NOAA Technical Memorandum NMFS-AFSC-131

Aerial and Land-Based Surveys of Steller Sea Lions (*Eumetopias jubatus*) From the Western Stock in Alaska, June and July 2001 and 2002

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J. L. Sease and C. J. Gudmundson

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Alaska Fisheries Science Center

December 2002

NOAA Technical Memorandum NMFS

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This document should be cited as follows:

> Sease, J. L., and C. J. Gudmundson. 2002. Aerial and land-based surveys of Steller sea lions (*Eumetopias jubatus*) from the western stock in Alaska, June and July 2001 and 2002. U. S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-131, 45 p.

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December 2002

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ABSTRACT

The National Marine Fisheries Service (NMFS) conducted aerial and land-based surveys of the western stock of Steller sea lions (*Eumetopias jubatus*) in Alaska during June and July of 2001 and 2002 at all sites from 144° W to 172° E, the westernmost point in the Aleutian Islands. Survey effort in 2001 was restricted to pup counts at selected sites in the Aleutian Islands and the Gulf of Alaska. The 2002 survey included the entire western stock: aerial surveys of non-pups at all sites and pup counts at all rookeries except those counted in 2001. In June 2002, a total of 26,602 non-pups were counted on all surveyed sites (n = 259). Of these non-pups, 14,320 were on 30 trend rookeries and 5,020 were on 54 trend haul-out sites for a total of 19,340 on all 84 trend sites. This was an increase of 5.5% for all trend sites and 6.8% for trend rookeries from June 2000, the first region-wide increase observed since standardized aerial surveys began in the 1970s. Counts were still down compared to 1998 (-5.4% for all trend sites and -1.2% for trend rookeries) and down more than 30% since 1990. From 1991 to 2002, the population declined by an average of 4.1% per year ($P < 0.001$: 95% C.I. ' -2.8% to -5.5%) for all trend sites and 3.9% per year (P ' 0.002: 95% C.I. ' -2.3% to -5.6%) at the trend rookeries.

The Kenai Peninsula to Kiska Island index area, a core subarea within the Alaska portion of the western stock, included 22,221 non-pup sea lions at 220 of the 259 surveyed sites. Of these, 12,893 were on 26 trend rookeries and 3,130 were on 44 trend haul-out sites (16,023 non-pups on all 70 trend sites). These counts represented increases from June 2000 of 4.9% and 9.8%, respectively, for all trend sites and for trend rookeries. Trend rookeries in the Kenai-to-Kiska region also increased by 6.4% relative to 1998, although all trend sites were down 2.4%, and both were down about 25% from 1991. From 1991 to 2002, Kenai-to-Kiska

counts declined by an average of 3.1% per year ($P < 0.001$: 95% C.I. ' -2.0% to -4.2%) for all 70 trend sites and 3.2% per year (P ' 0.006: 95% C.I. ' -1.4% to -5.1%) for the 26 trend rookeries from 1991 to 1998. The 2002 aerial survey included replication of 27 sites in the Gulf of Alaska and 30 sites in the eastern and east-central Aleutian Islands. Coefficients of variation calculated from the replicate counts were 0.029 for all sites, 0.044 for the Gulf of Alaska sites, and 0.038 for sites in the Aleutian Islands.

Region-wide pup counts are on a 4-year schedule (including 2002), with counts at selected sites during intervening years. During June and July 2001, NMFS personnel counted 3,837 live pups at 11 rookeries and 90 live pups at five haul-out sites in Alaska. During June and July 2002, NMFS counted 5,472 live pups at 27 rookeries and 178 live pups at six haul-out sites. Pups were counted in both years at Marmot, Ugamak, and Semisopochnoi Island rookeries and at the Seguam Island, Turf Point haul-out site. Using a composite of 2001 and 2002 pup counts, the total pup count for the western stock was 8,345 live pups at 35 rookeries and 244 live pups at 10 haul-out sites. This represented a decline of 11.2% since 1998 for the western stock in Alaska.

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INTRODUCTION

In November 1990 the National Marine Fisheries Service (NMFS) listed Steller sea lions (*Eumetopias jubatus*) as "threatened" range-wide under the U.S. Endangered Species Act (55 Federal Register 49204). Several years later, two population stocks were identified, based on differences in genetics and population trends (Loughlin 1997). The western stock, which occurs from 144° W (just east of Prince William Sound, Alaska) westward to Russia and Japan, was listed as "endangered" in June 1997 (62 Federal Register 24345). The eastern stock, which occurs from Southeast Alaska southward to California, remains classified as threatened.

The NMFS conducted aerial surveys of Steller sea lion non-pups (adults and juveniles) and land-based surveys of pups across the range of the western stock in Alaska during June and July 2002. These efforts extended the series of surveys in Alaska that began in the mid-1970s (Braham et al. 1980, Calkins and Pitcher 1982, Loughlin et al. 1984, Merrick et al. 1987, Loughlin et al. 1990, Merrick et al. 1991, Merrick et al. 1992, Sease et al. 1993, Strick et al. 1997, Sease et al. 1999, Sease and Loughlin 1999, Sease et al. 2001). This report focuses primarily on counts of non-pup Steller sea lions at trend sites, which include both rookeries and haul-out sites, from 1990-1991 to 2002. Longer historical perspectives are included in Merrick et al. (1991: for 1956-90) and Sease et al. (1993: for 1976-92).

METHODS

The 2001 and 2002 surveys for western-stock sites adhered to protocols of earlier aerial and land-based surveys (Braham et al. 1980, Calkins and Pitcher 1982, Merrick et al. 1991, Merrick et al. 1992, Loughlin et al. 1992, Sease et al. 1993, Strick et al. 1997, Sease et al. 1999, Sease and Loughlin 1999, Sease et al. 2001). Analyses of non-pup counts focus on "trend sites."

Trend sites are those rookeries and haul-out sites surveyed consistently from the 1970s to the present, thus allowing analysis of population trends on a decadal scale. Trend sites include the majority of animals observed in each survey (70-75% from 1998 to 2002). "Trend rookeries" are a subset of all trend sites. Most non-trend sites are haulouts with few animals. The only major rookeries not included as trend sites are located on Outer and Attu Islands. "Rookeries" are those sites where adult males actively defend territories, pups are born, and mating takes place. "Haul-out sites" are those where sea lions rest on land (haul out), but where few or no pups are born (Calkins and Pitcher 1982, Loughlin et al. 1984). The distinction between rookeries and haul-out sites has become blurred during recent years as some sites traditionally listed as rookeries have produced few or no pups; for example, Semisopochnoi Island, Agligadak Island, and Amchitka Island (Column Rocks). Conversely, noteworthy numbers of pups have been counted during recent years at some haul-out sites, such as the Chiswell Islands and Jude Island.

Geographical regions used for analyzing survey results were the same as those used in previous survey reports (Merrick et al. 1987, Loughlin et al. 1990, Merrick et al. 1991, Merrick et al. 1992, Sease et al. 1993, Strick et al. 1997, Sease et al. 1999, Sease and Loughlin 1999, Sease et al. 2001) and those adopted in the Final Recovery Plan for Steller sea lions (NMFS 1992). The NMFS survey effort during 2001 and 2002 covered six western-stock regions: the eastern, central, and western Gulf of Alaska and the eastern, central, and western Aleutian Islands (Fig. 1). The NMFS surveys did not include western stock sites in the Bering Sea region, which contain few haul-out sites and only one rookery (Walrus Island in the Pribilof Islands), or eastern stock sites in Southeast Alaska.

Another geographical region used during the analyses of survey data extends from the Kenai Peninsula (Outer Island) to Kiska Island This index area (the central and western Gulf of Alaska, and the eastern and central Aleutian Islands) encompasses what historically was the heart of the Steller sea lions' range (Merrick et al. 1987, NMFS 1992). The Kenai-to-Kiska region typically has included about 60% of the Alaska sea lion population.

It should be noted that, except for the distinction between the eastern and western stocks, the geographical divisions between regions are arbitrary and may not accurately reflect the underlying structure of stocks or other subunits of the population, if they exist. We present results for each region to identify and highlight varying population trends in the different regions. However, readers should not think that sea lion populations in one region are separate and independent of those in other regions.

Aerial Surveys of Non-Pups

The NMFS surveyed from Sitkagi Bluffs in the eastern Gulf of Alaska to Attu Island in the western Aleutian Islands, from 14 June to 25 June 2002 (Table 1). Flight tracks included traditional sea lion rookeries and haul-out sites, but potential haul-out sites along the flight path also were examined en route. Under ideal conditions, we surveyed each site at 100-150 knots air speed, 150-200 m (500-650 ft) altitude, and 500 m (0.25 nautical mile) offshore, depending on the topography of the site. Strong winds occasionally required flying at higher altitudes or farther offshore, whereas low clouds sometimes required flying at lower altitudes or closer inshore.

We photographed sea lions at most sites using 35-mm, manual-focus cameras with motor drives and zoom lenses (80-200 mm or equivalent) and moderately fast (e.g., ISO 200 or faster) color transparency (slide) film. Where appropriate, sequential photographs overlapped slightly to guarantee complete coverage of a site. We also photographed each site with a miniDV digital video camera and a high-resolution (5.3 megapixel) digital still camera to record an overview of each site and to provide backup imagery. In the laboratory, we counted sea lions from projected images. The final count of non-pup sea lions for each rookery or haul-out site was the mean for two independent counters. If the individual results for a particular site differed by 10% or more, each person re-counted the images for that site. Because all final counts from photographs were means of two independent counts, many ended in ".5". To avoid a systematic upward bias, we rounded all such means up or down to the next even integer (Knuth 1981). We frequently relied on direct visual counts instead of photographs for sites with few (e.g., #10) sea lions.

Replication of individual site counts is the only way to measure variability of counts, typically through a coefficient of variation (CV). The 2002 aerial survey included two sets of replicate sites. Replicate sites in the Gulf of Alaska included 5 rookeries and 22 haul-out sites, primarily around the Kodiak Archipelago. Replicates in the eastern Aleutian Islands included 8 rookeries and 21 haul-out sites from Amak and Sea Lion Rocks westward to Seguam Island, plus an incidental replicate at Kagalaska Island in the central Aleutian Islands. Table 1 includes the dates for each individual survey visit and a mean for the counts. Mean counts also were used in the analyses. Coefficients of variation were calculated by summing the variances for individual counts at each replicated site and dividing the square root of that sum by the sum of mean counts for the same sites.

Pup Surveys

NMFS counted pups at 10 rookeries and 5 haul-out sites between 23 June and 6 July 2001 and at 28 rookeries and 8 haul-out sites from 25 June to 9 July 2002. Most pup counts were performed by personnel on the rookery beach. As one person cleared most sea lions older than pups from the beach, two or three others followed, counting all live pups on the beach and in the water. The final pup count for each rookery was the mean of the two or three individual counts. Beach counts of pups introduce disturbance to the rookeries and are logistically difficult to conduct. Consequently, complete Alaska-wide pup counts are attempted only every 4 years (including 2002), with counts at selected rookeries during intervening years. In a further attempt to reduce disturbance, NMFS personnel did not count pups at 8 rookeries in 2002 that were counted the previous year. Pup counts were made from overlooks or from a skiff without disturbing sea lions at several sites where few or no pups were present and vantage points offered clear views of the entire rookery beach. Shore-based observers count pups at the Ugamak Island rookery from overlooks daily during the breeding season; for this site we used the maximal daily count. Pups were counted from medium-format aerial photographs for two sites (Fish and Marmot Islands) and from oblique digital aerial photographs for another site (Sviechnikof Harbor, Amlia Island) that ship-based survey personnel were unable to count. It is not unusual for pups to be born at haul-out sites, although the numbers typically are very small in comparison to births at rookeries (Calkins and Pitcher 1982, Loughlin et al. 1984).

Data Analysis

Analyses for population trends included comparison of subtotals of non-pups for 1) all trend sites (both rookeries and haul-out sites) and 2) rookery trend sites for a) the western stock, b) the Kenai-to-Kiska index area, and c) within the six smaller geographical regions. Overall changes in numbers of non-pups and pups, either regionally or for individual rookeries, are expressed as a percentage of the earlier count. The estimated annual rate of change for 1991 to 2000 is the slope of a simple linear regression of the natural log of counts on survey year, testing the null hypothesis of no trend using the significance of the slope for the natural-log regression.

RESULTS

Aerial Surveys of Non-pups

The June 2002 survey resulted in a total count of 26,602 non-pup Steller sea lions on all surveyed sites (n ' 259) in the western stock in Alaska (Tables 1 and 2; Fig. 2). Of these sites, 137 (53%) were occupied by more than 20 sea lions, 34 sites (13%) were occupied by 1 to 20 sea lions, and 88 sites (34%) were unoccupied. Of those sites occupied by 20 or more sea lions in 2002, 19% changed by less than 5% or by fewer than 10 animals from 2000 to 2002, 47% increased by more than 5%, and 34% declined by more than 5%.

The western stock includes 84 trend sites; the June 2002 counts included 14,320 non-pups on the 30 trend rookeries and 5,020 non-pups on 54 trend haul-out sites. The overall total for all 84 trend sites was 19,340 non-pups. This represented an increase of 5.5% from June 2000, but it was still 5.4% and 34.2%, respectively, below the 1998 and 1991 counts (Table 2,

Fig. 2). The long-term trend, based on natural log regression, was a decline of 4.1% per year from 1991 to 2002 (P < 0.001: 95% C.I. ' -2.8% to -5.5%). The trend rookery count increased 6.8% from June 2000, showed equivocal change from 1998 (-1.2%), but declined by 32.1% from 1991 (Table 2, Fig. 2). The estimated average annual rate of decline for trend rookeries from 1991 to 2002 was 3.9% per year (P ' 0.002: 95% C.I. ' -2.3% to -5.6%).

Kenai-to-Kiska Index Area

We counted a total of 22,221 non-pup sea lions at all surveyed sites (n ' 220) in the Kenai-to-Kiska index area in June 2002 (Tables 1 and 2; Fig. 2). The Kenai-to-Kiska index area includes 70 of the Alaskan trend sites (26 rookeries and 44 haulouts), at which we counted 16,023 non-pups in 2002. This was an increase of 4.9% from June 2000 but a decline of 2.4% from 1998, and 26.2% since 1991. The 26 trend rookeries in the Kenai-to-Kiska area included 12,893 non-pups, representing increases of 9.8% from June 2000 and 6.4% from 1998, but an overall decline of 25.0% from 1991. The average trends from 1991 to 2002 were a decline of 3.1% per year (P < 0.001: 95% C.I. ' -2.0% to -4.2%) for the 70 trend sites and a decline of 3.2% per year (P ' 0.006: 95% C.I. ' -1.4% to -5.1%) for the 26 trend rookeries. Overall declines for Kenai-to-Kiska have been more than 80% since 1976, when there were almost 90,000 non-pups on trend sites and more than 70,000 non-pups on trend rookeries (Fig. 2).

Counts Within Geographical Subareas

Numbers of non-pups on trend sites increased or remained stable in five of the six western stock subregions from 2000 to 2002, although the maximal increase was only 525

animals (Table 3; Fig. 3). The only observed decline at trend sites was in the western Aleutian Islands: -23.7% or -254 animals. The same general trend of increase or negligible change in five of the six subregions and decline in the western Aleutian Islands was apparent for trend rookeries (Table 4; Fig. 4) and for all surveyed sites (Table 5; Fig. 5). Declines in the western Aleutian Islands were equally steep for trend rookeries, for all trend sites, and for all surveyed sites.

Counts of Non-pups on Rookeries

Counts of non-pups at individual Alaskan rookeries from 1991 through 2000 are presented in Table 6. Across the western stock, non-pup counts changed by less than 5% or fewer than 25 animals from 2000 to 2002 at 12 rookeries (34%), increased by more than 5% at 13 rookeries (37%), and declined by more than 5% at 10 rookeries (29%). Distribution of increasing and declining rookeries was not uniform across the region. Eight of 10 declining rookeries but only 1 of 13 increasing rookeries are located from Adak (176° W) westward (Fig. 6). That one increasing rookery, Ayugadak Island, increased from 146 non-pups in 2000 to 182 in 2002 (Table 6).

Coefficients of Variation from Replicate Counts

The 2002 aerial survey included replication of 27 sites (3 rookeries and 24 haul-out sites) in the Gulf of Alaska and 29 sites (8 rookeries and 21 haul-out sites) in the eastern and east-central Aleutian Islands. Coefficients of variation calculated from the replicate counts were 0.029 for all sites, 0.044 for the Gulf of Alaska sites, and 0.038 for sites in the Aleutian Islands.

Pup Surveys

During 25 June to 9 July 2002, NMFS personnel counted pups at 24 rookeries and 8 haul-out sites during ship-board surveys. The pup count for Ugamak Island was the maximal counts made by shore-based personnel on 8-9 July for the south and north sides, respectively. We counted pups for Amlia (Sviechnikof Harbor) from digital oblique aerial photographs taken on 19 June. For Marmot and Fish Islands, we used counts made from medium-format aerial photographs taken on 22 June and 4 July, respectively (SWFSC[1]). All 2002 pup counts are listed in Tables 1 and 7. Table 7 also lists pup counts made at 9 rookeries (Seal Rocks, Sugarloaf Island, Chowiet Island, Chernabura Island, Clubbing Rocks, Ugamak Island, Akutan Island, Ogchul Island, and Seguam Island-Saddleridge) and 2 haul-out sites (Chiswell Islands and Seguam Island-Turf Point) during ship-board surveys between 23 June and 6 July 2001, as well as counts made from medium-format aerial photographs for 7 sites: Fish Island, Outer Island, Marmot Island, Nagai Rocks haul-out site, Jude Island haul-out site, Sea Lion Rocks, and Semisopochnoi Island SWFSC[1]) .

During June and July 2001, NMFS personnel counted 3,837 live pups at 11 rookeries and 90 live pups at five haul-out sites in Alaska. During June and July 2002, NMFS counted 5,472 live pups at 27 rookeries and 178 live pups at six haul-out sites. For the individual rookeries listed in Table 7, pup counts changed from 1998 to 2001-2002 by less than 5% or fewer than 20 pups at 10 sites (29%), increased by more than 5% at 9 sites (26%), and declined by more than 5% at 15 sites (44%). All nine rookeries with increasing numbers of pups were in the central

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[1]Southwest Fisheries Science Center, National Marine Fisheries Service, 8604 La Jolla Shores Drive, La Jolla, CA 92037. Unpublished data.

portion of the range, from Chowiet Island (156°40' W) through Adak Island (177° W), whereas declining rookeries were located east of Chowiet Island or west of Adak Island (Fig. 7).

The composite 2001-2002 pup count for the western stock, which included counts from 24 rookeries in 2002 and 7 in 2001, showed continuing decline in pup production: 10.8% from 1998 to 2001-2002 (Table 8, Fig. 8). For the Kenai-to-Kiska index area, the area with the longest time series of region-wide counts, pup numbers were down 7.5% from 1998, 24.3% from 1994, and 42.3% from 1990-1991. Pup counts increased in one region (western Gulf of Alaska: +5.5%) from 1998 to 2002, but declined in the five other regions. The western Aleutian Islands experienced the worst decline (39.2%) from 1998 to 2002.

DISCUSSION

The 5.5% increase from June 2000 to June 2002 in numbers of non-pup Steller sea lions counted at western-stock sites was the first region-wide increase observed during more than two decades of systematic surveys. The decline had persisted at an average rate of about 5% per year from 1989 through 2000 (Sease et al. 2001). As importantly, the observed increase was not the result of a large increase at a few sites in one region, but rather by a geographically broad-based increase from the eastern Gulf of Alaska through the central Aleutian Islands. Although this observed increase certainly is a favorable change, it is premature to conclude that the decades-long decline is over. Non-pup counts at all western-stock trend sites in 2002 still were 5.4% below the 1998 counts and 34.2% below the 1991 count.

In contrast to the observed increases in non-pup counts, numbers of pups continued to decline across the western stock in Alaska. The combined 2001-2002 pup count was 11.2%

below the 1998 count for the western stock. For the Kenai-to-Kiska index area, 2001-2002 pup counts were 7.8% below 1998 and 42.4% below the composite 1990-1991 count. Comparison of the observed trends for pups and non-pups is confounded by differences in survey regimen. Non-pups are counted biennially, whereas region-wide pups counts take place every 4 years. In fact, non-pup counts at all trend sites and at trend rookeries showed net declines (5.4% and 7.5%, respectively) over the same 4-year interval (1998 to 2002) available for comparing pup counts.

The status of Steller sea lions in the western Aleutian Islands region, which includes Buldir Island and the Near Islands, continues to be troubling. The decline in pup counts from 1998 to 2002 was greatest (down 39%) in this region, and it is the only region where non-pup numbers continued to decrease (down 24% at trend sites) from 2000 to 2002. In fact, the relative changes in numbers of non-pups on rookeries (Fig. 6) suggest that the region may still be undergoing a decline that may extend as far east as Adak Island.

The distinction between rookeries and haul-out sites has become blurred during recent years. Several sites legally defined as rookeries (50 CFR 223.202, 50 CFR 226.202) produced few or no pups during recent years, notably Agligadak Island, Semisopochnoi Island (Pochnoi and Petrel Points), and Amchitka Island (East Cape). These individual rookeries may recover when and if the western stock of Steller sea lions experiences significant population recovery. As a case in point, Fish Island (also called Wooded Island or Lewis Island) has undergone several changes in status. Rookery studies were conducted there during the late 1950s and 1960s (Sandegren 1970, 1976). It was abandoned as a rookery sometime during the 1970s, perhaps as a result of uplifting and other physiographic changes caused by the 1964 earthquake (Sandegren 1970), although it continued to be used as a haul-out. Pups (n = 514) were rediscovered on Fish

Island in 1993 (ADF&G[2], NMML[3]). Pup numbers there ranged from 70 to 150 during 1997 to 2002 (Table 7).

Conversely, several haul-out sites have evolved into rookeries. White Sisters in Southeast Alaska became established as a rookery just over 10 years ago; production has increased from 30 pups in 1990 to over 200 by 1997 (ADF&G[2]). In 2001 and 2002, there were about 400 pups at White Sisters, and increasing numbers of pups at two other traditional haul-out sites in Southeast Alaska (SWFSC[1]). Table 7 includes four traditional haul-out sites within the western stock where noteworthy numbers of pups have been observed in recent years. During 2001 and 2002, two haul-outs sites adjacent to existing rookeries (Nagai Rocks, approximately 10 km northwest of the Chirikof Rookery, and Turf Point, approximately 20 km distant from the rookery at Saddleridge Point on Seguam Island) produced 20-30 pups per year, and the Chiswell Islands haul-out site produced more than 50 newborn pups. At Jude Island, in the western Gulf of Alaska, 192 and 119 pups were counted in 2001 and 2002, respectively; re-examination of survey photographs from June 1998 and June 2000 revealed no evidence of pups. It is not uncommon to observe low numbers of pups (e.g., fewer than 10) at haul-out sites, but the sudden appearance of more than 100 pups certainly is unexpected.

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[2] Division of Wildlife Conservation, Alaska Department of Fish and Game, 333 Raspberry Road, Anchorage, Alaska 99518. Unpublished data.

[3] National Marine Mammal Laboratory, Alaska Fisheries Science Center, National Marine Fisheries Service, 7600 Sand Point Way, Seattle, Washington 98115. Unpublished data.

ACKNOWLEDGMENTS

We thank our pilots D. Vollum and L. Teufel of Aero Planes, Hillsboro, Oregon, for aircraft transportation during aerial surveys. We thank the captains and crews of M/V *Tiglax* and F/V *Pacific Star* for vessel support during pup counts in the Gulf of Alaska and Aleutian Islands. We greatly appreciate the wide-ranging assistance from personnel of the Alaska Maritime National Wildlife Refuge in Homer, Alaska, and especially J. Mueller and C. Hill of the Refuge's Aleutian Islands Unit on Adak Island The National Marine Fisheries Service Observer Program, the Dutch Harbor Airport Manager, and Delta Western Fuels, provided valuable assistance in Dutch Harbor, Alaska. J. Cesarone (NMML), W. Testa (NMML), and Brian Mullaly (Alaska SeaLife Center, Seward, Alaska) participated in the aerial survey. Many individuals including NMFS personnel and cooperating scientists participated in pup counts. B. Fadely, L. Fritz, T. Loughlin, and A. York provided comments on early drafts of the manuscript. G. Duker and J. Lee provided editorial support. We conducted these surveys under the authority of NOAA MMPA/ESA Permit No. 782-1532-00 and Special Use Permit No. 51576 from the Alaska Maritime National Wildlife Refuge.

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Table 1.--Counts of adult and juvenile (non-pup) Steller sea lions at rookery (*) and haul-out sites in Alaska, June and July 2002. Trend sites (+) are those sites used for analyses of trends in survey counts. Counts are from photographs (P) or visual (V).

	Non-pup count			Pup count	
Location	Date	Type	Count	Date	Count
Eastern Gulf of Alaska					
Sitkagi Bluffs +	13 June	V	0		
Cape St. Elias +	14 June	P	574		
Hook Point	14 June	P	258		
Cape Hinchinbrook	14 June	P	107		
Seal Rocks +*	14 June	P	768		
Fish (Wooded) +	14 June	P	396	22 June	86[1]
Middleton	14 June	V	0		
Glacier +	14 June	P	435		
Point Eleanor	14 June	V	0		
The Needle +	14 June	P	115		
Perry	14 June	V	0		
Pleiades	14 June	V	0		
Point LaTouche	14 June	V	2		
Danger	14 June	V	0		
Point Elrington +	14 June	P	114		
Procession Rocks	14 June	P	147		
Cape Puget	14 June	V	0		
Cape Junken	14 June	V	0		
Cape Fairfield	14 June	V	2		
Cape Resurrection	14 June	P	84		
Rugged +	14 June	V	0		
Aialik Cape	14 June	V	6		
Chiswell Islands +	14 June	P	97		
Granite Cape	14 June	P	68		
Seal Rock (Kenai) +	14 June	V	1		
Steep Point	14 June	P	8		
Rabbit	14 June	V	0		

Table 1.--Counts of adult and juvenile Steller sea lions in Alaska, June and July 2002, continued.

	Non-pup count			Pup count	
Location	Date	Type	Count	Date	Count
Subtotals for the Eastern Gulf of Alaska					
All 27 surveyed sites			**3,182**		
10 trend rookery and haul-out sites			**2,500**		
1 trend rookery site			**768**		
Central Gulf of Alaska					
Outer *	14 June	P	226	6 July	58
Nuka Point	14 June	V	0		
Gore Point	14 June	V	0		
East Chugach	14 June	V	0		
Perl	14, 25 June	P	98		
Perl Rocks	14, 25 June	V	0		
Nagahut Rocks	14, 25 June	V	0		
Cape Elizabeth	14 June	P	177		
Flat	14, 25 June	V	0		
West Amatuli	14 June	V	n.s.[2]		
Sugarloaf +*	14, 25 June	P	736		
Ushagat +	14, 25 June	P	116		
Rocks south of Ushagat +	14, 25 June	P	4		
Sud			n.s.		
Latax Rocks +	14, 25 June	P	144		
Sea Otter	14, 25 June	P	45		
Afognak/Tonki Cape	14 June	V	0		
Sea Lion Rocks (Marmot) +	14, 25 June	V	0		
Marmot +*	14, 15, 25 June	P	848	22 June	515[1]
Long +	14, 15, 25 June	P	80		
Kodiak/Cape Chiniak +	15, 25 June	P	102		
Ugak	15 June	V	0		
Kodiak/Gull Point	15, 25 June	P	99		
Kodiak/Cape Barnabas +	15, 25 June	V	0		
Twoheaded +	15, 25 June	P	227		
Cape Sitkinak +	16, 25 June	P	91		
Sundstrom	16 June	V	0		

Table 1.--Counts of adult and juvenile Steller sea lions in Alaska, June and July 2002, continued.

	Non-pup count			Pup count	
Location	Date	Type	Count	Date	Count
Kodiak/Cape Alitak	16 June	V	0		
Cape Ikolik	16, 25 June	P	74		
Tombstone Rock	16 June	V	0		
Kodiak/Sturgeon Head	16 June	V	0		
Kodiak/Cape Uyak	16 June	V	0		
Kodiak/Cape Kuliuk	16 June	V	0		
Kodiak/Cape Ugat	16, 25 June	P	104		
Noisy	15 June	V	0		
Kodiak/Malina Point	15 June	V	0		
Kodiak/Steep Cape	15 June	P	28		
Kodiak/Cape Paramanof	15 June	V	0		
Cape Shaw	15 June	P	52		
Cape Douglas	15 June	V	0		
Shakun Rocks	15, 25 June	P	45		
Cape Nukshak	15 June	V	0		
Cape Ugyak	15 June	V	0		
Cape Gull	15 June	V	0		
Cape Kuliak	15 June	V	0		
Takli	15, 25 June	P	79		
Puale Bay	15, 25 June	P	94		
Kilokak Rocks	15 June	P	88		
Aiugnak Columns	16 June	P	0		
Ugaiushak +	16 June	V	2		
Sutwik +	16 June	P	114		
Aghiyuk			n.s.		
Chowiet +*	16, 24 June	P	582		
Chirikof +*	16 June	P	320	1 July	225
Nagai Rocks	16, 24 June	P	230	1 July	19
Subtotals for the Central Gulf of Alaska					
All 52 surveyed sites			**4,805**		
15 trend rookery and haul-out sites			**3,366**		
4 trend rookery sites			**2,486**		

Table 1.--Counts of adult and juvenile Steller sea lions in Alaska, June and July 2002, continued.

	Non-pup count			Pup count	
Location	Date	Type	Count	Date	Count
Western Gulf of Alaska					
Lighthouse Rocks	16, 24 June	P	84	30 June	7
Atkulik	16 June	V	0		
Kak	16 June	P	108		
Chankliut	16 June	P	28		
Seal Cape	16 June	V	0		
Mitrofania	16 June	P	150		
Spitz +	16 June	P	0		
Kupreanof Point	16 June	P	64		
Castle Rock +	16 June	P	75		
Big Koniuji	16 June	V	0		
Atkins +*	16 June	P	560	30 June	224
Chernabura +*	16 June	P	496		
Twins	16 June	V	0		
The Haystacks	16 June	P	50	29 June	0
The Whaleback	16 June	P	116	29 June	16
Nagai					
Mountain Point +	16 June	P	105		
Rocks west of Cape Wedge	16 June	V	0		
Egg (Sand Point)	16 June	V	0		
Sea Lion Rocks (Shumagins) +	16 June	P	26		
Unga					
Cape Unga	16 June	V	0		
Acheredin Pt.	17 June	P	188		
Jude	17, 24 June	P	374	29 June	119
Omega	17 June	V	0		
Wosnesenski	17 June	V	2		
Olga Rocks	17 June	P	164		
Sushilnoi Rocks	17 June	P	110		
Pinnacle Rock +*	17 June	P	1,034	28 June	769
Rocks 1.5 nm NW of Pinnacle Rk	17 June	P	12		
Hunt			n.s.		
Sozavarika			n.s.		

Table 1.--Counts of adult and juvenile Steller sea lions in Alaska, June and July 2002, continued.

	Non-pup count			Pup count	
Location	Date	Type	Count	Date	Count
Umga			n.s.		
Clubbing Rocks +*	17 June	P	830		
Cherni	17 June	V	0		
Hague	17 June	V	1		
Caton	17 June	P	89		
South Rock	17 June	P	262		
Sanak			n.s.		
Bird +	17 June	P	95		
Rock	17 June	V	0		
Subtotals for the Western Gulf of Alaska					
All 35 surveyed sites			**5,023**		
9 trend rookery and haul-out sites			**3,221**		
4 trend rookery sites			**2,920**		
Eastern Aleutian Islands					
Unimak					
Cape Lasaref	17 June	V	0		
Cape Lutke	17 June	V	0		
Scotch Cap	17 June	V	0		
Sennett Point	17 June	V	0		
Cape Sarichef	17, 24 June	P	320		
Cave Point	17 June	V	0		
Oksenof Point	17 June	V	0		
Amak +	17, 24 June	P	563	25 June	3
Sea Lion Rocks (Amak) +*	17, 24 June	P	507	25 June	160
Ugamak and Round +*	17, 24 June	P	1044	8, 9 July	482 [3]
Aiktak	17, 24 June	P	75	27 June	10
Kaligigan	17 June	V	2		
Tigalda/NE Rocks	17, 24 June	P	134		
Tigalda/South side	17, 24 June	P	38		
Basalt Rock	17 June	V	0		
Rootok	17, 24 June	P	84		
Tanginak	17, 24 June	P	3		

Table 1.--Counts of adult and juvenile Steller sea lions in Alaska, June and July 2002, continued.

	Non-pup count			Pup count	
Location	Date	Type	Count	Date	Count
Akun					
Jackass Point	17 June	V	0		
Akun Bay	17 June	V	0		
Round Head	17 June	V	0		
Billings Head +*	17, 24 June	P	275	25 June	55
Akun Head	17 June	V	0		
Akutan					
North Head	17 June	V	0		
Reef Point/Lava Bight +	17, 24 June	P	36		
Cape Morgan +*	17, 24 June	P	783		
Battery Point			n.s.		
Baby Islands			n.s.		
Old Man Rocks	17, 18, 24 June	P	25		
Egg	17 June	V	1		
Outer Signal	18, 24 June	V	0		
Inner Signal	17, 18, 24 June	V	5		
Unalaska					
Cape Sedanka	18 June	V	106		
Priest Rock	17, 18, 24 June	V	2		
Cape Wislow	18 June	V	0		
Bishop Point	18, 24 June	P	122		
Point Kadin	18 June	P	41		
Cape Kovrizhka	18 June	V	0		
Makushin Bay/North Side	18, 22 June	P	46		
Makushin Bay	18, 22 June	P	6		
Cape Starichikof	18 June	V	0		
Spray Cape	18 June	V	67		
Whalebone Cape	18 June	V	0		
Cape Izigan	18, 24 June	P	211		
Bogoslof +*	18, 24 June	P	356	9 July	180
Umnak					
Cape Idak	18 June	V	0		
Reindeer Point	18 June	V	0		

Table 1.--Counts of adult and juvenile Steller sea lions in Alaska, June and July 2002, continued.

Location	Non-pup count Date	Type	Count	Pup count Date	Count
Cape Chagak	18 June	V	0		
Aguliuk Point	18 June	V	0		
Cape Aslik +	18, 22 June	P	52		
Emerald	18 June	V	0		
Polivnoi Rock	18, 24 June	P	98		
The Pillars	18 June	P	14		
Ogchul +*	18, 24 June	P	105		
Rocks 2.7 nm west of Ogchul	24 June	V	2		
Vsevidof +	18, 24 June	P	34		
Samalga	18 June	V	0		
Adugak +*	18, 22 June	P	201	25 June	160
Subtotals for the Eastern Aleutian Islands					
All 55 surveyed sites			**5,358**		
11 trend rookery and haul-out sites			**3,956**		
7 trend rookery sites			**3,271**		
Central Aleutian Islands					
Uliaga	18 June	P	121		
Kagamil +	18 June	P	12		
Chuginadak +	18 June	P	62		
Carlisle +	18 June	P	0		
Herbert +	18 June	P	2		
Yunaska +*	18 June	P	276	25 June	145
Chagulak +	18 June	P	5		
Amukta +	18 June	P	42		
Seguam					
Saddleridge +*	18, 22 June	P	666		
Other +	18, 22 June	P/V	220	26 June	23
Agligadak +*	19 June	P	82		
Amlia					
East Cape +	19 June	P	82		
Sviechnikof Harbor *	19 June	P	98	19 June	18[4]
Cape Misty	19 June		42		

Table 1.--Counts of adult and juvenile Steller sea lions in Alaska, June and July 2002, continued.

	Non-pup count			Pup count	
Location	Date	Type	Count	Date	Count
Tanadak + (Amlia)	19 June	P	32		
Sagigik +	19 June	P	40		
Amatagis			n.s.		
Sagchudak			n.s.		
Atka					
North Cape +	19 June	P	224		
Cape Korovin +	19 June	V	1		
Salt +	19 June	V	0		
Koniuji	19 June	V	0		
Kasatochi +*	19 June	P	529	28 June	302
Oglodak	21 June	P	76		
Ikiginak +	21 June	P	8		
Fenimore	21 June	P	22		
Tagalak	21 June	P	28		
Chugul	21 June	P	52		
Anagaksik +	21 June	P	40		
Igitkin			n.s.		
Great Sitkin	19 June	P	106		
Little Tanaga + (including Silak I.)	21 June	P	82		
Kagalaska	19, 21 June	P	34		
Adak					
Argonne Point/Cape Moffet +	19 June	P/V	99		
Cape Yakak/Lake Point +*	21 June	P	821	29 June	363
Crone	21 June	V	2		
Kanaga					
North Cape/Cape Miga	19 June	P	12		
Ship Rock	19 June	P	242		
Cape Chunu	19 June	V	62		
Bobrof	19 June	V	28		
Tanaga					
Bumpy Point	19 June	P	26		
Cape Sasmik	19 June	P	148		

Table 1.--Counts of adult and juvenile Steller sea lions in Alaska, June and July 2002, continued.

	Non-pup count			Pup count	
Location	Date	Type	Count	Date	Count
Ilak	19 June	P	46		
Gramp Rock +*	19 June	P	600	30 June	444
Ugidak +	19 June	P	23		
Tag +*	19 June	P	279	30 June	153
Ogliuga	19 June	V	34		
Skagul			n.s.		
Gareloi	19 June	V	0		
Kavalga +	19 June	P	18		
Unalga and Dinkum Rocks +	19 June	P	46		
Ulak/Hasgox Point +*	21 June	P	481	30 June	331
Amatignak					
Knob Point +	21 June	V	0		
Nitrof Point +	21 June	P	40		
Semisopochnoi					
Pochnoi Point *	20 June	P	70	7 July	0
Petrel Point	20 June	P	18		
Tuman Point	20 June	V	0		
Southwestern point	20 June	P	18		
Southern tip	20 June	P	11		
Amchitka					
Ivakin Point +	20 June	V	0		
East Cape +	20 June	P	186	1 July	0
Omega Point	20 June	V	0		
Cape St. Makarias	20 June	V	0		
Column Rocks *	20 June	P	71	1 July	52
Bird	20 June	V	0		
Chitka Point	20 June	P	21		
Ayugadak +*	20 June	P	182	1 July	90
Rat	20 June	P	28		
Little Sitkin	20 June	V	0		
Segula	20 June	V	0		
Sea Lion Rocks (Kiska)	20 June	P	1		
Tanadak (Kiska)	20 June	P	54		

Table 1.--Counts of adult and juvenile Steller sea lions in Alaska, June and July 2002, continued.

	Non-pup count			Pup count	
Location	Date	Type	Count	Date	Count
Kiska					
Twin Rocks	20 June	P	23		
South Head	20 June	V	0		
Gertrude-Bukhti Pt.	20 June	V	0		
Sobaka-Vega Pt.	20 June	P	54		
Cape St. Stephen +*	20 June	P	126	2 July	71
Lief Cove +*	20 June	P	174	2 July	158
Witchcraft Point	20 June	V	0		
Wolf Point	20 June	V	4		
Sirius Point	20 June	V	0		
Pillar Rock	20 June	P	3		
Subtotals for the Central Aleutian Islands					
All 78 surveyed sites			**7,035**		
35 trend rookery and haul-out sites			**5,480**		
11 trend rookery sites			**4,216**		
Western Aleutian Islands					
Buldir +*	20 June	P	94	3 July	42
Ingenstrem Rocks	20 June	V	0		
Shemya	20 June	P	34		
Nizki	20 June	V	0		
Alaid +	20 June	P	158		
Agattu					
Cape Sabak +*	20 June	P	307	4 July	212
Gillon Point +*	20 June	P	258	4 July	159
Attu					
Massacre Bay and 'Dan's Rocks'	20 June	V/P	3		
Chirikof Point	20 June	P	19		
Chichagof Point	20 June	P	62		
Kresta Point	20 June	V	0		
Cape Wrangell *	20 June	P	264	3 July	75

Table 1.--Counts of adult and juvenile Steller sea lions in Alaska, June and July 2002, continued.

	Non-pup count			Pup count	
Location	Date	Type	Count	Date	Count
Subtotals for the Western Aleutian Islands					
All 12 surveyed sites			**1,199**		
4 trend rookery and haul-out sites			**817**		
3 trend rookery sites			**659**		
Totals for Kenai-to-Kiska index area					
All 220 surveyed sites			**22,221**		
70 trend rookery and haul-out sites			**16,023**		
26 trend rookery sites			**12,893**		
Totals for the western stock (west of 144° W)					
All 259 surveyed sites			**26,602**		
84 trend rookery and haul-out sites			**19,340**		
30 trend rookery sites			**14,320**		

[1] Pup counts for Fish (Wooded) and Marmot Islands from medium-format, vertical photographs: Southwest Fisheries Science Center, National Marine Fisheries Service, 8604 La Jolla Shores Drive, La Jolla, CA 92037. Unpublished data.

[2] "n.s." indicates sites not surveyed in 2002.

[3] Pup count for Ugamak Island made from observation points at periphery of rookery.

[4] Pup count for Sviechnikof Harbor, Amlia Island, made from oblique digital aerial photographs.

Table 2.--Counts of adult and juvenile (non-pup) Steller sea lions at trend rookeries, at all trend sites, and at all surveyed sites in the Kenai-to-Kiska index area and Alaska-wide for June-July aerial surveys from 1991 to 2002, including the number of sites (n) surveyed in each region in 2002, the percent change from 1991 or 2000 to 2002, estimated annual rates of change, upper and lower 95% confidence intervals, and significance (P) for the linear regressions.

	Kenai-to-Kiska index area			Western stock in Alaska		
Year	Trend rookeries (n=26)	All trend sites (n=70)	All surv. Sites (n=220)	Trend rookeries (n=30)	All trend sites (n=84)	All surv. Sites (n=259)
1991	17,181	21,726	27,454	21,086	29,405	37,186
1992	16,593	20,692	26,970	19,908	27,299	35,887
1994	14,534	18,736	25,997	16,983	24,136	33,353
1996	13,902	17,891	24,603	16,353	22,210	30,595
1998	12,116	16,417	24,380	14,489	20,438 *	29,475 *
2000	11,738	15,279	21,381	13,402	18,325	25,384
2002	12,893	16,023	22,221	14,320	19,340	26,602
Percent change						
2000 to 2002	+ 9.84	+ 4.87	+ 3.93	+ 6.85	+ 5.54	+ 4.80
1998 to 2002	+ 6.41	- 2.40	- 8.86	- 1.17	- 5.37	- 9.75
1991 to 2002	- 24.96	- 26.25	- 19.06	- 32.09	- 34.23	- 28.46
Estimated annual rates of change: 1991 to 2002						
Annual change	- 3.24	- 3.09	- 2.20	- 3.94	- 4.15	- 3.43
Upper 95 % C.I.	- 1.42	- 1.99	- 1.40	- 2.32	- 2.78	- 2.45
Lower 95 % C.I.	- 5.05	- 4.18	- 3.00	- 5.55	- 5.52	- 4.41
P	0.006	< 0.001	< 0.001	0.002	< 0.001	< 0.001

* Includes 1999 counts substituted for incomplete 1998 counts in the eastern Gulf of Alaska.

Table 3.--Counts of adult and juvenile (non-pup) Steller sea lions observed at **rookery and haul-out trend sites** in seven subareas of Alaska during June and July aerial surveys from 1991 to 2002, including overall percent change from between 1991, 1998, and 2000 to 2002 and estimated annual rates of change from 1991 to 2002.

	Gulf of Alaska			Aleutian Islands				
Year	Eastern (n=10)	Central (n=15)	Western (n=9)	Eastern (n=11)	Central (n=35)	Western (n=4)	Kenai to Kiska (n=70)	Western stock (n=84)
1991	4,596	6,270	3,732	4,228	7,496	3,083	21,726	29,405
1992	3,738	5,739	3,716	4,839	6,398	2,869	20,692	27,299
1994	3,365	4,516	3,981	4,419	5,820	2,035	18,736	24,136
1996	2,132	3,913	3,739	4,715	5,524	2,187	17,891	22,210
1998	2,110 *	3,467	3,360	3,841	5,749	1,911	16,417	20,438 *
2000	1,975	3,180	2,840	3,840	5,419	1,071	15,279	18,325
2002	2,500	3,366	3,221	3,956	5,480	817	16,023	19,340
Percent change								
2000-2002	+ 26.6	+ 5.8	+ 13.4	+ 3.0	+ 1.1	- 23.7	+ 4.87	+ 5.54
1998-2002	+ 18.5	- 2.9	- 4.1	+ 3.0	- 4.7	- 57.2	- 2.40	- 5.37
1991-2002	- 45.6	- 46.3	- 13.7	- 6.4	- 26.9	- 73.5	- 26.25	- 34.23
Estimated annual rates of change: 1991 to 2002								
Annual change	-6.6	-6.2	-2.2	-1.6	-2.3	-11.4	-3.1	-4.1
Upper 95 %	-1.3	-3.7	-0.2	+0.4	-0.4	-7.1	-2.0	-2.8
Lower 95 %	-11.9	-8.7	-4.2	-3.6	-4.2	-15.7	-4.2	-5.5
P	0.024	0.001	0.038	0.090	0.025	0.001	< 0.001	< 0.001

* 1999 counts substituted for sites in the eastern Gulf of Alaska not surveyed in 1998.

Table 4.--Counts of adult and juvenile (non-pup) Steller sea lions observed at **rookery trend sites** in seven subareas of Alaska during June-July aerial surveys from 1991 to 2002, including overall percent change from 1991, 1998, and 2000 to 2002 and estimated annual rates of change from 1991 to 2002.

Year	Gulf of Alaska			Aleutian Islands			Kenai to Kiska (n=26)	Western stock (n=30)
	Eastern (n=1)	Central (n=4)	Western (n=4)	Eastern (n=7)	Central (n=11)	Western (n=3)		
1991	1,220	4,336	3,234	3,516	6,095	2,685	17,181	21,086
1992	784	4,308	3,313	3,712	5,260	2,531	16,593	19,908
1994	636	3,098	3,155	3,514	4,767	1,813	14,534	16,983
1996	544	2,795	3,029	3,538	4,540	1,907	13,902	16,353
1998	730 [1]	2,255	2,948	2,719	4,194	1,643	12,116	14,489 [1]
2000	749	2,157	2,613	2,731	4,237	915	11,738	13,402
2002	768	2,486	2,920	3,271	4,216	659	12,893	14,320
Percent change								
2000-2002	+ 2.5	+ 15.3	+ 11.7	+ 19.8	< 1	- 28.0	+ 9.84	+ 6.85
1998-2002	+ 5.2	+ 10.2	< 1	+ 20.3	< 1	- 59.9	+ 6.41	- 1.17
1991-2002	- 37.0	- 42.7	- 9.7	- 7.0	- 30.8	- 75.5	- 24.96	- 32.09
Estimated annual rates of change: 1991 to 2002								
Annual change	-2.2	-6.3	-1.6	-2.1	-3.1	-12.1	-3.2	-3.9
Upper 95 % C.I.	-- [2]	-2.8	-0.4	+0.6	-1.3	-7.5	-1.4	-2.3
Lower 95 % C.I.	-- [2]	-9.8	-2.8	-4.8	-4.8	-16.6	-5.1	-5.6
P	0.427	0.006	0.020	0.104	0.006	0.001	0.006	0.002

[1] 1999 counts substituted for sites in the eastern Gulf of Alaska not surveyed in 1998.
[2] No C.I. reported for P ' 0.427.

Table 5.--Counts of adult and juvenile (non-pup) Steller sea lions observed at **all surveyed rookery and haul-out sites** for seven subareas of Alaska during June and July aerial surveys from 1991 to 2002, including overall percent change from 1991, 1998, and 2000 to 2002 and estimated annual rates of change from 1991 to 2002.

Year	Gulf of Alaska			Aleutian Islands			Kenai to Kiska (n=220)	Western stock (n=259)
	Eastern (n=27)	Central (n=52)	Western (n=35)	Eastern (n=55)	Central (n=78)	Western (n=12)		
1991	4,812	7,872	5,338	5,285	8,959	4,920	27,454	37,186
1992	4,386	7,462	5,495	5,711	8,302	4,531	26,970	35,887
1994	3,989	6,788	5,717	5,875	7,617	3,367	25,997	33,353
1996	2,585	5,744	5,722	5,967	7,170	3,407	24,603	30,595
1998	2,230 [1]	5,022	5,850	5,837	7,671	2,865	24,380	29,475 [1]
2000	2,353	4,817	4,568	4,996	7,000	1,650	21,381	25,384
2002	3,182	4,805	5,023	5,358	7,035	1,199	22,221	26,602
Percent change								
2000-2002	+ 35.2	< 1	+ 10.0	+ 7.2	< 1	- 27.3	+ 3.92	+ 4.80
1998-2002	+ 42.7	- 4.3	- 14.1	- 8.2	- 8.3	- 58.2	- 8.86	- 9.75
1991-2002	- 33.9	- 39.0	- 5.9	+ 1.4	- 21.5	- 75.6	- 19.06	- 28.46
Estimated annual rates of change: 1991 to 2002								
Annual change	-5.7	-5.0	-1.1	-0.5	-1.9	-12.2	-2.2	-3.4
Upper 95 % C.I.	+0.1	-3.6	+1.1	-- [2]	-0.7	-8.1	-1.4	-2.4
Lower 95 % C.I.	-11.5	-6.4	-3.2	-- [2]	-3.2	-16.2	-3.0	-4.4
P	0.054	< 0.001	0.263	0.489	0.012	< 0.001	< 0.001	< 0.001

[1] 1999 counts substituted for sites in the eastern Gulf of Alaska not surveyed in 1998.
[2] No 95% C.I. reported for P ' 0.489.

Table 6.--Counts of Steller sea lion **non-pups** (adults and juveniles) at principal western stock rookeries in Alaska during June and July surveys, 1991 though 2002, including the Chiswell Islands, Nagai Rocks, Jude Island, and Seguam Island (Turf Point), haul-out sites where noteworthy numbers of pups have been counted during recent years.

Rookery	1991	1992	1994	1996	1997	1998	1999	2000	2002
Eastern Gulf of Alaska									
Seal Rocks	1,220	784	636	544		730	624	749	
Fish (Wooded)	1,350	1,005	648	502		330	311	396	
Chiswell Islands *	383	240	180	115			79	54	97
Central Gulf of Alaska									
Outer	489	378	406	318	224	278		262	226
Sugarloaf	1,216	1,186	976	741	624	748		706	736
Marmot	1,458	1,581	1,091	1,102	780	726		671	848
Chowiet	716	771	599	592	538	515		504	582
Chirikof	946	770	432	360	294	266		276	320
Nagai Rocks *	245	362	331	180	204	312		228	230
Western Gulf of Alaska									
Atkins	616	792	571	624	544	602		537	560
Chernabura	650	459	676	422	729	624		496	496

Table 6.--**Non-pup** counts at selected rookeries, 1991-2002, continued.

Rookery	1991	1992	1994	1996	1997	1998	1999	2000	2002
Jude *	363	352	410	355	434	450		391	374
Pinnacle Rock	1,048	1,092	977	1,026	1,007	864		868	1,034
Clubbing Rocks	920	970	931	957	934	858		712	830
Eastern Aleutian Islands									
Sea Lion Rock	300	329	480	590	452	444		258	507
Ugamak (and Round)	1,062	954	971	854	840	742		746	1,044
Akun (Billings Head)	156	271	220	346	247	212		254	275
Akutan (Cape Morgan)	818	1,061	908	934	760	681		739	783
Bogoslof	558	540	413	382		274		347	356
Ogchul	228	235	208	155	166	136		117	105
Adugak	394	322	314	277		230		270	201
Central Aleutian Islands									
Yunaska	398	394	462	340		210		241	276
Seguam (Saddleridge)	684	696	658	553		586		570	666
Seguam (Turf Point) *		101	146	0		0		82	84

Table 6.--**Non-pup** counts at selected rookeries, 1991-2002, continued.

Rookery	1991	1992	1994	1996	1997	1998	1999	2000	2002
Kasatochi	466	376	288	330		350		390	529
Adak (Lake Point-Cape Yakak)	847	615	765	618		683		874	821
Gramp Rock	773	691	537	582		570		580	600
Tag	440	370	309	320		370		301	279
Ulak (Hasgox Point)	1,046	1,059	866	844		698		663	481
Amchitka (Column Rocks)	233	194	188	137		112		92	71
Ayugadak	324	313	284	281		179		146	182
Kiska (Lief Cove)	506	357	358	341		284		272	174
Kiska (Cape St. Stephen)	380	248	232	258		224		152	126
Western Aleutian Islands									
Buldir	587	454	344	312		336		129	94
Agattu (Cape Sabak)	1,428	1,304	961	1,001		826		480	307
Agattu (Gillon Point)	670	773	508	594		481		306	258
Attu (Cape Wrangell)	736	754	839	721		584		310	264

* Haul-out sites where pups have been observed.

Table 7.--Counts of Steller sea lion **pups** at western stock rookeries and other sites in Alaska during June and July surveys, 1990 to 2002, including several haul-out sites where noteworthy numbers of pups have been counted during recent years. Pup counts are beach counts unless indicated otherwise. Underlined bold face counts are included in the 2001-2002 regional totals in Table 8.

Rookery	1990	1994	1996	1997	1998	2000	2001	2002
Eastern Gulf of Alaska								
Seal Rocks	571	598	352	487	542		**500**	
Fish (Wooded)		305	232	123 [1]	147 [2]	149	85 [1]	**86** [1]
Chiswell Islands [3]						58	54	
Central Gulf of Alaska								
Outer	363	119	114	106 [1]	113	108	104 [1]	**58**
Sugarloaf	1,638	958		673	703		**490**	
Marmot	1,611	804	632		642		466 [1]	**515** [1]
Chirikof	607	325			184	187		**225**
Nagai Rocks [3]							35 [1]	19
Chowiet	582 [4]	625			234		**278**	
Western Gulf of Alaska								
Lighthouse Rocks [3]								7
Atkins	433	324	366		352	262		**224**
Chernabura	197	139			54		**92**	
The Haystacks [3]								0
The Whaleback [3]								16
Jude [3]							192 [1]	119
Pinnacle Rock	794 [5]	652			639	634		**769**
Clubbing Rocks		547			448		**490**	
Eastern Aleutian Islands								
Sea Lion Rocks (Amak)					134		165 [1]	160

Table 7.--Counts of Steller sea lion pups in Alaska, 1990-2002, continued.

Rookery	1990	1994	1996	1997	1998	2000	2001	2002
Amak [3]								3
Aiktak [3]								10
Ugamak (including Round)	847	574	706	589	558		570	**482** [2]
Akun (Billingshead)	63	69			56	41		**55**
Akutan (Cape Morgan)	442	631			505		**508**	
Bogoslof	461	302 [6]		281	220	249		**180**
Ogchul		94			42		47	
Adugak	262	180			135	153		**160**
Central Aleutian Islands								
Yunaska	230	217		192	161	136		**145**
Seguam (Saddleridge)	684	444		463	479		**468**	
Seguam (Turf Point) [3]					30 [7]		24	23
Amlia (Sviechnikof Harbor)		26			13			18 [8]
Kasatochi	178	215		268	247			**302**
Adak (Lake Point)		327			340			**363**
Gramp	448	425			456			**444**
Tag	357	234			238			**153**
Ulak (Hasgox Point)	790	638			521			**331**
Semisopochnoi		21			6		3 [1]	0
Amchitka (East Cape)		6			9			0
Amchitka (Column Rocks)	148	114			70			**52**
Ayugadak	163	142			89			**90**
Kiska (Cape St. Stephen)	212	120			54			**71**
Kiska (Lief Cove)	221	233			179			**158**

Table 7.--Counts of Steller sea lion pups in Alaska, 1990-2002, continued.

Rookery	1990	1994	1996	1997	1998	2000	2001	2002
Western Aleutian Islands								
Buldir	381	120[9]		120	122			**42**
Agattu (Cape Sabak)				379	314			**212**
Agattu (Gillon Point)				258	213			**159**
Attu (Cape Wrangell)				222	154			**75**

[1] Count from medium-format photographs: Southwest Fisheries Science Center, National Marine Fisheries Service, 8604 La Jolla Shores Drive, La Jolla, CA 92037 and Division of Wildlife Conservation, Alaska Department of Fish and Game, 333 Raspberry Road, Anchorage, Alaska 99518. Unpublished data.
[2] Counts from observation points at periphery of rookery.
[3] Haul-out sites where pups have been observed.
[4] Mean of 1989 and 1990 counts at Chowiet.
[5] 1991 count at Pinnacle Rocks.
[6] Mean of 1993 and 1995 counts at Bogoslof.
[7] 1999 count for Seguam (Turf Point).
[8] Count from 35-mm oblique aerial photographs for Amlia (Sviechnikof Harbor) in 2002.
[9] 1995 count at Buldir.

Table 8.--Counts of Steller sea lion pups at rookeries in six subareas of the western stock in Alaska from 1990-1991 to 2001-2002. The 2001-2002 composite pup count included 7 counts from 2001and 24 counts from 2002. The 1990-1992 composite count included 2 counts from 1991 and 1 from 1992. Blank cells indicate incomplete counts in a region.

Count year(s)	Gulf of Alaska			Aleutian Islands			Kenai to Kiska (n=25)	Western stock (n=31)
	Eastern (n=2)	Central (n=5)	Western (n=4)	Eastern [1] (n=5)	Central [2] (n=11)	Western (n=4)		
1990-1991		4,801	1,857	2,075	3,568		12,301	
1994	903	2,831	1,662	1,776	3,109		9,378	
1996	584							
1997	610					979		
1998	689	1,876	1,493	1,474	2,834	803	7,677	9,169
2001-2002	586	1,566	1,575	1,385	2,577	488	7,103	8,177
Percent change								
1990-1991 to 2001-2002		-67.4%	-15.2%	-33.3%	-27.8%		-42.3%	
1994 to 2001-2002	-35.1%	-44.7%	-5.2%	-22.0%	-17.1%		-24.3%	
1998 to 2001-2002	-14.9%	-16.5%	5.5%	-6.0%	-9.1%	-39.2%	-7.5%	-10.8%

[1] Does not include Sea Lion Rocks (Amak) or Ogchul.
[2] Does not include Semisopochnoi, Amchitka (East Cape), or Amlia (Sviechnikof Harbor).

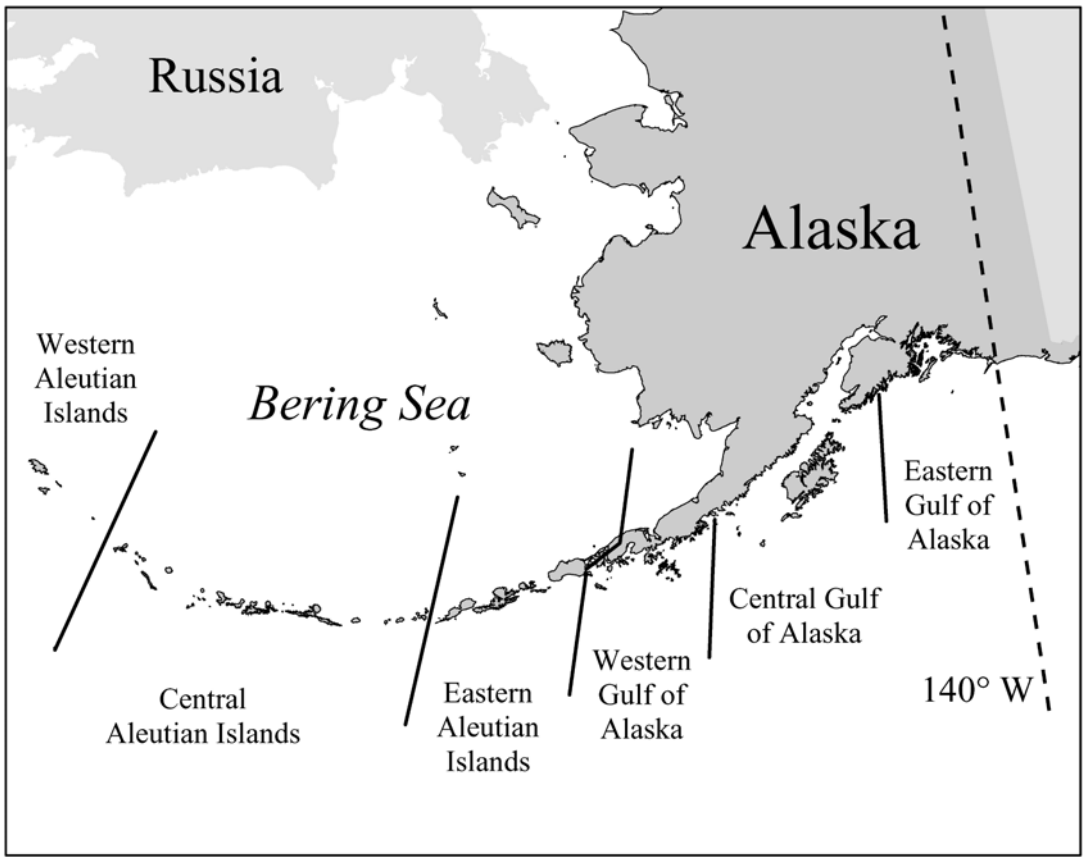


Figure 1.--Map of Alaska, showing seven geographical regions used for analyses of aerial survey results and major rookeries. The dashed line indicates 140° W, the demarcation between the eastern and western stocks of Steller sea lions.

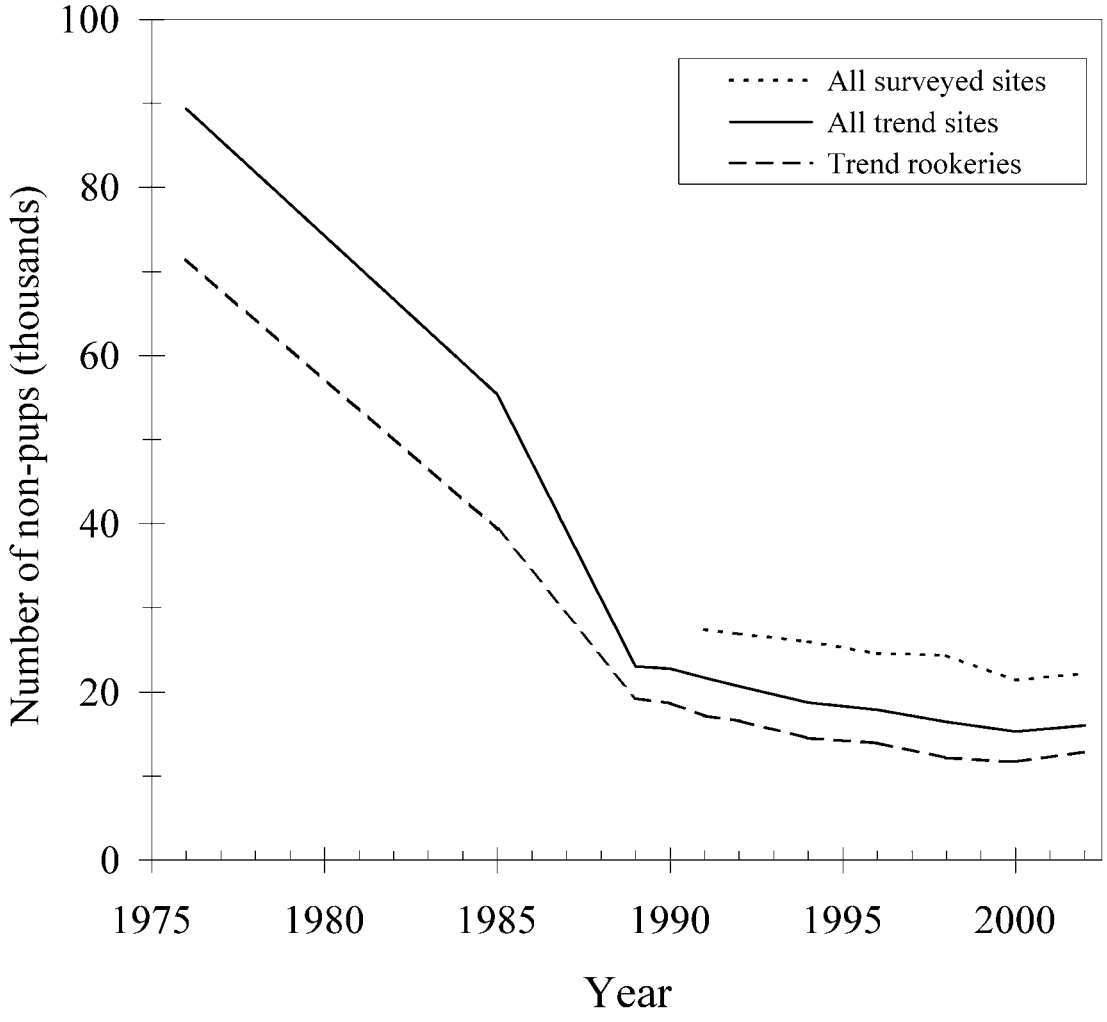
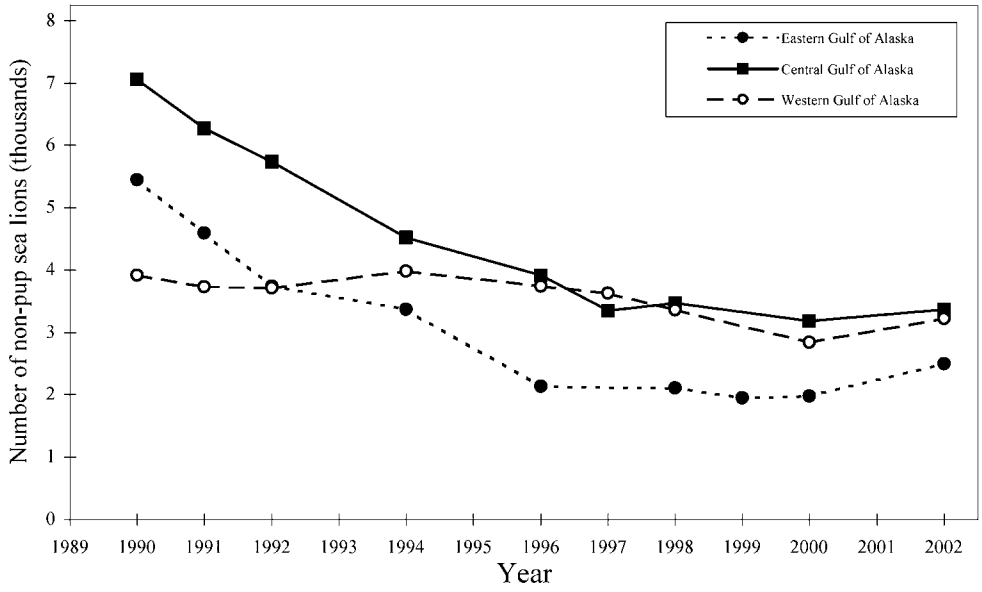


Figure 2.--Counts of non-pup (adult and juvenile) Steller sea lions at all surveyed sites, all trend sites (rookeries and major haulouts), and trend rookeries for the western stock in Alaska, mid-1970s to 2002. All counts are from aerial surveys.



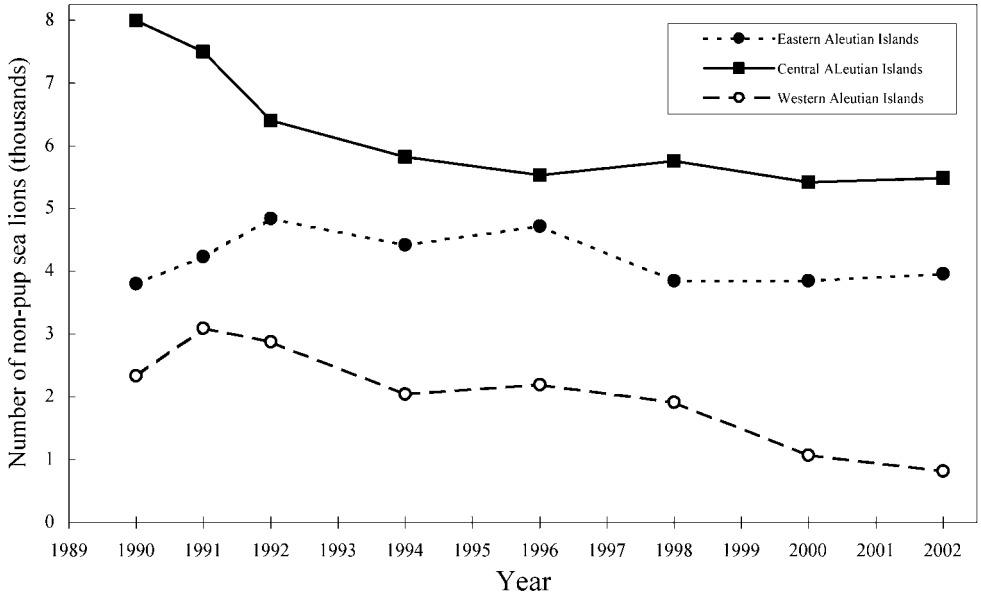


Figure 3.--Numbers of non-pup (adult and juvenile) Steller sea lions counted on rookery and haul-out trend sites in the Gulf of Alaska (top) and the Aleutian Islands (bottom), 1990 to 2002.

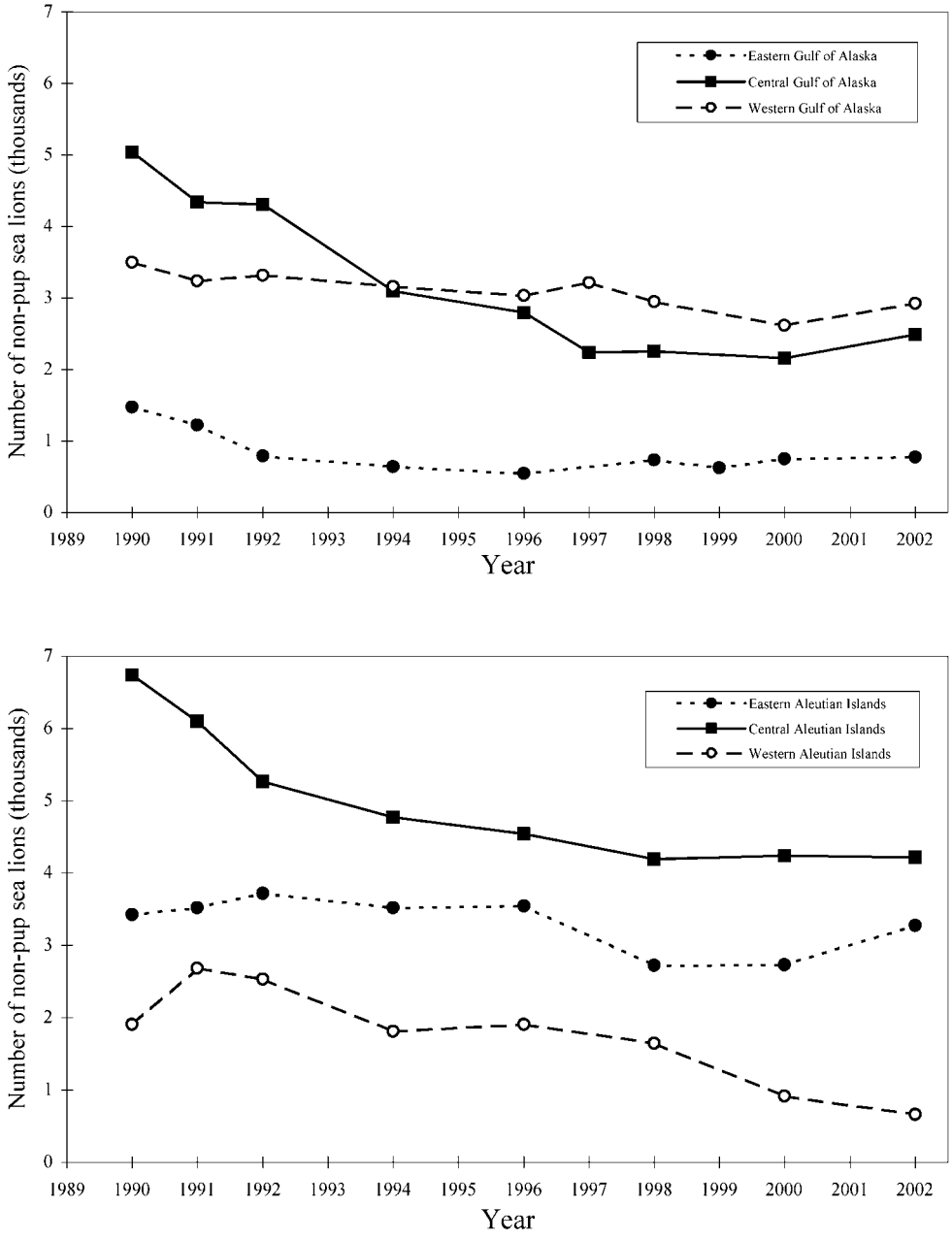


Figure 4.--Numbers of non-pup (adult and juvenile) Steller sea lions counted on trend rookery sites in the Gulf of Alaska (top) and the Aleutian Islands (bottom), 1990 to 2002.

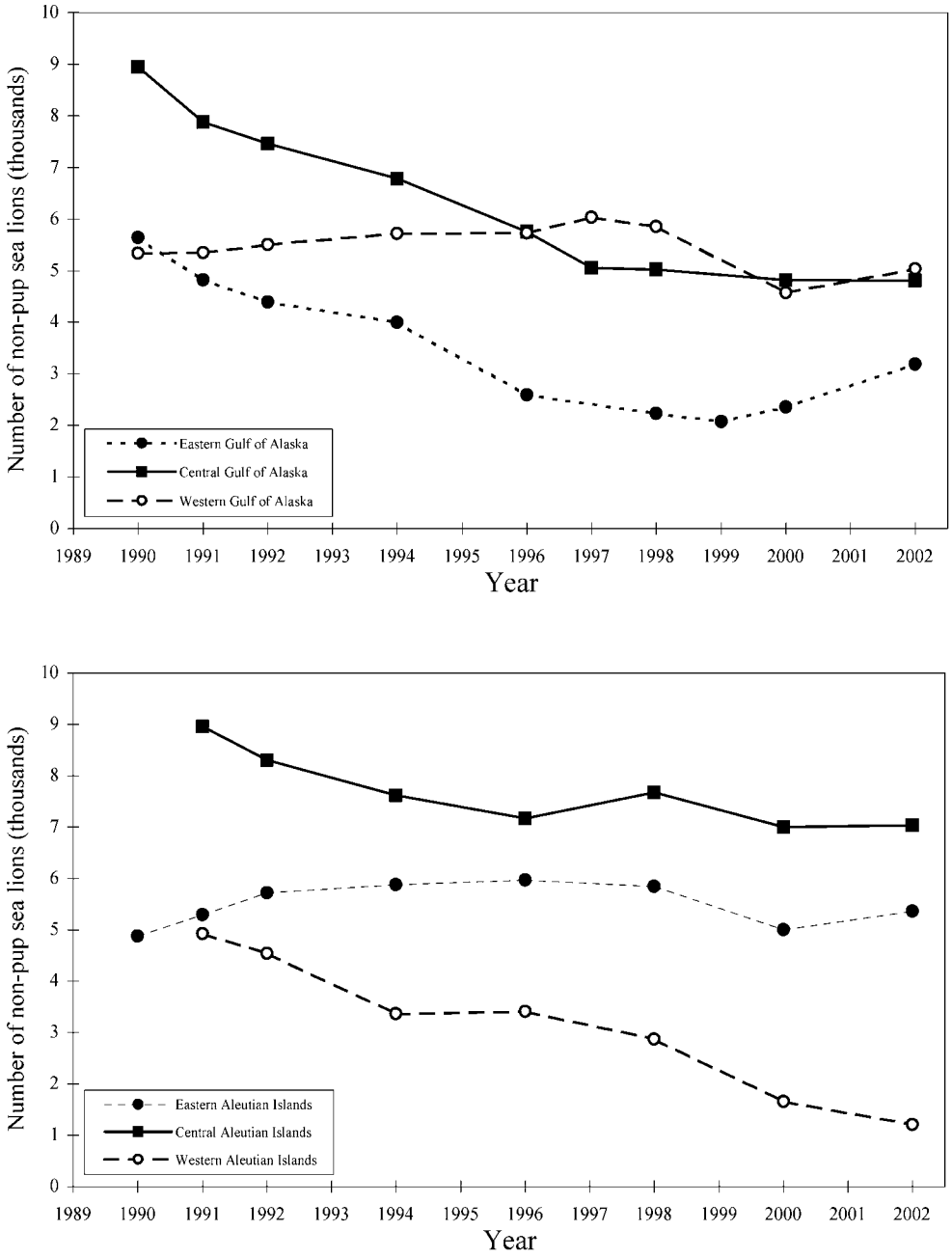


Figure 5.--Numbers of non-pup (adult and juvenile) Steller sea lions counted on all surveyed rookery and haul-out sites in the Gulf of Alaska (top) and the Aleutian Islands (bottom), 1990 to 2002.

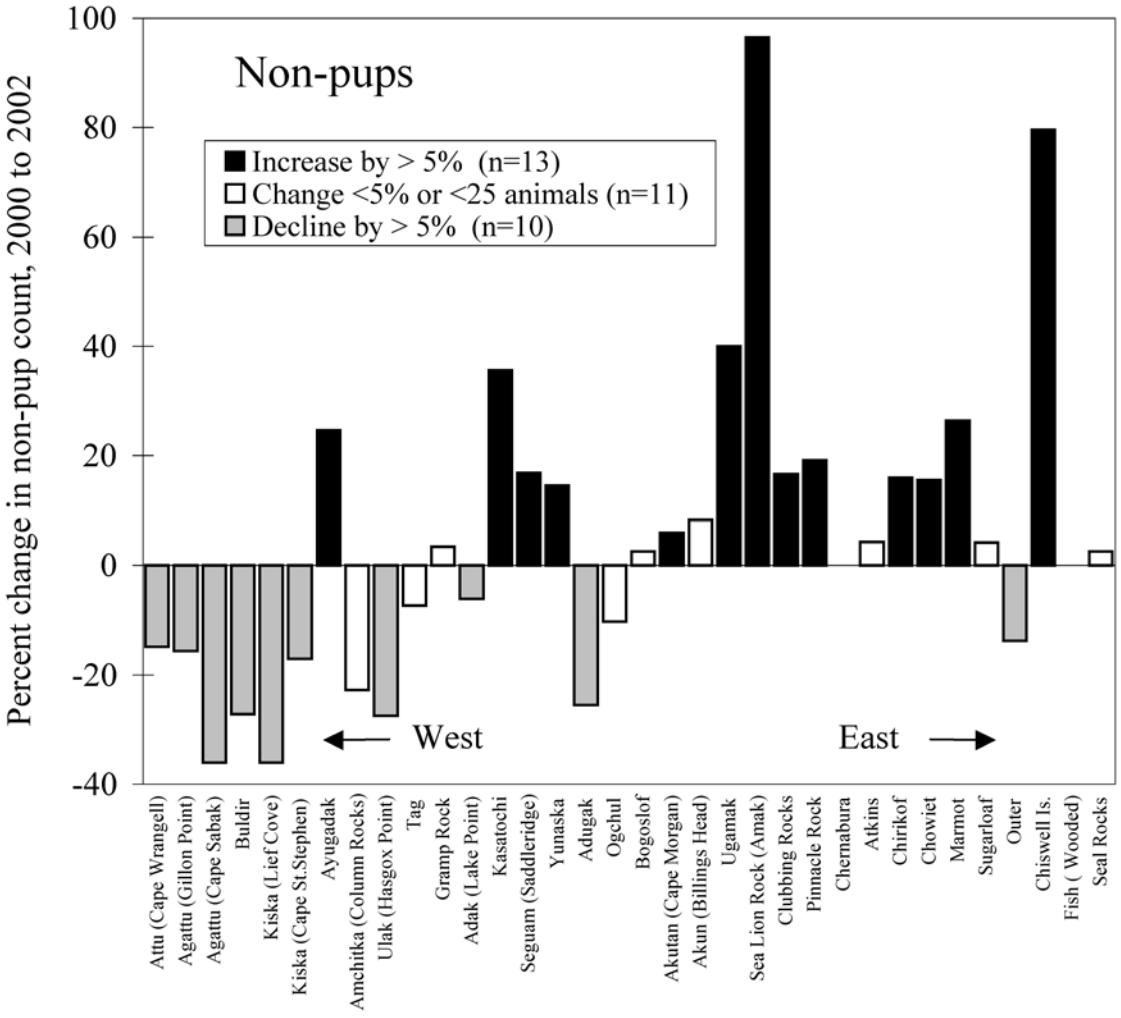


Figure 6.--Percent change in numbers of non-pup Steller sea lions at western stock rookeries from 2000 to 2002. Rookeries are arranged geographically from west (left) to east (right).

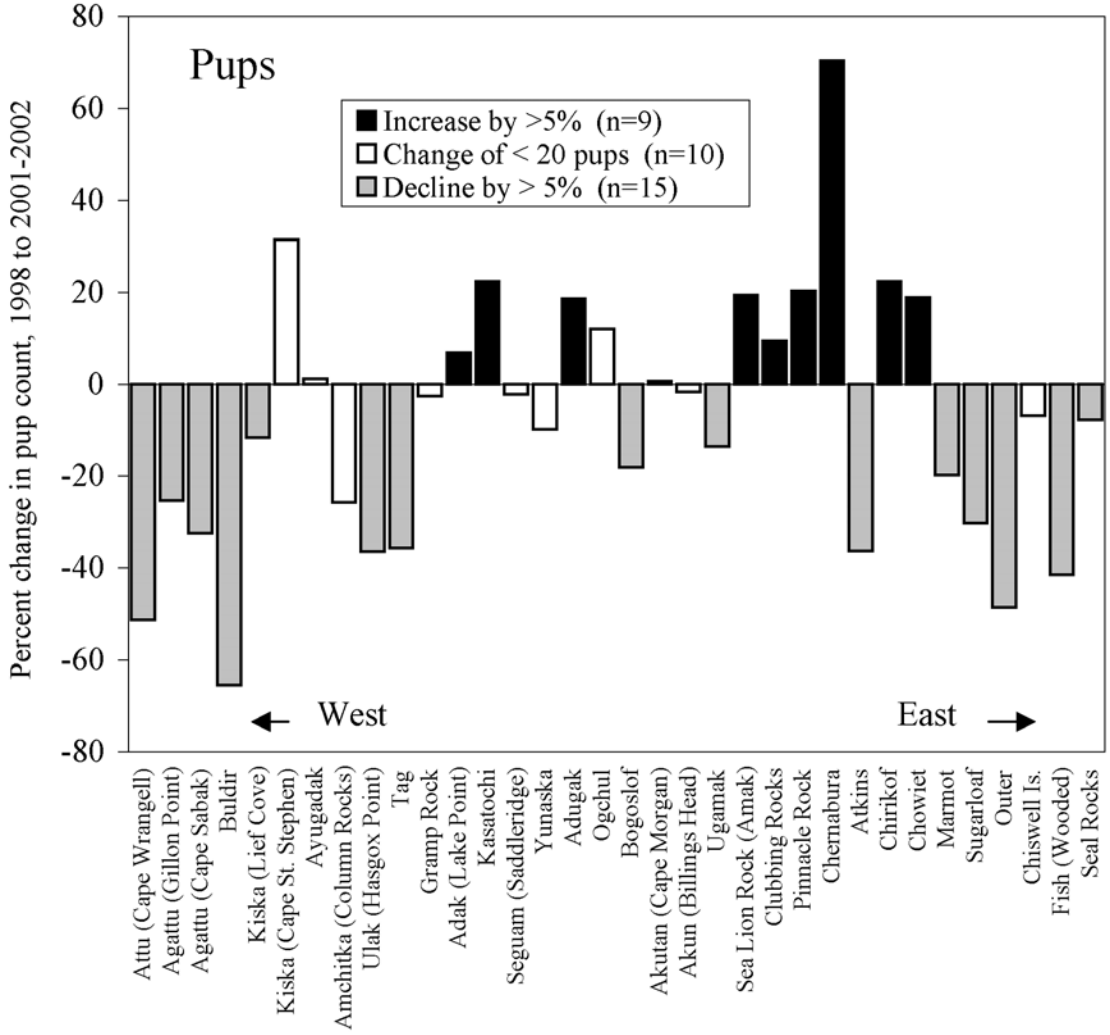


Figure 7.--Percent change in numbers of Steller sea lion pups at western stock rookeries from 1998 to 2001-2002. Rookeries are arranged geographically from west (left) to east (right).

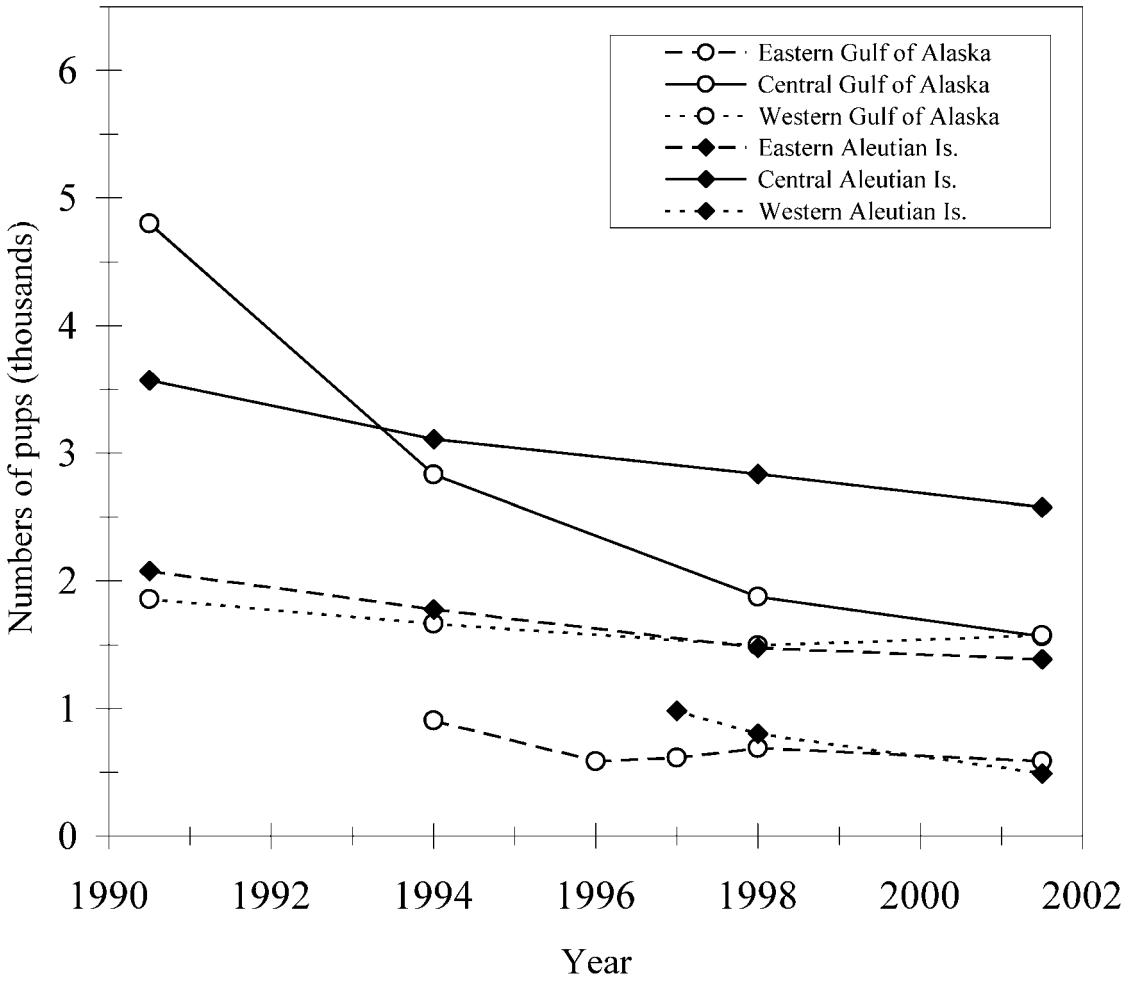


Figure 8.--Counts of Steller sea lion pups at rookeries in Alaska, by region, 1990-1991 to 2001-2002. Counts for individual rookeries and for regional subtotals are provided in Tables 7 and 8, respectively.

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