone Cape | 6/16 | 1152 | V | 0 | | |
| Cape Izigan | 6/16 | 1210 | P | 276 | | |
| Spray Cape | 6/16 | 1455 | V | 0 | | |
| Cape Starichkof | 6/16 | 1503 | V | 0 | | |

Table 2.--Continued.

| Location | Adult and juvenile Date | Time | Type[a] | Count | Pup count Date | Count |
|---|---|---|---|---|---|---|
| Makushin Bay | 6/16 | 1504 | P | 88 | | |
| Bishop Point | 6/16 | 1517 | P | 116 | | |
| Cape Wislow | 6/16 | 1521 | V | 0 | | |
| Outer Signal | 6/16 | 1137 | P | 14 | | |
| Emerald Isle | 6/16 | 1216 | V | 0 | | |
| Polivnoi Rock | 6/16 | 1219 | P | 65 | | |
| Pillars | 6/16 | 1305 | V | 2 | | |
| Ogchul+* | 6/16 | 1313 | P | 229 | | |
| Vsevidof+ | 6/17 | 1147 | P | 54 | | |
| Samalga | 6/16 | 1338 | V | 0 | | |
| Adugak+* | 6/16 | 1344 | P | 395 | | |
| Umnak | | | | | | |
| Cape Aslik+ | 6/16 | 1404 | V | 30 | | |
| Cape Chuganch | 6/16 | 1410 | V | 0 | | |
| Reindeer Point | 6/16 | 1412 | V | 0 | | |
| Cape Idak | 6/16 | 1417 | V | 0 | | |
| Bogoslof+* | 6/16 | 1437 | P | 558 | 6/28 | 501 |
| Total | | | | 5,291 | | 1,375 |
| Central Aleutian Islands | | | | | | |
| Chuginadak+ | 6/17 | 1212 | P | 175 | | |
| Herbert+ | | | | | | |
| Southeast | 6/17 | 1219 | V | 31 | | |

Table 2.--Continued.

| Location | Adult and juvenile Date | Time | Type[a] | Count | Pup, count Date | Count |
|---|---|---|---|---|---|---|
| Southwest | 6/17 | 1222 | V | 50 | | |
| Kagamil+ | 6/17 | 1243 | V | 25 | | |
| Uliaga | 6/21 | 1556 | P | 33 | | |
| Carlisle+ | 6/21 | 1546 | V | 19 | | |
| Yunaska+* | 6/21 | 1535 | P | 398 | | |
| Chagulak+ | 6/21 | 1518 | P | 39 | | |
| Amukta+ | 6/21 | 1513 | P | 38 | | |
| Seguam | | | | | | |
| Saddleridge+* | 6/21 | 1444 | P | 684 | | |
| Other+* | 6/21 | 1451 | P | 161 | | |
| Amlia | | | | | | |
| Sviechnikof* | 6/21 | 1418 | P | 201 | | |
| East Cape+ | 6/21 | 1358 | V | 38 | | |
| Sagigik+ | 6/21 | 1411 | P | 102 | | |
| Tanadak+ | 6/21 | 1405 | V | 7 | | |
| Agligadak+ | 6/21 | 1402 | P | 231 | | |
| Atka | | | | | | |
| North Cape+ | 6/21 | 1333 | P | 180 | | |
| Cape Korovin+ | 6/21 | 1325 | V | 0 | | |
| Salt+ | 6/21 | 1319 | V | 0 | | |
| Great Sitkin | 6/19 | 1137 | V | 0 | | |
| Anagaksik+ | 6/19 | 1151 | P | 65 | | |

Table 2.--Continued.

| Location | Adult and juvenile | | | | Pun count | |
|---|---|---|---|---|---|---|
| | Date | Time | Type[a] | Count | Date | Count |
| Fenimore | 6/19 | 1159 | V | 0 | | |
| Ikiginak+ | 6/19 | 1200 | V | 0 | | |
| Ogladak | 6/19 | 1203 | V | 40 | | |
| Kasatochi+* | 6/19 | 1211 | P | 466 | | |
| Koniuji | 6/19 | 1221 | V | 0 | | |
| Sagchudak | 6/19 | 1240 | V | 0 | | |
| Amtagis | 6/19 | 1239 | V | 0 | | |
| Kagalaska | 6/21 | 1807 | P | 5 | | |
| Little Tanaga Straits+ | 6/21 | 1810 | P | 64 | | |
| Adak | | | | | | |
| Cape Yakak+ | 6/21 | 1824 | P | 106 | | |
| Lake Point+* | 6/21 | 1826 | P | 741 | | |
| Argonne Point+ | 6/21 | 1834 | V | 0 | | |
| Cape Moffet+ | 6/21 | 1841 | V | 0 | | |
| Kanaga | | | | | | |
| North Cape | 6/22 | 1633 | P | 75 | | |
| Ship Rock | 6/22 | 1642 | P | 92 | | |
| Tanaga | | | | | | |
| Bumpy Point | 6/22 | 1657 | P | 18 | | |
| Cape Sajaka | 6/22 | 1701 | V | 0 | | |
| Cape Sasmik | 6/22 | 1716 | P | 69 | | |

Table 2. --Continued.

| Location | Adult and juvenile | | | | Pun count | |
|---|---|---|---|---|---|---|
| | Date | Time | Type[a] | Count | Date | Count |
| Gramp Rock+* | 6/22 | 1725 | P | 773 | | |
| Ugidak+ | 6/22 | 1733 | V | 26 | | |
| Tag +* | 6/22 | 1736 | P | 440 | | |
| Kavalga+ | 6/22 | 1741 | V | 25 | | |
| Unalga+ | 6/22 | 1747 | P | 77 | | |
| Dinkum Rocks+ | 6/22 | 1749 | V | 24 | | |
| Ulak | | | | | | |
| Hasgox Point+* | 6/22 | 1758 | P | 1,046 | | |
| Amatignak | | | | | | |
| Knob Point+ | 6/22 | 1802 | V | 3 | | |
| Nitrol Point+ | 6/22 | 1804 | P | 104 | | |
| Semisopochnoi | | | | | | |
| Tuman Point | 6/23 | 1142 | P | 129 | | |
| Pochnoi Point* | 6/23 | 1148 | P | 298 | | |
| Southside | 6/23 | 1154 | V | 16 | | |
| Amchitka | | | | | | |
| East Cape+ | 6/22 | 1824 | P | 151 | | |
| Cape St. Makarias | 6/22 | 1830 | V | 3 | | |
| Column Rocks* | 6/22 | 1840 | P | 233 | | |
| Ivakin Point+ | 6/22 | not surveyed | | | | |
| Ayugadak+* | 6/22 | 1850 | P | 324 | | |

Table 2. --Continued.

| Location | Adult and juvenile | | | | Pun count | |
|---|---|---|---|---|---|---|
| | Date | Time | Type[a] | Count | Date | Count |
| Rat | | | | | | |
| Southside | 6/22 | 1852 | V | 18 | | |
| Sea Lion Rocks | 6/22 | 1859 | V | 12 | | |
| Tanadak | 6/22 | 1904 | V | 80 | | |
| Kiska | | | | | | |
| Sobaka Rocks | 6/22 | 1913 | P | 62 | | |
| Vega Point | 6/22 | 1914 | P | 75 | | |
| Cape St. | | | | | | |
| Stephens+* | 6/22 | 1920 | P | 380 | | |
| Lief Cove+* | 6/22 | 1927 | P | 506 | | |
| Pillar Rock | 6/22 | 1931 | V | 8 | | |
| Total | | | | 8,966 | | |
| Western Aleutian Islands | | | | | | |
| Buldir | | | | | | |
| East Cape+ | 6/22 | 1956 | V | 5 | | |
| Southside+ | 6/22 | 2000 | P | 395 | | |
| Northwest Point+* | 6/22 | 2008 | P | 189 | | |
| Agattu | | | | | | |
| Cape Sabak+* | 6/22 | 2040 | P | 1,428 | | |
| Chirikof Point | 6/22 | 2139 | P | 280 | | |
| Gillon Point* | 6/22 | 2054 | P | 670 | | |

Table 2. --Continued.

| Location | Adult and juvenile | | | | Pup count | |
|---|---|---|---|---|---|---|
| | Date | Time | Type[a] | Count | Date | Count |
| Attu | | | | | | |
| Cape Wrangell* | 6/22 | 2117 | P | 736 | | |
| Kresta Point | 6/22 | 2121 | v | 55 | | |
| Holtz Bay | 6/22 | 2128 | P | 313 | | |
| Alaid+ | 6/22 | 2148 | P | 398 | | |
| Nizki | 6/22 | 2152 | V | 0 | | |
| Shemya | 6/22 | 2156 | P | 447 | | |
| Ingraham Rocks | 6/23 | 1029 | v | 6 | | |
| Total | | | | 4,922 | | |
| Total all areas | | | | 46,496 | | 9,993 |

[a]P = aerial photo count; V = aerial visual count.
nd = no count.

Table 3. --Counts of adult and juvenile Steller sea lions observed at rookery and haul-out trend sites in the Kenai to Kiska trend area and Alaska statewide during June and July aerial surveys from 1976 to 1991. Only sites counted in all surveys are included (Table 2).

| Year | Kenai to Kiska Index Area | | All of Alaska | |
|---|---|---|---|---|
| | Rookeries | All sites | Rookeries | All sites |
| 1976 | 71,455[a] | 89,364[a] | | |
| 1979 | | | 90,821[a] | 116,804[a] |
| 1985 | 39,634 | 55,824 | | |
| 1989 | 18,647 | 23,064 | 30,388 | |
| 1990 | 18,694 | 22,754 | 27,563 | 38,154 |
| 1991 | 17,080 | 21,737 | 26,099 | 36,459 |
| Overall change | - 76% | - 76% | - 71% | - 69% |
| Annual rate | | | | |
| 1976/79-91 | - 9% | - 9% | - 10% | - 9% |
| 1985-91 | - 13% | - 15% | nd | |
| 1990-91 | - 10% | - 5% | - 5% | - 4% |
| Correlation | | | | |
| 1976/79-91 | nc | 0.954[b] | nc | 0.999[b] |
| 1985-91 | nc | 0.996[b] | nd | nd |
| 1989-91 | nc | 0.954 | nd | nd |

[a]Sum of regional counts from 1975 through 1979.
Significant trend ($P < 0.10$).
nd = no data.
nc = not calculated.

Table 4. --Counts of adult and juvenile Steller sea lions observed at rookery and haul-out trend sites in seen subareas of Alaska during June and July aerial surveys from 1975 to 1991. Only sites counted in all surveys are included (Table 2).

| Year | Source | Southeast Alaska | Gulf of Alaska | | | Aleutian Islands | | |
|---|---|---|---|---|---|---|---|---|
| | | | Eastern | Central | Western | Eastern | Central | Western |
| 1975 | 1 | | | | | 19,769 | | |
| 1976 | 1,2 | | 7,053 | 24,678 | 8,311 | 19,743 | | |
| 1977 | 1 | | | | | 19,195 | | |
| 1979 | 3,4,5 | 6,376 | | | | | 36,632 | 14,011 |
| 1982 | 3 | 6,898 | | | | | | |
| 1985 | 6 | | | 19,002 | 6,275 | 7,505 | 23,042 | |
| 1989 | 3,7 | 8,471 | 7,241 | 8,552 | 3,908 | 3,032 | 7,572 | |
| 1990 | 3,5,8 | 7,629 | 5,444 | 7,050 | 3,915 | 3,801 | 7,988 | 2,327 |
| 1991 | 9 | 7,715 | 4,596 | 6,273 | 3,734 | 4,231 | 7,499 | 2,411 |
| Overall change | | + 21% | - 35% | - 75% | - 55% | - 79% | - 80% | - 83% |
| Annual rate | | | | | | | | |
| 1976/79-91 | | + 2% | - 3% | - 9% | - 5% | - 10% | - 12% | - 14% |
| 1985-91 | | nd | nd | - 17% | - 8% | - 9% | - 17% | nd |
| 1990-91 | | + 1% | - 16% | - 11% | - 5% | + 11% | - 6% | + 4% |
| Correlation | | | | | | | | |
| 1976/79-91 | | 0.861 | 0.602 | 0.918[a] | 0.962[a] | 0.977[a] | 0.964[a] | 0.996[a] |
| 1985-91 | | nd | nd | 0.998[a] | 0.970[a] | 0.777 | 0.952[a] | nd |
| 1989-91 | | 0.813 | 0.990[a] | 0.991[a] | 0.849 | 0.979 | 0.142 | nd |

Source: 1. Braham et al. 1980; 2. Calkins and Pitcher 1982; 3. Alaska Dept. Fish and Game unpub. data; 4. Fiscus et al. 1981; 5. Douglas and Byrd 1991; 6. Loughlin et al. 1986; 7. Loughlin et al 1990; 8. Merrick et al. 1991; 9. This study.

[a]Significant trend ($P < 0.10$).

nd = no data.

Table 5.--Counts of adult and juvenile Steller sea lions at trend rookeries in seven subareas of Alaska during June and July aerial surveys from 1975 to 1991. Only sites counted in all surveys are included (see Table 2).

| Year | Source | Southeast Alaska | Gulf of Alaska | | | Aleutian Islands | | |
|---|---|---|---|---|---|---|---|---|
| | | | Eastern | Central | Western | Eastern | Central | Western |
| 1975 | 1 | | | | | 17,452 | | |
| 1976 | 1,2 | | 1,709 | 19,479 | 7,125 | 17,745 | | |
| 1977 | 1 | | | | | 17,370 | | |
| 1978 | 3 | | 2,463 | | | | | |
| 1979 | 3,4,5 | 4,775 | 2,961 | | | | 27,106 | 11,536 |
| 1982 | 3 | 5,979 | | | | | | |
| 1985 | 6 | | | 12,379 | 4,888 | 6,975 | 15,392 | |
| 1989 | 3,5,7 | 6,844 | 2,159 | 6,207 | 3,521 | 2,813 | 6,106 | 2,738 |
| 1990 | 3,5,8 | 5,491 | 1,491 | 5,043 | 3,496 | 3,417 | 6,738 | 1,907 |
| 1991 | 9 | 5,786 | 1,220 | 4,337 | 3,235 | 3,519 | 5,989 | 2,013 |
| **Overall change** | | **+ 21%** | **- 29%** | **- 78%** | **- 55%** | **- 80%** | **- 78%** | **- 83%** |
| **Annual rate** | | | | | | | | |
| 1976/79-91 | | + 2% | - 7% | - 10% | - 5% | - 10% | - 12% | - 14% |
| 1985-91 | | nd | nd | - 16% | - 7% | - 11% | - 15% | nd |
| 1990-91 | | + 5% | - 18% | - 14% | - 8% | 2% | - 11% | + 6% |

Source: 1. Braham et al. 1980; 2. Calkins and Pitcher 1982; 3. Alaska Dept. Fish and Game unpub. data; 4. Fiscus et al. 1981; 5. Douglas and Byrd 1991; 6. Loughlin et al. 1986; 7. Loughlin et al. 1990; 8. Merrick et al. 1991; 9. This study.
nd = no data.

Table 6.--Counts of Steller sea lions at principal rookeries in the Aleutian Islands and Gulf of Alaska for 1976-79 though 1991.

| Island | Count | | | | Percent change | | |
|---|---|---|---|---|---|---|---|
| | 1976-79 | 1985 | 1990 | 1991 | 1976-91 | 1985-91 | 1990-91 |
| Southeast Alaska | | | | | | | |
| Forrester | 3,121 | 3,777 | 3,324 | 3,648 | + 17 | - 3 | + 10 |
| Hazy | 893 | 1,251 | 1,187 | 1,278 | + 43 | + 2 | + 8 |
| White Sisters | 761 | 1,144 | 980 | 860 | + 13 | - 25 | - 12 |
| Eastern Gulf of Alaska | | | | | | | |
| Seal Rocks | 2,961 | nd | 1,471 | 1,220 | - 50 | - | - 17 |
| Central Gulf of Alaska | | | | | | | |
| Outer | nd | nd | 589 | 334 | - | - | - 43 |
| Sugarloaf | 5,226 | 2,991 | 1,319 | 1,216 | - 77 | - 59 | - 8 |
| Marmot | 9,862 | 4,983 | 1,766 | 1,459 | - 71 | - 71 | - 17 |
| Chowiet | 2,000 | 2,059 | 897 | 716 | - 85 | - 65 | - 20 |
| Chirikof | 2,391 | 2,346 | 1,061 | 946 | - 60 | - 60 | - 11 |
| Western Gulf of Alaska | | | | | | | |
| Atkins | 2,726 | 1,562 | 728 | 616 | - 77 | - 61 | - 15 |

Table 6.--Continued

| Island | Count | | | | Percent change | | |
|---|---|---|---|---|---|---|---|
| | 1976-79 | 1985 | 1990 | 1991 | 1976-91 | 1985-91 | 1990-91 |
| Chernabura | 1,437 | 487 | 442 | 650 | - 55 | + 34 | + 47 |
| Pinnacle Rock | 1,745 | 1,588 | 1,305 | 1,049 | - 40 | - 34 | - 20 |
| Clubbing Rocks | 1,217 | 1,251 | 1,021 | 920 | - 24 | - 27 | - 10 |
| **Eastern Aleutian Islands** | | | | | | | |
| Sea Lion Rock | 2,076 | 538 | 286 | 300 | - 86 | - 44 | + 5 |
| Ugamak[a] | 5,006 | 1,503 | 945 | 1,063 | - 79 | - 29 | + 13 |
| Akun | 1,050 | 435 | 118 | 156 | - 85 | - 64 | + 32 |
| Akutan | 3,145 | 1,710 | 765 | 818 | - 74 | - 52 | + 7 |
| Bogoslof | 3,308 | 1,287 | 713 | 558 | - 83 | - 57 | - 22 |
| Ogchul | 1,109 | 547 | 240 | 229 | - 79 | - 58 | - 5 |
| Adugak | 1,177 | 955 | 350 | 395 | - 66 | - 59 | + 13 |
| **Central Aleutian Islands** | | | | | | | |
| Yunaska | 2,249 | 1,071 | 391 | 398 | - 82 | - 63 | + 2 |
| Seguam | 6,493 | 2,942 | 833 | 684 | - 90 | - 77 | - 18 |

Table 6. --Continued

| Island | Count | | | | Percent change | | |
|---|---|---|---|---|---|---|---|
| | 1976-79 | 1985 | 1990 | 1991 | 1976-91 | 1985-91 | 1990-91 |
| Agligadak | 993 | 514 | 274 | 231 | - 77 | - 55 | - 16 |
| Kasatochi | 2,166 | 1,170 | 641 | 466 | - 79 | - 60 | - 27 |
| Adak | 972 | 964 | 592 | 741 | - 24 | - 23 | + 25 |
| Gramp Rock | 1,705 | 1,290 | 712 | 773 | - 55 | - 40 | + 9 |
| Tag | 1,740 | 944 | 478 | 440 | - 75 | - 53 | - 8 |
| Ulak | 2,170 | 2,729 | 1,324 | 1,046 | - 52 | - 62 | - 21 |
| Amchitka | | | | | | | |
| Column Rocks | 1,943 | 728 | 197 | 233 | - 88 | - 68 | + 18 |
| East Cape | 639 | nd | nd | 151 | - 76 | - | - |
| Ayugadak | 1,463 | 702 | 401 | 324 | - 78 | - 54 | - 19 |
| Semisopochnoi | 1,223 | nd | nd | 443 | - 74 | | |
| Kiska | | | | | | | |
| Lief Cove | 4,953 | 1,715 | 528 | 506 | - 90 | - 71 | - 4 |
| St. Stephens | 2,202 | 1,350 | 564 | 380 | - 83 | - 72 | - 33 |

Table 6.--Continued

| Island | Count | | | | Percent change | | |
|---|---|---|---|---|---|---|---|
| | 1976-79 | 1985 | 1990 | 1991 | 1976-91 | 1985-91 | 1990-91 |
| Western Aleutian Islands | | | | | | | |
| Buldir | 5,118 | nd | 729 | 584 | - 89 | - | - 20 |
| Agattu | | | | | | | |
| Cape Sabak | 6,512 | 3,130 | 1,178 | 1,429 | - 78 | - 54 | + 21 |
| Gillon Point | 821 | nd | nd | 670 | - 18 | - | - |
| Attu | | | | | | | |
| Cape Wrangell | 5,400 | nd | nd | 736 | - 86 | - | - |
| Trend Site Totals | | | | | | | |
| Kenai-Kiska[b] | 71,455 | 39,634 | 18,694 | 17,080 | - 76 | - 57 | - 9 |
| Alaska[c] | 90,821 | - | 27,563 | 26,099 | - 71 | - | - 5 |

Source: As in Tables 4 and 5.
[a]Includes Round Island.
[b]Does not include Attu, Agattu, Buldir, Semisopochnoi, Amchitka, Outer, Seal Rocks, White Sisters, Hazy, and Forrester Islands.
[c]Excludes Attu, Agattu (Gillon Point), Semisopochnoi, Amchitka, and Outer Islands.
nd = no data.

Table 7.--Proportion of adult and juvenile numbers observed on trend rookeries in seven subareas of Alaska during June and July aerial surveys from 1975 to 1991. Only sites counted in all surveys are included (see Table 2).

| Year | Southeast Alaska | Gulf of Alaska | | | Aleutian Islands | | |
|---|---|---|---|---|---|---|---|
| | | Eastern | Central | Western | Eastern | Central | Western |
| 1975 | - | - | - | - | 0.882 | - | - |
| 1976 | - | 0.243 | 0.789 | 0.857 | 0.898 | - | - |
| 1977 | - | - | - | - | 0.914 | - | - |
| 1978 | - | - | - | - | - | - | - |
| 1979 | 0.748 | - | - | - | - | 0.740 | 0.823 |
| 1982 | 0.867 | - | - | - | - | - | - |
| 1985 | - | - | 0.651 | 0.779 | 0.929 | 0.668 | - |
| 1989 | 0.807 | 0.298 | 0.726 | 0.901 | 0.928 | 0.806 | - |
| 1990 | 0.719 | 0.274 | 0.715 | 0.892 | 0.899 | 0.843 | 0.819 |
| 1991 | 0.749 | 0.265 | 0.691 | 0.866 | 0.831 | 0.799 | 0.834 |

Table 8.--Counts of Steller sea lion pups at selected rookeries in the Gulf of Alaska and Aleutian Islands during June and July surveys from 1984-87 through 1991.

| Area or island | 1984-87[a] | 1989-90[b] | 1991 | Percent change 1985-91 | Percent change 1990-91 |
|---|---|---|---|---|---|
| Southeast Alaska | | | | | |
| White Sisters | nd | 30+ | 95 | - | +216 |
| Hazy | nd | 641 | 808 | - | + 26 |
| Forrester | 1,954 | 3,016 | 3,261 | + 67 | + 8 |
| Eastern Gulf of Alaska | | | | | |
| Seal Rocks | nd | 571 | 657 | - | + 15 |
| Central Gulf of Alaska | | | | | |
| Outer | 933 | 363 | 180 | - 81 | - 50 |
| Marmot | 4,266 | 2,199 | 1,611 | - 62 | - 27 |
| Chirikof | 1,913 | 607 | 656 | - 66 | + 8 |
| Western Gulf of Alaska | | | | | |
| Atkins | 2,093 | 433 | 505 | - 76 | + 16 |
| Pinnacle | 2,748 | nd | 845 | - 69 | - |
| Eastern Aleutian Islands | | | | | |
| Ugamak | 1,635 | 851 | 811 | - 50 | - 5 |
| Akun | 60 | 63 | 63 | + 5 | 0 |
| Bogoslof | 1,109 | 461 | 501 | - 54 | + 9 |
| Bering Sea | | | | | |
| Walrus | 114 | nd | 50 | - 57 | - |

[a]Loughlin et al. (1986) and Merrick et al. (1987),
[b]National Marine Fisheries Service and Alaska Dept. Fish & Game.
nd = no data.

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