

A Viability Analysis for the Alaskan Steller Sea Lion Population

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## ABSTRACT

The worldwide population of the Steller sea lion (Eumetopias jubatus) declined more than 50% between the late 1960's and 1989. Numbers in Alaska, where most of the world's Steller sea lion population is concentrated, continued to decline through 1992. As a result, the species was listed under the U.S. Endangered Species Act in 1990 as threatened rangewide. This report describes a population viability analysis prepared to evaluate the potential for extinction of the Alaska population, as well as criteria against which the population's status can potentially be measured.

A population viability analysis was prepared to evaluate the potential for extinction of the Alaskan Steller sea lion population. Three models were developed based on the 1985-92 population trend. Two (an all Alaska model and a Kenai Peninsula-Kiska Island model) were based on the trajectory of the sum of the rookery populations within their respective areas. A third was based on a simulation of the population trajectories of individual rookeries in the Kenai-Kiska area. All three models predicted the Alaska population will be reduced to levels approaching extinction within 100 years from the present, if the 1985-92 trend persists into the future. Both the all Alaska and Kenai-Kiska models predicted the probability of extinction approached 1.0 at 100 years. Mean times to extinction were 75 and 60 years, respectively. The individual rookery simulation

predicted a longer time to extinction due to the persistence of small populations on several rookeries; however, the probability of extinction was still greater than 0.10 at 100 years. Results indicated that, if the 1985-92 trend persists, the next 20 years may be crucial to the survival of the Alaska population. Though the population will not go extinct within 20 years, populations on individual rookeries may be reduced to low levels (mean size may be less than 100 adult females). After 20 years, rookeries may rapidly begin to disappear as the population contracts to the core of the range in the western Gulf of Alaska and eastern Aleutian Islands. At about the time most rookeries have been vacated, extinction probabilities will increase rapidly. Thus, if the 1985-92 trend persists, in 100 years the only Steller sea lions remaining in the U.S. may be in the area between southeastern Alaska and northern California.

These analyses were also performed using three other trends: 1970's-1992, 1985-89, and 1989-92. The first two predicted extinction at least as soon as predicted by the 1985-92 trend. However, should the more moderate recent (1989-92) trend continue mean times to extinction would be significantly longer (i.e., 207 for Alaska and 148 years for Kenai-Kiska).

## INTRODUCTION

Steller sea lions (Eumetopias jubatus) in the 1960's had an estimated population worldwide of 240,000-300,000 animals (Kenyon and Rice 1961). By 1989 the estimated world population had declined to less than 117,000 animals, a decline of more than 50% (Loughlin et al. 1992). Surveys conducted during 1990-92 indicated that numbers have continued to decline in Alaska, the area which includes 70% of the world's population. Currently the population is reduced or declining in the area from the Sea of Okhotsk eastward through the Aleutian Islands and Gulf of Alaska to Prince William Sound, Alaska. Numbers from southeast Alaska southward to Oregon appear stable, though numbers in California continue to decline (Loughlin et al. 1992).

The species was listed in 1990 as threatened rangewide under the U.S Endangered Species Act and depleted under the Marine Mammal Protection Act. A recovery team was appointed by the National Marine Fisheries Service and a recovery plan for the species was prepared. The final plan will include the required delisting criteria, but will not propose criteria for listing the species as threatened or endangered.

The purpose of this document is to support the development of listing criteria for the species. The results of a population viability analysis are presented for the portion of the world's

Steller sea lion population residing in Alaska. Particular attention is given to the Alaskan subpopulation which is currently in decline--Prince William Sound westward. This analysis is meant to determine the probability of persistence of the Alaskan Steller sea lion population should recent downward trends continue. Other areas either were not analyzed because data are lacking (e.g., Russia) or because the stability of the population (e.g., Oregon) results in a very high probability of persistence for the foreseeable future (e.g., for 100 years).

#### METHODS

Thompson (1991) described several approaches to population viability analysis. The most appropriate for use here was the stochastic model of exponential growth developed by Dennis et al. (1991). That model was determined to be appropriate because the primary database available for this analysis was annual population estimates, and these are the only input data required for the model. The Dennis model (Dennis et al. 1991) incorporated "environmental type" stochastic fluctuations based on the variance in the time series and yielded a lognormal probability distribution of population abundance. Maximum likelihood estimates of the two unknown parameters in the model (the slope parameter,  $\mu$ , and the estimate of the error variance parameter,  $\sigma^2$ ) were calculated as:

$$\hat{\mu} = \left[ \sum_{i=1}^q \ln (n_i / n_{i-1}) \right] / \sum_{i=1}^q \tau_i$$

$$\hat{\delta}^2 = (1 / q) \left[ \sum_{i=1}^q (1 / \tau_i) \left[ \ln (n_i / n_{i-1}) - \hat{\mu} \tau_i \right]^2 \right]$$

where the unbiased estimate of  $\hat{\delta}^2$  is calculated as

$$\tilde{\delta}^2 = q \hat{\delta}^2 / (q - 1)$$

and  $n_i$  = population size at time period  $i$

$q$  = number of time periods

$\tau_i$  = interval of time period  $i$

In actual application this involved performing a simple linear regression on the time series. Then based on  $n_q$ ,  $\mu$  and  $\sigma^2$ , the model estimates the continuous rate of increase ( $r$ ), extinction probabilities ( $\pi$ ), mean time (years) to extinction ( $\theta$ ), and population size ( $\psi$ ), assuming trends from the time series ( $\mu$  and  $\sigma^2$ ) remained the same. Maximum likelihood estimates for these values were

$$\hat{r} = \hat{\mu} + (\hat{\delta}^2 / 2)$$

$$\hat{\pi} = (n_{EX} / n_q)^{2\hat{\mu}/\hat{\delta}^2}$$

$$\theta = x_d / |\hat{\mu}|$$

$$\hat{\psi} = n_0 \exp\{[\hat{\mu} + (\hat{\delta}^2 / 2)] t\}$$

where  $n_0$  = initial population size

$n_{EX}$  = extinction population size

$x_d = \ln (n_0 / n_{EX})$

Additional detail on the model is given by Dennis et al. (1991).

Areas outside of Alaska were excluded from this analysis generally because the data was incomplete or had been collected by methods different from the current survey protocol as described by Merrick et al. (1987). This included California, British Columbia, and Russia. Oregon was also excluded because the stability of that population ( $\mu = 0$ ) would lead to an infinite time to extinction under the Dennis model.

Aside from an initial run of the Dennis model for all of Alaska, most of the analysis was focused on the area of Alaska from the Kenai Peninsula to Kiska Island in the Aleutian Islands (Fig. 1). This approach appeared appropriate because:

1. Ongoing genetics research (Bickham et al. in review) indicates that the Alaskan Steller sea lion population can probably be separated into two groups--southeast Alaska versus the rest of Alaska. Numbers in southeast Alaska generally remain stable, despite declines throughout the remainder of Alaska. Thus, like Oregon, its population will probably persist for the foreseeable future.
2. The Kenai-Kiska area has been the area where most of the population decline has occurred.
3. The Kenai-Kiska area included most of the Alaskan Steller sea lion population prior to the declines, and even

in 1992 the area included 59% of the Alaskan population (NMFS unpubl. data).

4. The Kenai-Kiska area has the best count database.

Separate consideration of the Kenai-Kiska area was also proposed by the Recovery Team in their draft evaluation criteria.

The remaining areas of Alaska outside of Kenai-Kiska (eastern Gulf of Alaska and the western Aleutian Islands) were inconsistently surveyed prior to 1989. Therefore, these areas were generally excluded from analysis.

Data for the years 1985-92 were analyzed because they include the period during which population declines were documented to spread throughout much of Alaska (Merrick et al. 1987; Loughlin et al. 1992). The 1985-92 period is also the time when data became available for all major rookeries in the Kenai-Kiska area within the same years. However, it should be remembered that the population had already declined by 52% in the Kenai-Kiska area prior to 1985 (Merrick et al. 1987). Furthermore, the rate of decline during the 1989-92 period was less than during the 1985-92 period. Consequently, some analyses of future trends based on these two period's (prior to 1985 and after 1985) trends were also prepared.

Within this temporal and spatial frame, three models were



developed for the viability analyses:

1. The total Alaska breeding (rookery) population was summed and analyzed in a single run of the Dennis model. This included data from 32 of the 37 rookeries in Alaska. Five rookeries (Outer, Amchitka, Semisopchnoi, Attu, and Walrus Islands) were excluded because of a lack of data.
2. The total Kenai-Kiska breeding population was also summed and analyzed in a single run of the Dennis model. Here data from 26 of 29 rookeries in the area were analyzed. Outer, Amchitka, and Semisopchnoi Islands were excluded. This was essentially the same analysis performed previously for Steller sea lions by Thompson (unpubl. analysis).
3. A simulation was performed using repetitive runs of the Dennis model on individual rookeries. The  $\mu$  and  $\sigma^2$  of individual rookeries were used to establish a lognormal distribution of  $r$  values ( $n=120$ , one for each year in the 120 year simulation). The population value at a single rookery (of 26 rookeries) for a single year (of 120 years) in a single simulation (of 500) was then calculated:

$$\text{Ln } (n_q) = \text{Ln } (n_0) + \sum_{i=1}^q r_i$$

This was performed separately for each rookery, and the mean number of animals remaining at each rookery each year were totaled to estimate the annual Kenai-Kiska population. Similarly, a running annual total was maintained of rookery

extinctions. This approach allowed use of all the data available for each rookery and allowed an analysis using the trends at each site. The annual growth rates ( $r_i$ ) were truncated at 15% on the upper end to ensure population growth remained biologically reasonable.

All three models have drawbacks. Both the Alaska and Kenai-Kiska models oversimplify analysis because they use only one trend for the entire area, and ignore differences between rookeries. The Alaska model also requires that values for six sites (the sites outside of Kenai-Kiska) be estimated from other year's counts. On the other hand, the rookery model, while it explicitly recognizes that each rookery has its own probability of persistence, provides results which are somewhat difficult to interpret because of the possibility of movements between rookeries. However, running all three models provided a nested level of detail which would be useful for analysis, and provided cross checks on the reasonableness of results. Furthermore, the rookery model also provided detail on the pattern of fragmentation which could be expected as the population declines.

It was necessary to specify an abundance index value which corresponds to extinction ( $N_{EX}$ ). Zero is not a possibility because the model operates in terms of  $\ln(N)$ . Thompson (1991) argues for setting  $N_{EX} = 1$ . This seems to be a reasonable value for an individual rookery. However, this seems inappropriately

low for the regional analysis because of the wide distribution of sea lions on a number of discrete breeding sites. The biological reality is that each of the 26-32 rookeries considered is reduced to one animal at extinction; therefore, the aggregate for the area must be higher. For computational simplicity, 10 was used for regional analysis, but other (higher) values may be appropriate.

Data used in this analysis were generally derived from aerial surveys conducted by NMFS and Alaska Department of Fish and Game (ADF&G) during June-July 1985-92. The 1985 population numbers for six sites used in the Alaska analysis had to be estimated from other year's data, because 1985 surveys were not conducted at those sites:

1. The 1984 count was used for the 1985 population estimate for the three southeast Alaska rookeries (Forrester, Hazy, and White Sisters).
2. The average of the 1979 and 1989 surveys were used for the 1985 population estimate for the single eastern Gulf of Alaska rookery (Seal Rocks).
3. The 1985 numbers for two western Aleutian Island rookeries (Buldir and Gillon Point/Agattu Island) were estimated by first calculating the amount of change which occurred during 1979-85 at the one surveyed rookery (Cape Sabak/Agattu Island). This change (-73%) was then applied

to the 1979 count for the other two sites to estimate the 1985 population size.

Counts were available for all other rookeries for same five years between 1985 and 1992.

Only animals counted on rookeries during the summer surveys were included in the analysis. This excluded nonbreeding animals observed on haul-outs during the summer surveys, as well as members of the rookery populations at sea during the survey. Rookery counts included adult males and females. This analysis was restricted to females by reducing the count based on the male to female ratio (1:5) observed at Ugamak Island during the 1970's and 1980's (Merrick et al. 1987). This represents a midrange of values for other sites in Alaska (i.e., Sugarloaf and Marmot Islands; ADF&G unpubl. data; NMFS unpubl. data).

Modelling and statistical analyses were performed using S-Plus.

## RESULTS AND DISCUSSION

### Population Viability Analysis

#### Alaska Model

In 1992, there were 25,849 nonpups located on the 32 rookeries. We calculated that 21,532 of these were females, based on the earlier data from Ugamak Island adult sex ratios. The trend for

Alaska for 1985-92 (Table 1 and Fig. 2) was a decline of  $-0.1020$  per year ( $\mu$ ) with a variance of  $0.0057$  ( $\bar{\sigma}^2$ ).

Using these values, the model predicted using the 1985-92 trend that the probability of extinction ( $N_{EX} = 10$  females) at 100 years was close to 1.00 (Fig. 3). Median ( $p = 0.50$ ) and mean extinction times were 75 years ( $SD = 6.40$ ; Table 2).

#### Kenai-Kiska Regional Model

In 1992, there were 16,589 nonpups located on the 26 rookeries; 13,819 of these were calculated to be females. The regional trend for the Kenai to Kiska area for 1985-92 (Table 1 and Fig. 2) was a decline of  $-0.1199$  per year ( $\mu$ ) with a variance of  $0.0109$  ( $\bar{\sigma}^2$ ).

This model predicted from the 1985-92 trend that the probability of extinction (for  $N_{EX} = 10$  females) at 100 years was 1.00 (Fig. 4). Both median ( $p = 0.50$ ) and mean extinction times were 60 years ( $SD = 6.76$ ; Table 2).

#### Kenai-Kiska Rookery Model

Trends at individual rookeries indicate nearby rookeries typically have had similar rates of change (Table 3, Fig. 5). These trajectories could, however, vary within a subarea. For example, declines during 1985-92 in the eastern Aleutian Islands ranged from  $-0.026$  per year at Akutan Island to  $-0.155$  per year

at Adugak Island. This difference indicates the potential difficulty in performing viability analysis at the subarea level. The similarity of trends between adjacent sites (Table 3, Fig. 5) also indicates adjacent rookeries are relatively closed populations. However, the possibility of long-distance movements between rookeries remains a weakness of the rookery analysis.

Results from the simulation predicted that within the Kenai-Kiska area the mean number of adult females will decline to a few 10's of animals and the mean number of rookeries to 1 within 100 years (Fig. 6 and 7). The female population will be reduced to around 2,000 animals during the next 20 years; however, few rookeries will be vacated in this period. At about 20 years from the present, the rate of rookery extinctions will increase sharply. By 40 years, over half of the rookeries will be vacant, and by 100 years only one rookery will remain.

The probabilities of extinction are lower over time under the rookery model than under the regional model. For  $N_{EX} = 10$  the mean extinction time is nearly 130 years under the rookery model (Fig. 8). This difference is due to the persistence of small rookeries at Chernabura and Akutan Islands, as well as Pinnacle and Clubbing Rocks. These sites have had a low rate of decline but a relatively high variance (Table 3). As a result, the rookery model predicts one or more of these (the specific site(s) varies between simulations) may persist past 100 years, despite

the extinction of all remaining rookeries (Fig. 9). Even with the persistence of these sites, the extinction probability of the population is greater than 10% at 100 years ( $N_{EX} = 10$ ; Fig. 8).

The pattern of extinction of rookeries indicates that the sea lion population within the Kenai-Kiska area will first fragment into small clusters of sites (Fig. 10). As these rookeries are vacated, the population will contract to the core of the Kenai-Kiska area in the western Gulf of Alaska and eastern Aleutian Islands (longitudes  $160^{\circ}$ - $166^{\circ}$  W).

#### Summary of Modelling Results

Results of the three models provide important insight into the future of the Alaska sea lion population. The Alaska model predicts that, despite the persistence of the southeast Alaska population, that the probability of extinction ( $P_{EX}$ ) of the Alaska Steller sea lion population is high (at 100 years  $P_{EX}$  approaches 1.0, with mean extinction time of 75 years). This is due to the large declines in the Kenai-Kiska area, and its high  $P_{EX}$  (1.0 at 100 years with mean extinction time of 60 years). If recent trends persist in the Kenai-Kiska area, the next 20 years appear crucial to survival of the Alaska population. Though there is no indication the population will go extinct in 20 years (Fig. 3, 4, and 8), populations on individual rookeries will be reduced to low levels (mean size will be less than 100 adult females). After 20 years, rookeries will rapidly begin to

disappear. At about the time most rookeries have been vacated, the probabilities of extinction increase rapidly. This culminates with all models predicting the population will be reduced to levels approaching extinction within 100 years from the present.

Although the eastern Gulf of Alaska and the western Aleutian Islands were not included in the Kenai-Kiska analyses, the similarity in recent trends between these areas and Kenai-Kiska (Merrick et al. 1992) indicates Steller sea lions could also be extirpated there. Thus, in 100 years the only Steller sea lions remaining in the U.S. may be in the area between southeastern Alaska and northern California.

#### Limitations of the Analysis

Several caveats are necessary about these analyses. Capping the  $r_i$  values at 0.15 in the rookery simulation model may bias the results. This cap was used to constrain interannual variability to a biologically reasonable level, and is necessary because of the low rate of decline and relatively high variance at a few sites. Median population size and the number of rookery extinctions remain relatively unaffected by the cap. However, the mean population size, when simulated without the 0.15 cap, was predicted to reach levels up to 4 times the current population size (Fig. 11). All of these animals would be concentrated on the remaining 1-4 rookeries. The problem with



using a fixed cap is that it still allows a higher than normal rate of increase (i.e., rates of increase around 6-7% would be normal but 15% is possible). Unbiased methods to deal with this problem are being investigated, the most promising of which appears to be to pool close rookeries (Fig. 5) to estimate the variance.

The choice of a starting date for the analysis (e.g., 1975 versus 1985 versus 1989) has some effect on the results, but this varies between models. For example, the mean extinction time for the Kenai-Kiska regional model was later for the 1975-92 trend than for the 1985-92 trend. This was due to the slower rate of decline under the 1975-92 trend. On the other hand, the results of the rookery simulation indicated extinction would occur earlier with the 1975-92 trend than with the 1985-92. This was due to higher rates of decline at certain rookeries (Akutan, Chernabura, and Clubbing Rocks) under the 1975-92 trend. Because the two starting dates produce the same basic results, the 1970's data is sparse and of lower quality than the 1980's data, and the 1985-92 trend is more representative of the recent declines, it appears reasonable to use the 1985-92 trend for population viability analyses.

A selection of 1989 as the starting date for the analysis will extend the time to extinction, because of the smaller rate of decline experienced during 1989-92. The mean time to extinction

under the all Alaska model would be 207 years using the 1989-92 trend (compared to 75 years using the 1985-92 trend), while the probability of extinction would be close to zero at 100 years (Fig. 12). Similarly, the regional Kenai-Kiska model predicts the mean time to extinction would be 148 years using the 1989-92 trend (compared to 60 years using the 1985-92 trend) and the probability of extinction at 100 years would be zero (Fig 13). The reason(s) for the moderation in the rate of the decline during 1989-92 remain unknown. This moderation could, however, be due in part to recent protective measures enacted by NMFS (e.g, placement of buffer zones around rookeries and modifications to fishing effort), and actions taken by individual fishermen (e.g., reductions in illegal shooting of sea lions).

However, it may be most appropriate from a conservation perspective to use the 1985-92 trend rather than the 1989-92 trend for this population viability analysis. This is because the 1985-92 trend acknowledges that both moderate (e.g, 1989-92) and severe (e.g, 1985-89) declines can be experienced by the population. The past history of declines in the eastern Aleutian Islands (Fig. 14; Merrick et al. 1987), the best surveyed area, has shown that the Alaskan Steller sea lion population decline has not followed a constant trajectory. Short periods of apparent moderation in the declines seem to have been interspersed throughout the overall period of decline. Whether 1989-92 is another of these periods of moderation or is truly an

indication that the declines are abating remains unknown.

Consequently, it would seem wise to rely on the 1985-92 period as the basis for viability analyses until additional data becomes available.

Exclusion of animals on haul-outs should not significantly affect the analysis because most were either juveniles or nonbreeding adult males. Ultimately, the fate of the population rests in the persistence of the breeding female population, thus the focus on rookeries. The uncounted members of the breeding population at sea during the surveys, could increase the population by up to one-quarter. Inclusion of these animals would delay the mean extinction time 2-3 years.

Finally, the models may overestimate the time to extinction. This is because the only variability explicitly considered in the model was environmental uncertainty (Shaffer 1981). Other factors that can effect population dynamics, and as a result the probability of extinction, include demographic and genetic uncertainty, and natural catastrophes (Shaffer 1981). The significance of the first two factors to Steller sea lions is unclear; however, natural catastrophes (like the epizootic which recently struck North Sea phocid seals) and catastrophes of human origin (e.g., the 1989 Prince William Sound oil spill) may significantly increase the probabilities of extinction. At least one such event has struck the Alaskan Steller sea lion population

in recent history. During 1985-89, sea lion numbers in the Kenai-Kiska area declined by 53% for unknown reasons (Loughlin et al. 1990). This event was incorporated into the calculation of the population trajectory for 1985-92. Thus, some measure of the effect of catastrophic changes is included in this analysis. However, an additional event (like the one which occurred in the eastern Aleutian Islands during the early 1970's when the population there declined by over 58%; Braham et al. 1980) could overwhelm the population if it is at low levels, and drive the population more rapidly to extinction. As such, a higher value of  $N_{EX}$  could be justified (eg., 100).

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Table 1.--Counts from aerial surveys of adult and juvenile Steller sea lions at rookeries in all of Alaska (n=32) and in the Kenai-Kiska area (n=26) of Alaska from 1985 to 1992.

Year	Source	Alaska	Kenai-Kiska
1985	1	53,579	39,518
1989	2,3	30,298	18,647
1990	3,4	27,583	18,694
1991	5,6	26,205	16,826
1992	7	25,849	16,589

Source: 1. Loughlin et al. 1986;  
 2. Loughlin et al. 1990;  
 3. Alaska Dept. Fish and Game unpubl. data; 4. Merrick et al. 1991; 5. Merrick et al. 1992;  
 6. Douglas and Byrd 1991;  
 7. NMFS unpubl. data.



Table 2.--Mean, standard deviation of the mean, and median times to extinction of the Alaska and Kenai-Kiska adult female Steller sea lion population for extinction population sizes of 1, 10, and 100 animals using 1985-92 trends. For the Alaska population the initial population is an estimated 21,532 females<sup>1</sup> at 32 rookeries in 1992 with  $\mu = -.1020$  per year and  $\sigma^2 = .0057$ . For the Kenai-Kiska population the initial population is an estimated 13,819 females<sup>2</sup> at 26 rookeries in 1992 with  $\mu = -.1199$  per year and  $\sigma^2 = .0109$ .  $N_{EX}$  is the extinction population size.

Model	Extinction population size		
	$N_{EX}=1$	$N_{EX}=10$	$N_{EX}=100$
<b>Alaska</b>			
Mean years	97.81	75.24	52.67
St. deviation	7.29	6.40	5.35
Median years	97.54	74.97	52.39
<b>Kenai-Kiska</b>			
Mean years	79.51	60.30	41.10
St. deviation	7.76	6.76	5.58
Median years	79.13	59.93	40.73

<sup>1</sup> Assumes that 83.3% of the 25,849 animals counted are female.

<sup>2</sup> Assumes that 83.3% of the 16,589 animals counted are female.

Table 3.--Rates of decline ( $\mu$ ), variance of the rate of decline ( $\sigma^2$ ), and longitude for 26 Kenai-Kiska trend rookeries under trends for 1985-92 as calculated by methods of Dennis et al. (1991).

Rookery	Longitude <sup>1</sup>	Rate of decline ( $\mu$ )	Variance ( $\sigma^2$ )
Marmot	151.8	-0.164	0.019
Sugarloaf	152.0	-0.133	0.015
Chirikof	155.7	-0.159	0.001
Chowiet	156.7	-0.140	0.055
Atkins	159.3	-0.097	0.037
Chernabura	159.5	-0.008	0.065
Pinnacle	161.8	-0.053	0.022
Clubbing	162.5	-0.036	0.017
Sea Lion	163.2	-0.070	0.014
Ugamak	164.8	-0.065	0.237
Akun	165.5	-0.068	0.173
Akutan	166.0	-0.026	0.077
Bogoslof	168.0	-0.124	0.014
Adugak	169.2	-0.155	0.038
Ogchul	169.5	-0.121	0.028
Yunaska	170.6	-0.143	0.015
Seguam	172.6	-0.206	0.119
Agligadak	172.9	-0.184	0.257
Kasatochi	175.5	-0.162	0.012
Adak	176.2	-0.106	0.143
Gramp Rock	178.3	-0.089	0.010

Table 3.--Cont.

Rookery	Longitude	Rate of decline ( $\mu$ )	Variance ( $\sigma^2$ )
Tag	178.6	-0.134	0.003
Ulak	179.0	-0.135	0.038
Ayugadak	181.6	-0.115	0.010
Kiska			
Lief Cove	182.7	-0.224	0.035
Cape St. Stephens	182.8	-0.242	0.063

<sup>1</sup> For Figure 10.

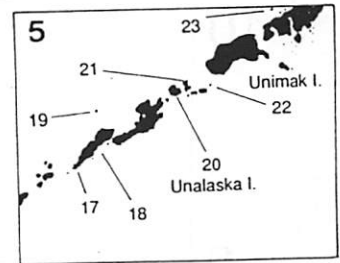
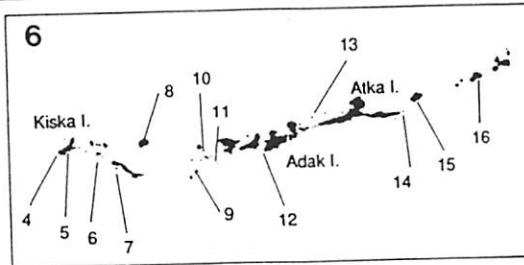
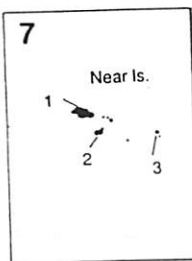
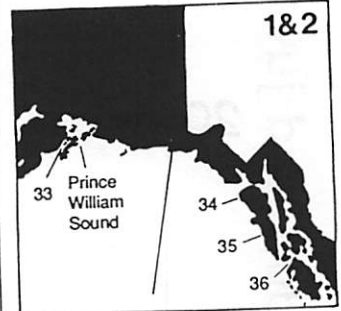
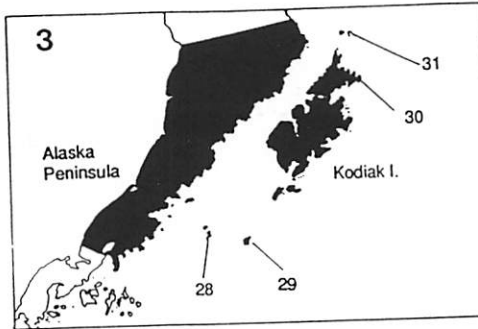
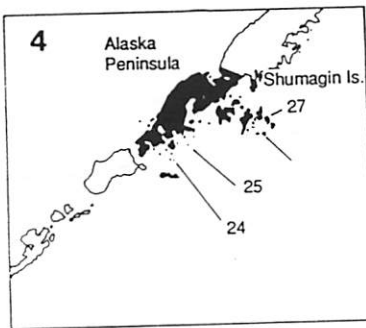
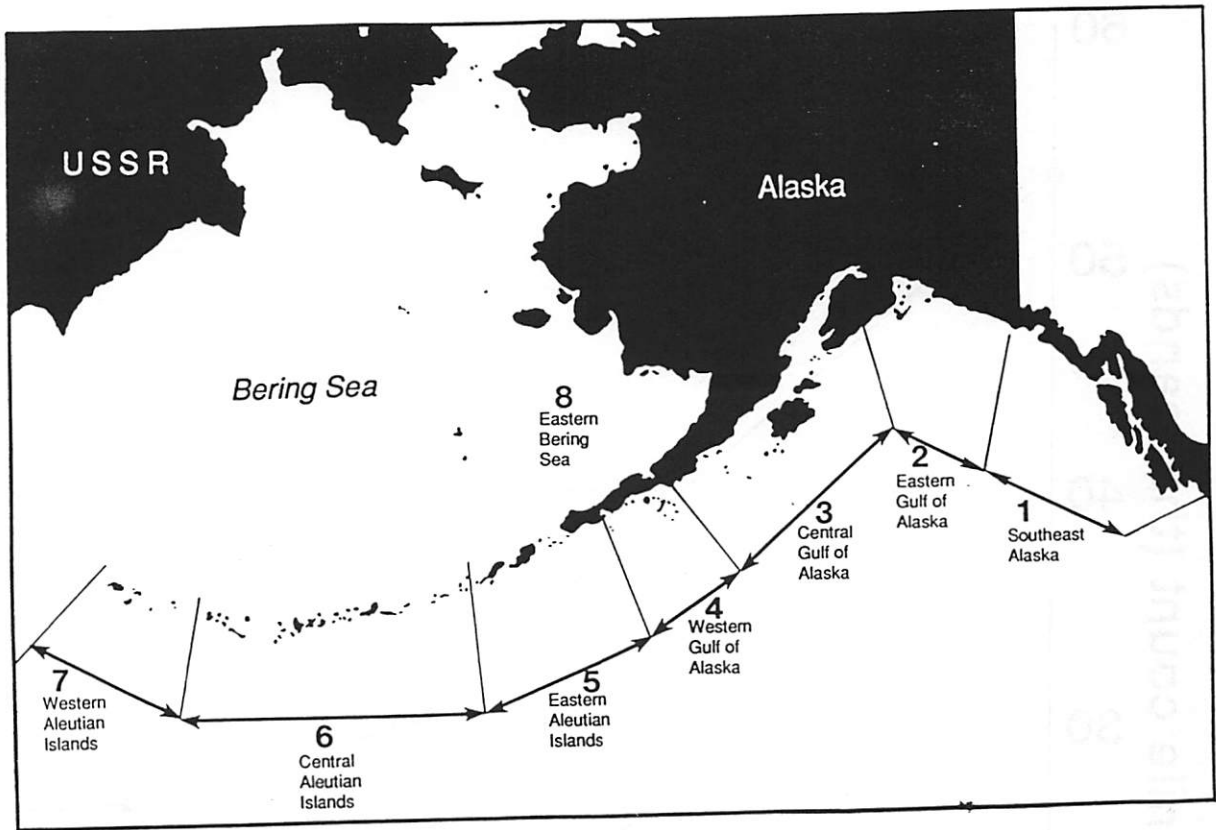
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Figure 14.--Counts of adult and juvenile Steller sea lions at three eastern Aleutian Island rookeries (Akun, Akutan, and Ugamak) during 1969-92.



- 1 Attu
- 2 Agattu
- 3 Buldir

- 4,5 Kiska
- 6 Ayudagak
- 7 Amchitka
- 8 Semisopochnoi
- 9 Ulak
- 10 Tag

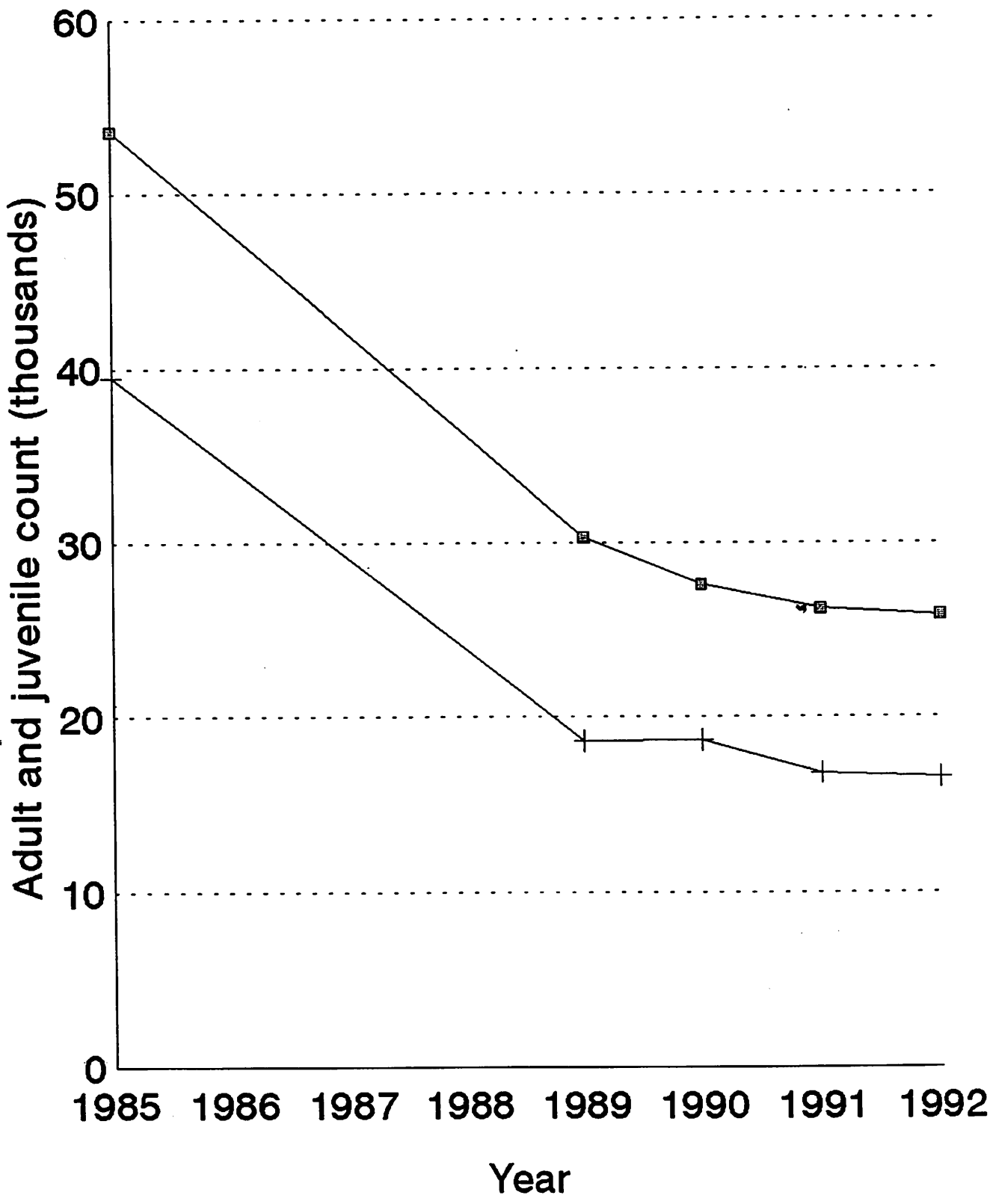
- 11 Gramp Rock
- 12 Adak
- 13 Kasatochi
- 14 Agligadak
- 15 Seguam
- 16 Yunaska

- 17 Adugak
- 18 Ogchul
- 19 Bogoslol
- 20 Akutan
- 21 Akun

- 22 Ugamak
- 23 Sea Lion Rock
- 24 Clubbing Rocks
- 25 Pinnacle Rock
- 26 Chernabura

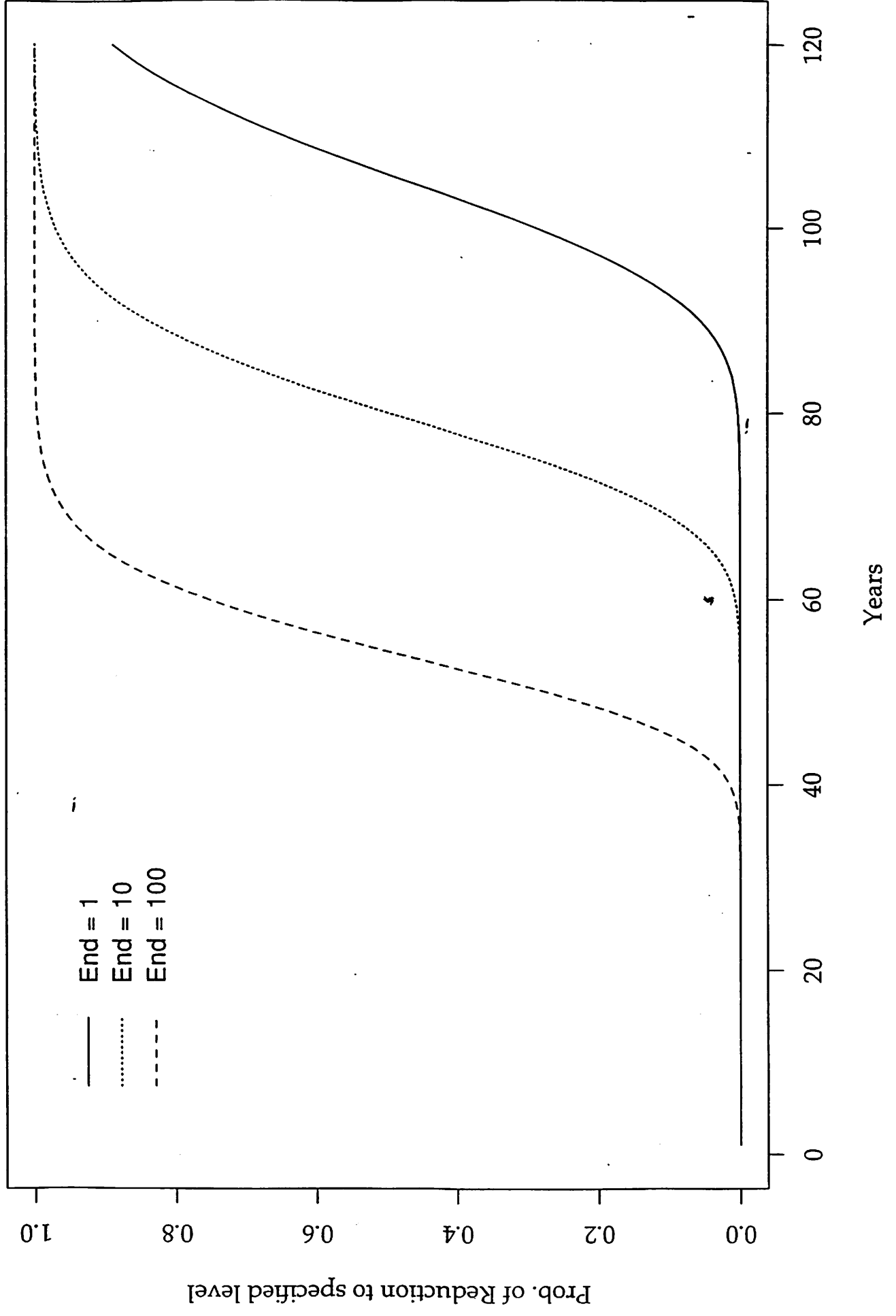
- 27 Atkins
- 28 Chowiet
- 29 Chirikof
- 30 Marmot
- 31 Sugarloaf
- 32 Outer

- 33 Seal Rocks
- 34 White Sisters
- 35 Hazy
- 36 Forrester



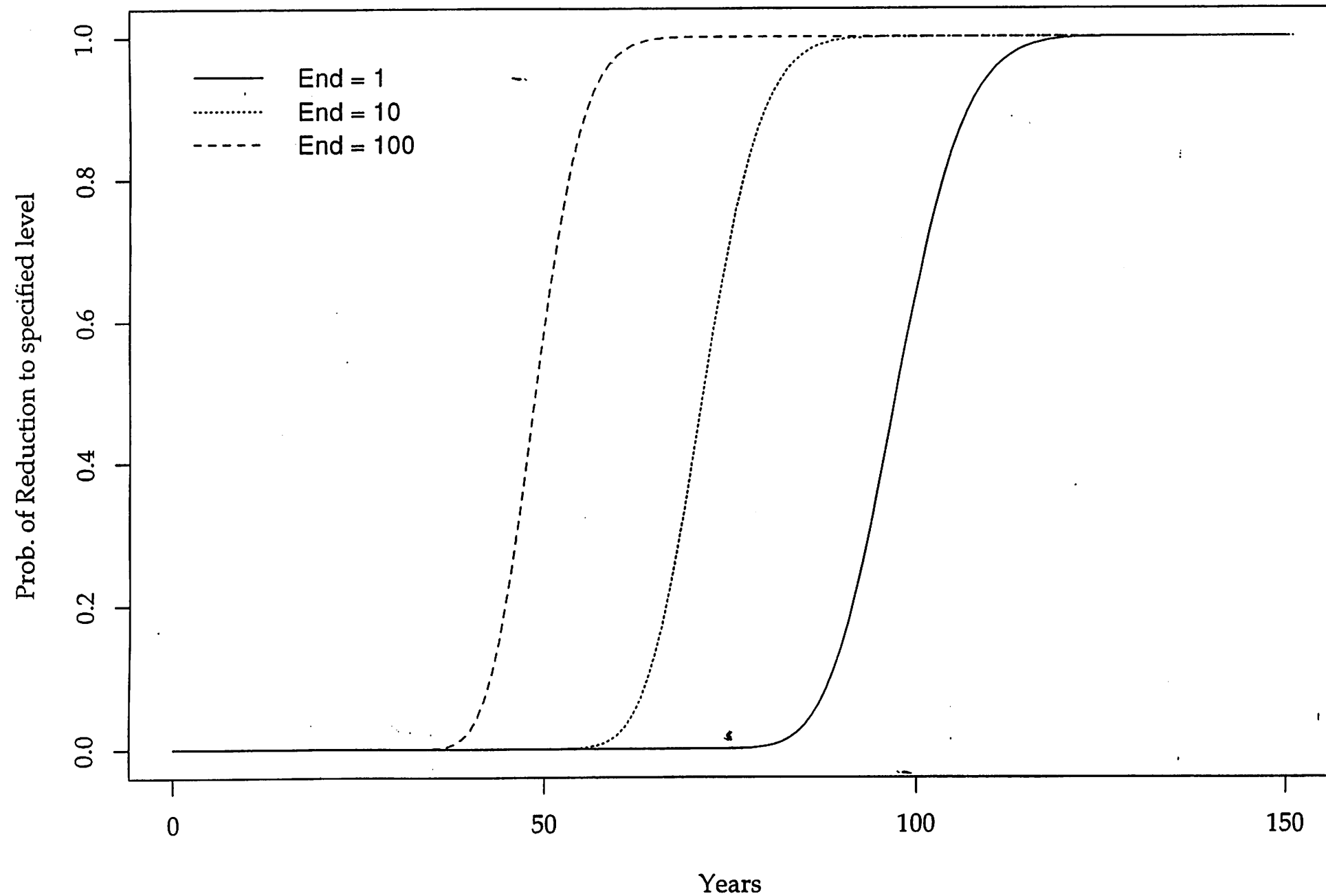
—■— Alaska + Kenai-Kiska

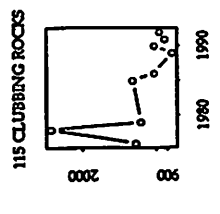
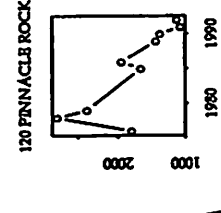
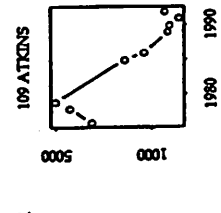
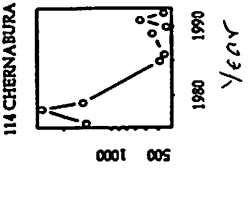
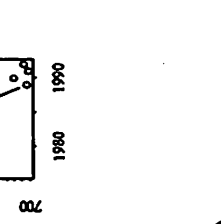
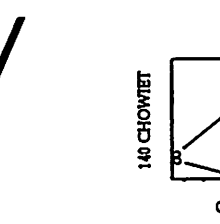
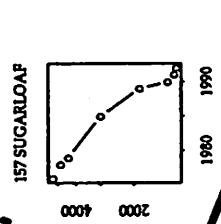
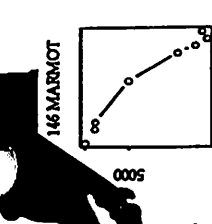
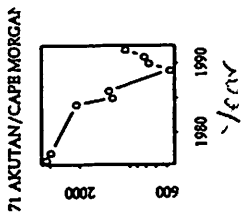
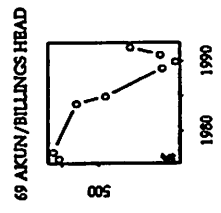
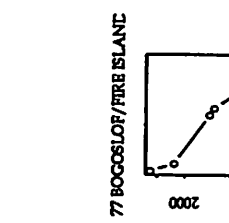
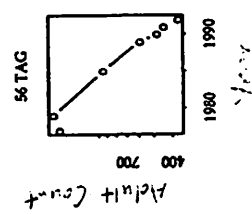
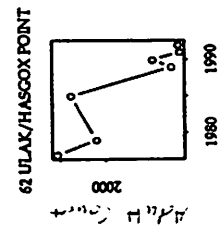
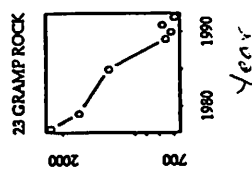
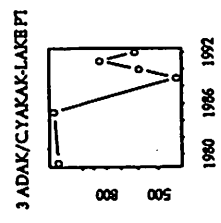
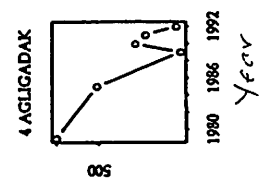
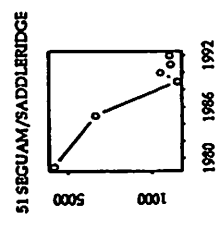
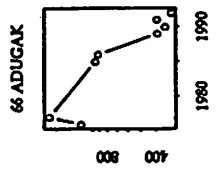
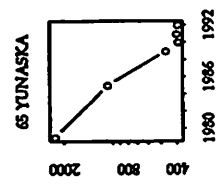
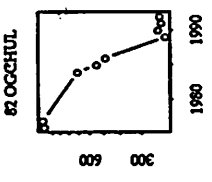
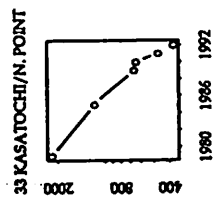
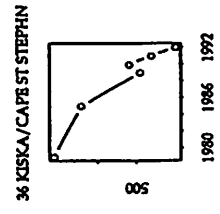
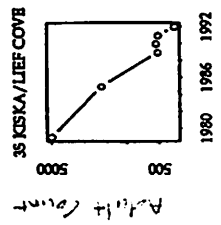
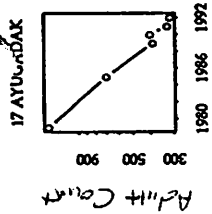
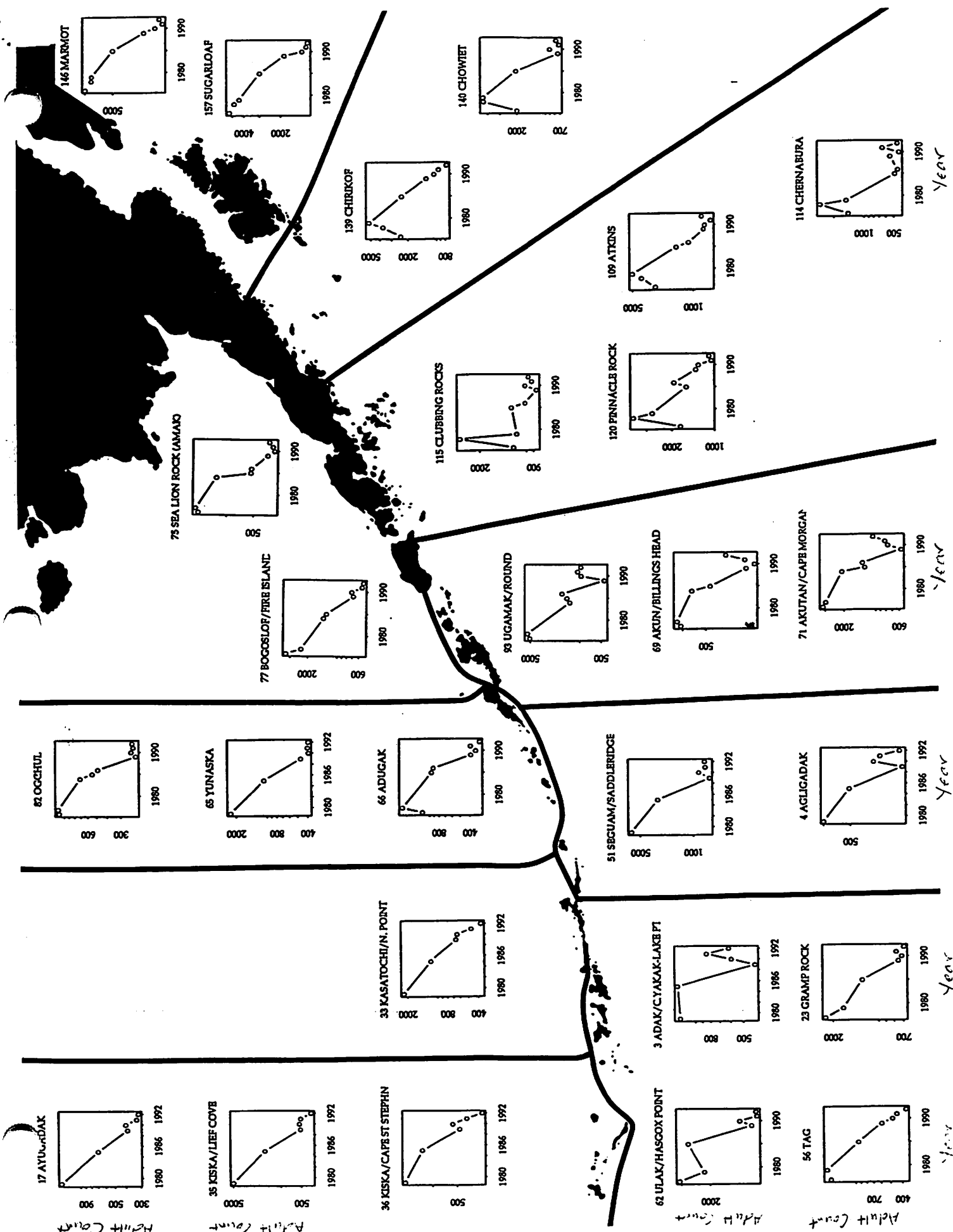
# Reduction of Alaska Population to Various Levels



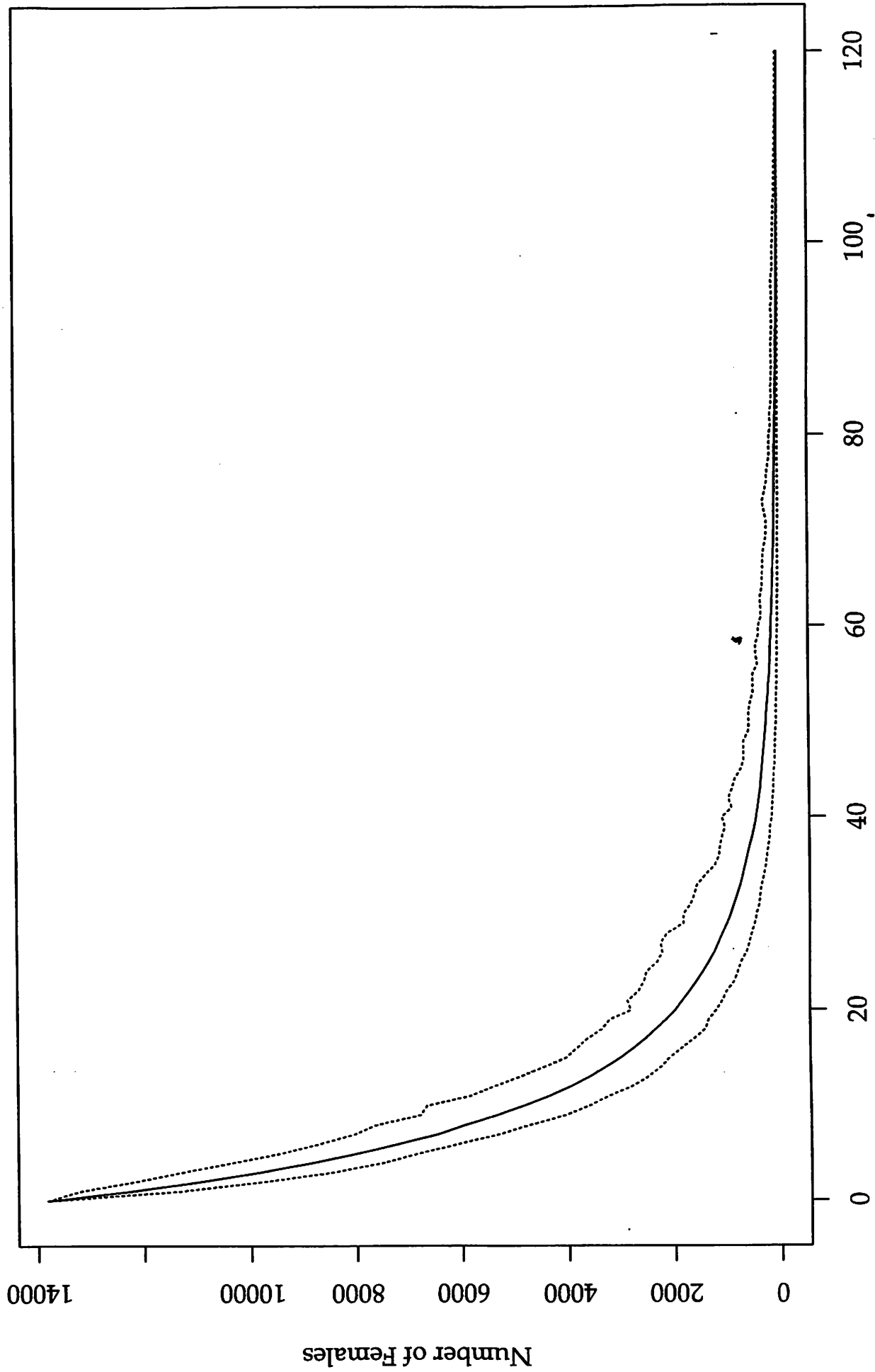


# Reduction of Kenai-Kiska Population to Various Levels



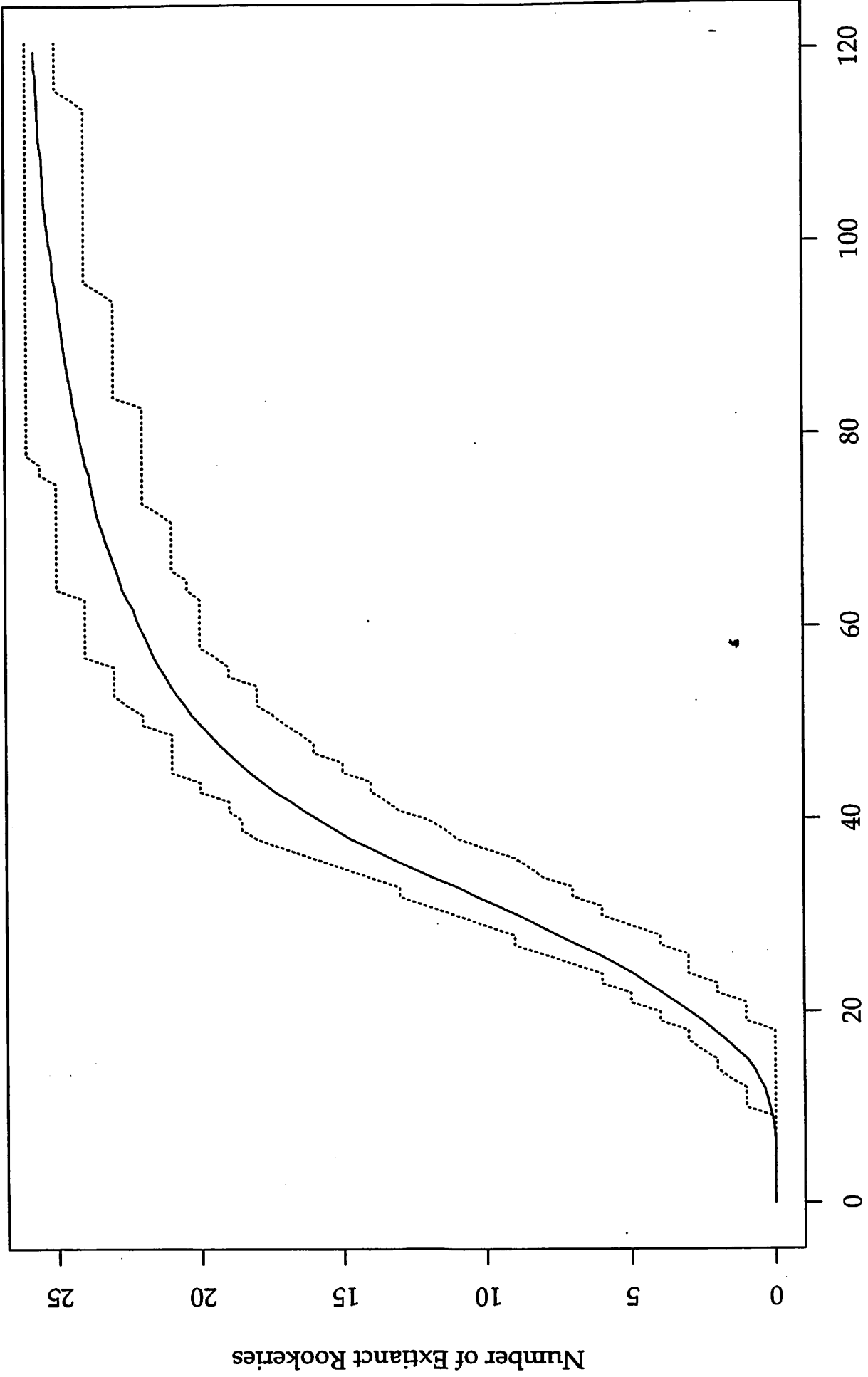


# Expected Number of Female Sea Lions



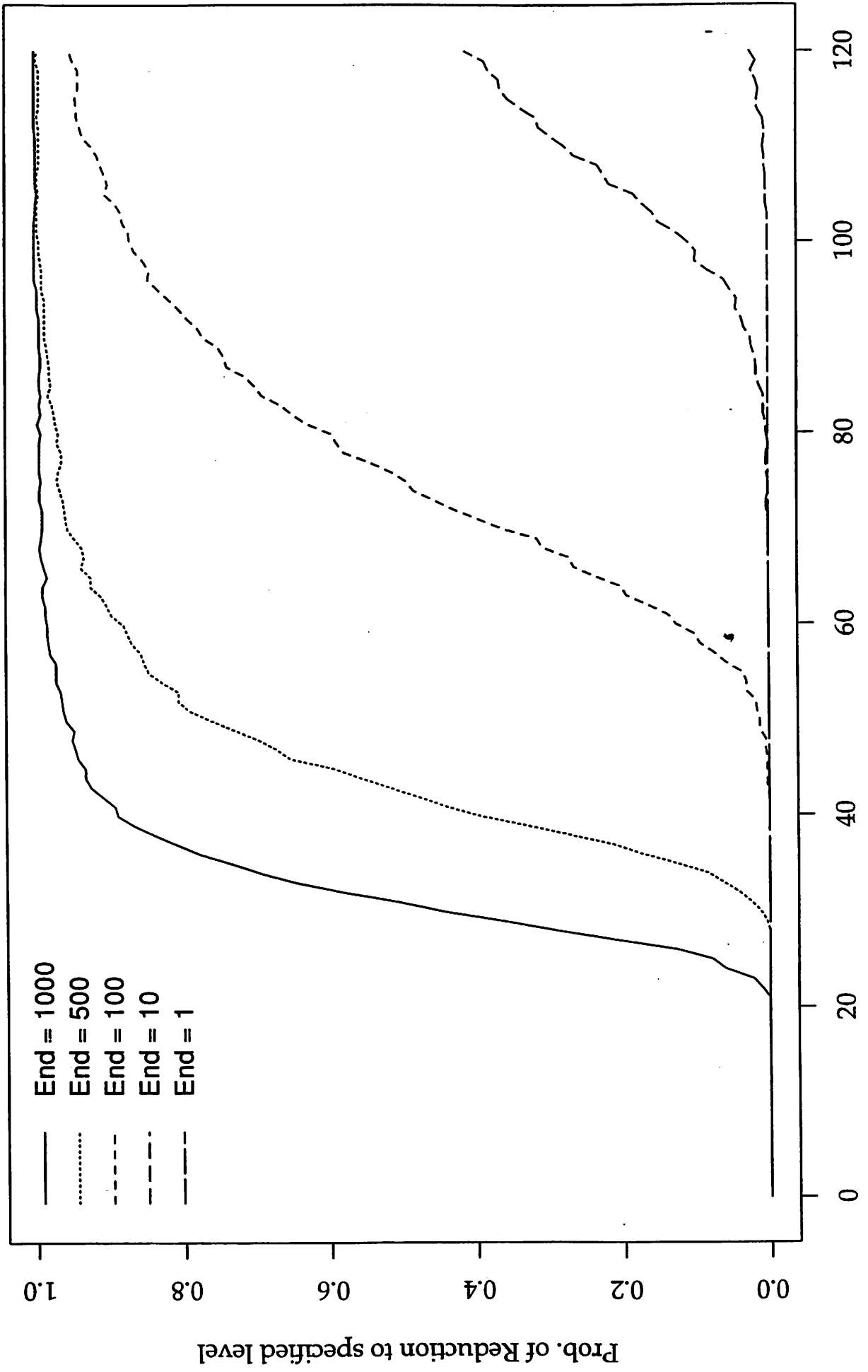
Years } decline for each rookery  
assuming 1985-92 rate

# Extinction of K-K Rookeries



Years  
assuming 1985-92 rates of decline for each rookery

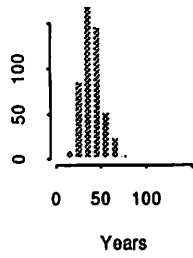
# Reduction of K-K Females (Simulation Results)



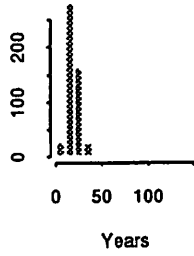
Years  
assuming 1985-92 rate of decline (cap = .15)

# Time to Extinction, $c = 0.15$ , 1985-92 rates

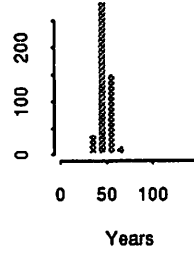
3 ADAK/CYAKAK-LAKE PT



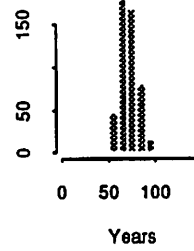
4 AGLIGADAK



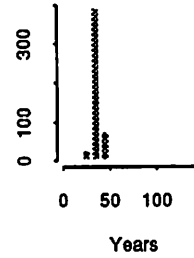
17 AYUGADAK



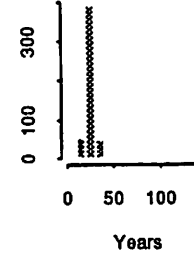
23 GRAMP ROCK



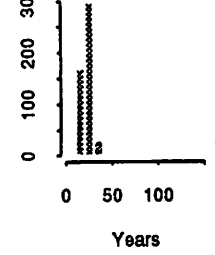
33 KASATOCHI/N. POINT



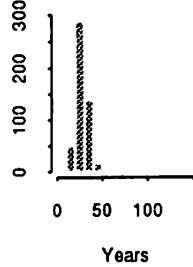
35 KISKA/LIEF COVE



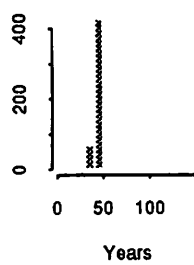
36 KISKA/CAPE ST STEPHN



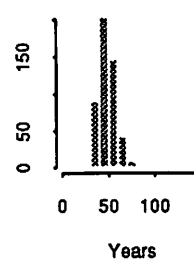
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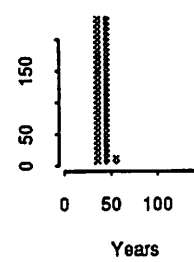
56 TAG



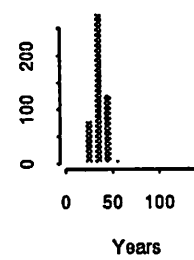
62 ULAK/HASGOX POINT



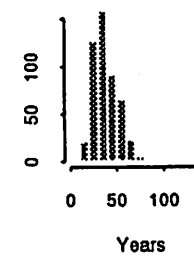
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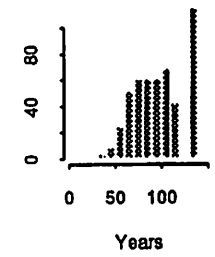
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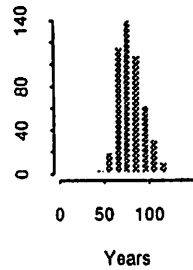
69 AKUN/BILLINGS HEAD



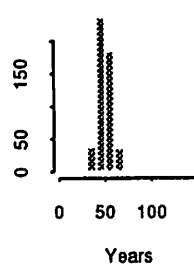
71 AKUTAN/CAPE MORGAN



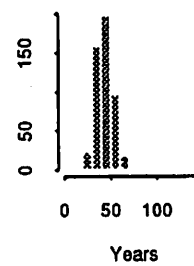
75 SEA LION ROCK (AMAK)



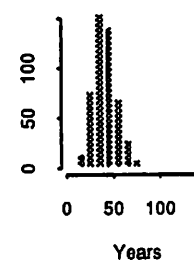
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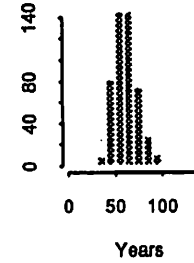
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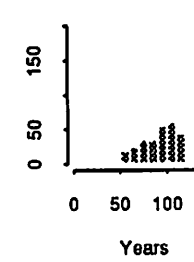
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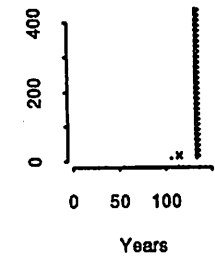
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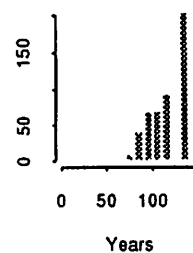
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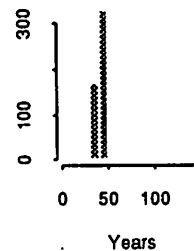
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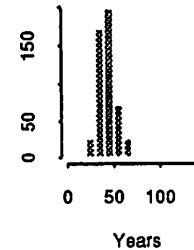
120 PINNACLE ROCK



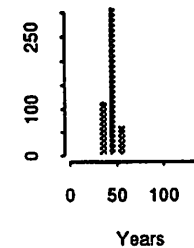
139 CHIRIKOF



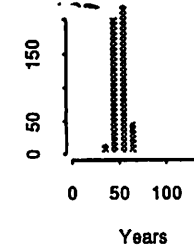
140 CHOWIET



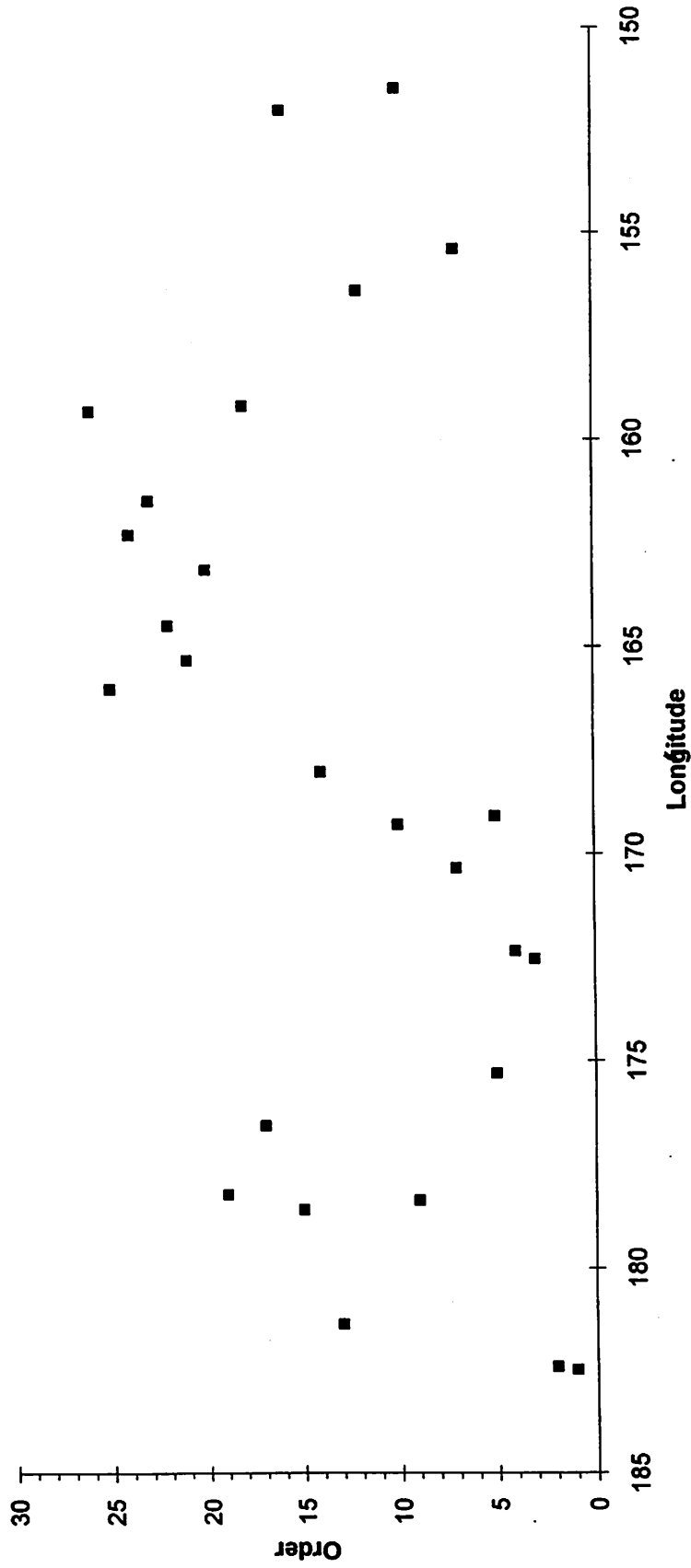
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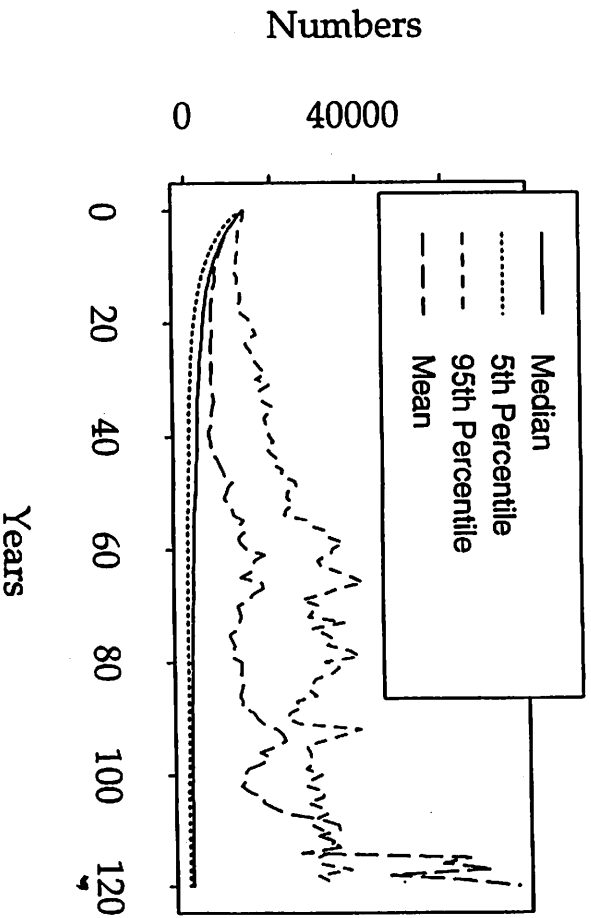
157 SUGARLOAF



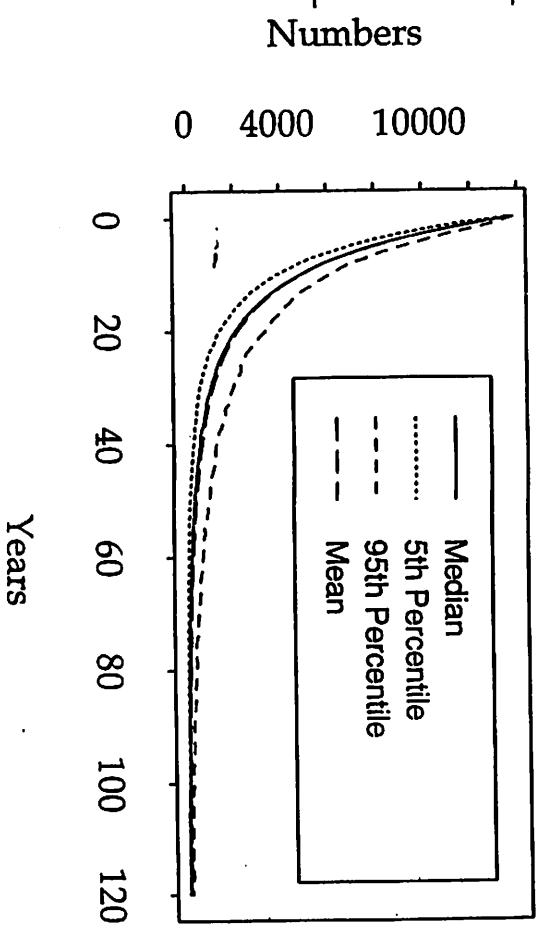
# Order of Extinction of Rookeries by Longitude



no cap , 85-92 estimates

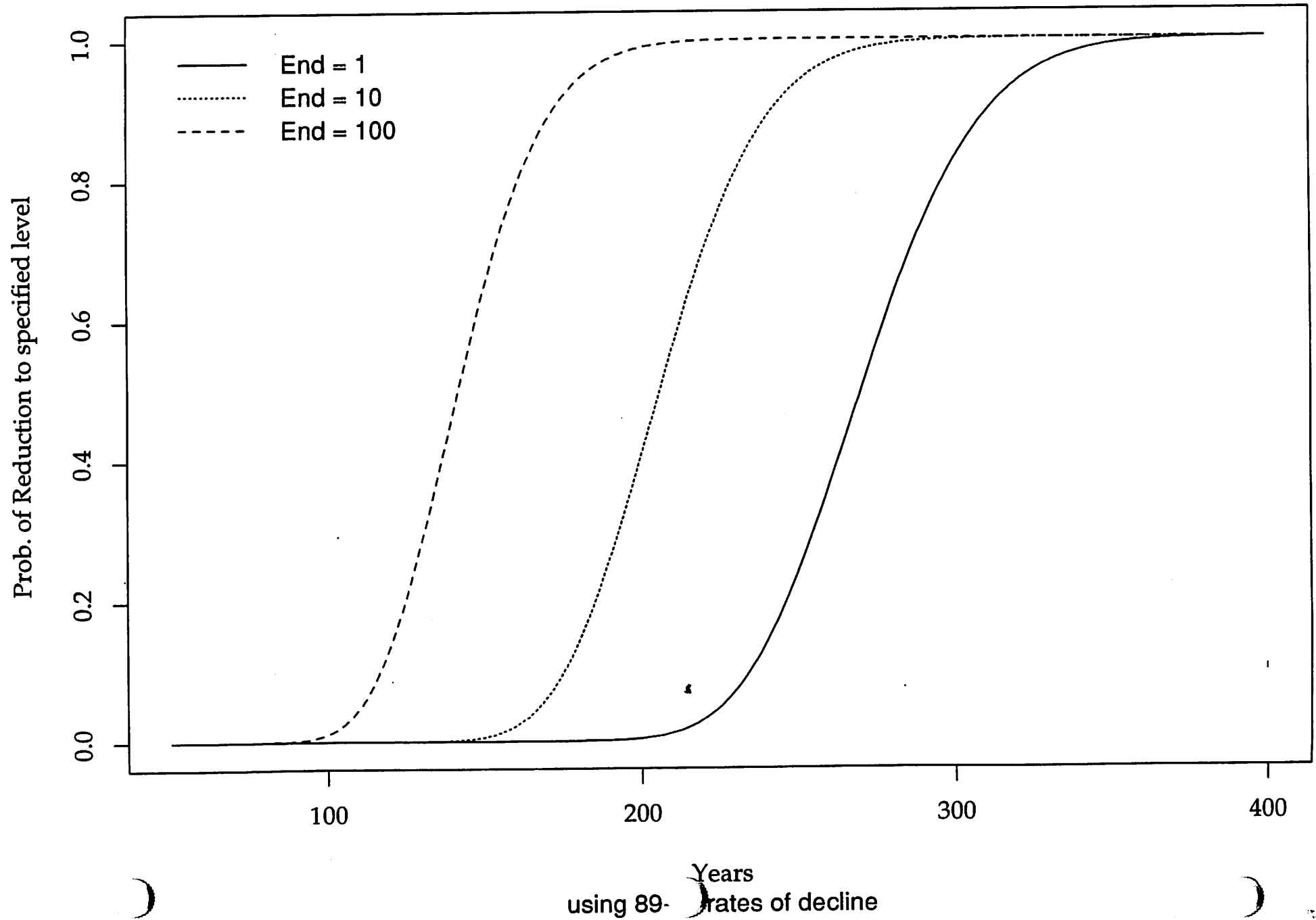


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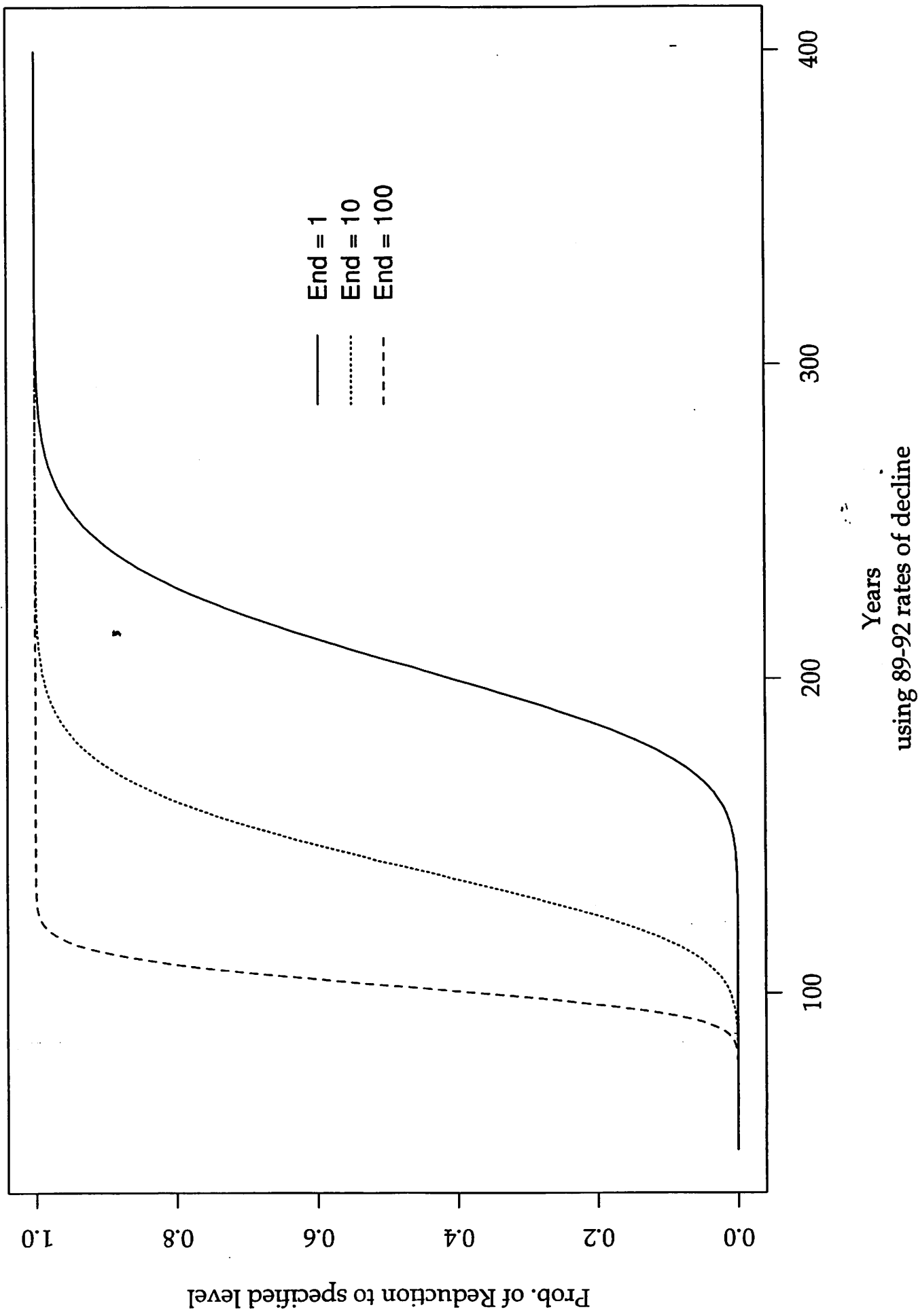




# Reduction of Alaska Population to Various Levels

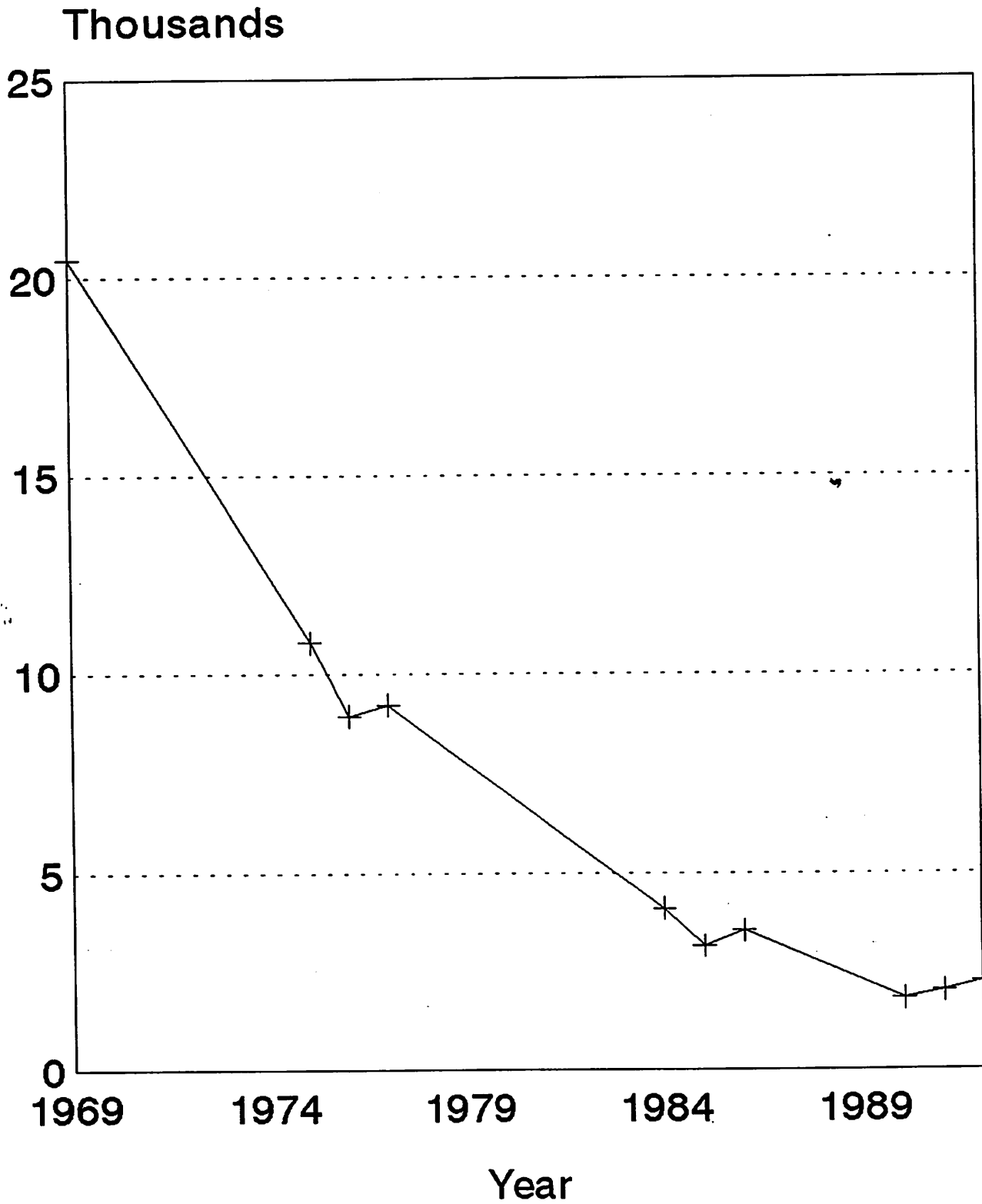


# Reduction of Kenai-Kiska Population to Various Levels



# Counts of adult and juvenile Steller sea lions at three eastern Aleutian Island rookeries

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# 1991-92 Steller Sea Lions

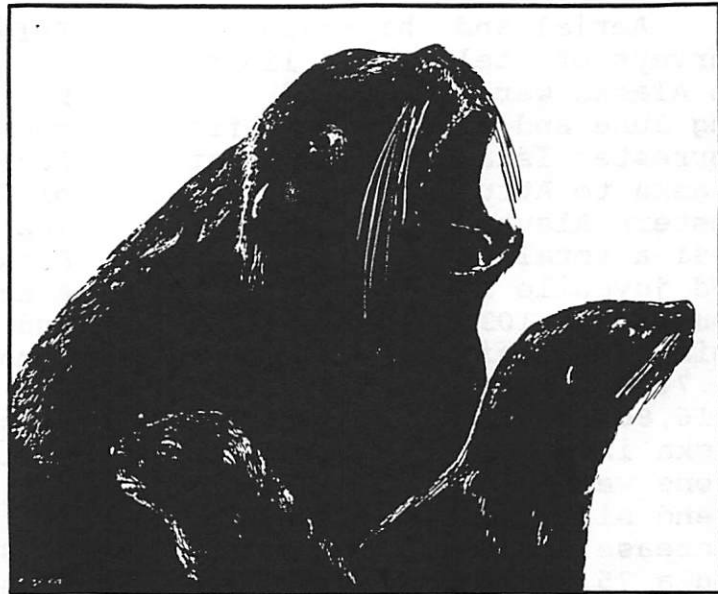
National Marine Mammal Laboratory, Alaska Fisheries Science Center,  
National Marine Fisheries Service, 7600 Sand Point Way NE,  
BIN C15700, Seattle, WA 98115-0070

Edited by Kathryn Chumbley

The following is a brief summary of events, activities, research, and management decisions made during 1991-92 that affect Steller sea lions. The newsletter will be produced on an annual basis. We would like to receive your opinions and comments regarding the content and length of the newsletter. To obtain copies send your requests to the address listed above.

## RESEARCH

Steller (northern) sea lion (*Eumetopias jubatus*) research was conducted in the Soviet Union, Alaska, British Columbia, Oregon, and California during summer and winter 1991-1992. Cooperative research between the National Marine Fisheries Service (NMFS) (National Marine Mammal Laboratory), Southwest Fisheries Center (SWFC), Alaska Department of Fish and Game (ADFG), the U.S. Fish and Wildlife Service (USFWS), Oregon Department of Fish and Wildlife (ODFW), University of California, Santa Cruz (UCSC), University of Alaska, Fairbanks (UAF), Texas A & M University, Galveston, Texas



and Alaska Sea Grant Marine Advisory Program, Cordova, Alaska was conducted during 1991-92 on population abundance, foraging, genetics, and physiology. Aerial and ship-based surveys were conducted to estimate the worldwide population of this threatened species. Research on foraging behavior of sea lions was conducted utilizing a satellite-linked time-depth recorder (SLTDR) to collect data on dive depth and duration, time at surface, water temperature, and at-sea and on-land locations. The health status and survival rate of Steller sea lion pups

was studied using blood chemistry and body condition. Marine mammal observers monitored Steller sea lion/fishery interactions. Beachcast carcass surveys were conducted on the Copper River Delta, Alaska.

## POPULATION SURVEYS

### Alaska Surveys - Aerial Surveys

Aerial and ship-based surveys of Steller sea lions in Alaska were conducted during June and July 1991-92 from Forrester Island in southeast Alaska to Attu Island in the western Aleutian Islands. In 1991 a total of 36,459 adult and juvenile sea lions were counted at 103 trend sites in this area; this represents a 68.7% decrease from the 1970s (116,804). In the Kenai to Kiska index area, 21,737 sea lions were counted at two trend sites in 1991, a 4.5% decrease from 1990 (22,754), and a 75.7% decrease from the 1970s count (89,364).

In 1992 in the Kenai to Kiska index area, 20,669 sea lions were counted at trend sites, a 4.9% decrease from 1991. In 1992, numbers at trend sites either increased or remained constant in southeastern Alaska (from 7,629 to 7,715 in 1991 and 7,557 in 1992), the western Gulf of Alaska (from 3,915 to 3,734 in 1991 and 3,718 in 1992), the eastern Aleutian Islands (from 3,801 to 4,231 in 1991 and 4,839 in 1992), and the central Aleutian Islands (from 7,988 to 7,499 in 1991 and 6,396 in 1992).

Decreases occurred in the eastern Gulf of Alaska (from 5,444 to 4,596 in 1991 and 3,738 in 1992), and central Gulf of Alaska (from 7,050 to 6,273 in 1991 and 5,716 in 1992). Statistically significant declining trends have occurred since the 1950s and the mid-1970s in all subareas other than southeastern Alaska, the eastern Gulf of Alaska, and the central Aleutian Islands.

### References:

Merrick, R.L., Calkins, D.G., and McAllister, D.C. 1991. 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. NOAA Tech. Memo. NMFS-AFSC-1.

Sease, J.L., Calkins, D.G., Lewis, J.P., McAllister, D.C. and R.L. Merrick. In review. 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 1992.

### Marmot Island, AK - Juvenile Survival

During 1987-88 a total of 800 Steller sea lion pups were marked at Marmot Island in a long term study of dispersal, survival, and reproduction. Calkins and Pitcher (1982) found that most of the pups surviving from cohorts marked in the mid-1970s returned to their island of birth by the time they were 4 to 5 years old. Life tables constructed

from mid-1970s collections indicated that 41% of females and 22% of males survived to age 4. Based on that study, 50 of the survivors of the 400 pups tagged in 1987, plus some animals from the 1988 cohort, were expected to return to Marmot Island in the summer of 1991. During June-July 1991 a field team on Marmot Island counted 7 of the 800 tagged animals during the month of observations. These low returns point towards either increased dispersal or some change in life history characteristics (e.g., declining juvenile survival or delayed age of first reproduction).

In June-July 1992 another field team was placed on the island to count returning animals. York (NMFS unpub. data) estimated that even with a 10%-per-year tag/brand loss, 106 females (of the original 400 female pups) should have been resighted at Marmot Island in 1992. A maximum of 11 tagged animals (of 800) were resighted during June-July observations. These and similar results from 1991 support the hypothesis that increases in juvenile mortality during the 1980s may be a major cause of the declines observed at Marmot Island in the past decade.

#### Forrester Island, AK

From May until August 1992, counts were conducted at Forrester Island sea lion rookery. No Steller sea lions that had been marked or tagged at other locations were seen. No count data is available at

this time.

From Calkins, D.G., Alaska Dept. of Fish and Game, Anchorage, AK.

#### Cape St. Elias, Ak

Several biologists, a pathologist and a bacteriologist conducted surveys of premature pups on Kayak Island at Cape St. Elias from March to May 1992. Concurrently, sex and age composition counts were conducted as well as searching for marked animals. Of nine premature pups recorded, six were recovered. Samples were collected from four of the six pups recovered. Histopathology and virology results are not available at this time. Preliminary results indicate that no unusual bacterial infections were present, and no unusual lesions were seen in the histopathology. Analyses of the count and marked animal observations are not complete at this time.

From Calkins, D.G., Alaska Dept. Fish and Game, Anchorage, Alaska.

#### Washington Survey

The National Marine Mammal Laboratory (NMML) and the Washington Department of Wildlife (WDW) have been collecting data on Steller sea lion distribution and abundance in Washington State since the mid-1970s. The center of abundance in Washington State is on the outer coast from Cape Flattery

to the mouth of the Columbia River, although some Stellers occur in fewer numbers in the inland waters such as Puget Sound.

All ages and sex classes occur and are migratory within the state. Steller sea lions use offshore islands, rocks, and navigation buoys to haul out on. These migratory animals may be seen at any time of year, but they appear to be the most abundant during summer, fall, and winter. More than 1,000 individuals have been counted along the outer Washington coast in recent years.

From Gearin, P.J., National Marine Mammal Lab, Seattle, WA and S.J. Jeffries, Washington Dept. of Wildlife, Tacoma, WA.

#### Oregon Survey

The Oregon Department of Fish and Wildlife (ODFW) conducted aerial surveys to census Steller sea lions along the Oregon coast in 1991-92 as part of a cooperative marine mammal assessment program with the NMFS. Two locations, Rogue and Orford Reefs, are major rookeries where pupping and breeding occur. Counts peaked in June and July 1991, during which time the maximum count was 1537 animals at Rogue Reef and 836 animals at Orford Reef. Preliminary counts in 1992 at Rogue Reef were 1862 animals and 877 at Orford Reef. Numbers of sea lions hauled out were high at Three Arch Rock and Sea Lion Caves, but were relatively low at other sites. Nearly all pups are born on Pyramid Rock at Rogue Reef, and on Seal

Rock and Long Brown Rock at Orford Reef. Maximum pup counts in 1991 from aerial photos were 341 pups at Rogue Reef and 80 pups at Orford Reef. In 1992 preliminary pup counts for Rogue Reef were 423 pups while Orford Reef had 123 pups. While statewide abundance, distribution, and production of Steller sea lions appear to have remained fairly stable, there is concern for the stability of Orford and Rogue Reef rookeries. Rogue Reef is the most important rookery for Steller sea lions in U.S. waters south of Alaska. The number of days that urchin fishing occurred increased from 28 in 1986 to 298 in 1989 and may be linked to disturbance of sea lions. On 9 May 1990 the Oregon Department of Fish and Wildlife implemented closures to sea urchin harvests within 1000 feet of three pupping rocks at Rogue and Orford Reefs from 10 May to 31 August to provide protection to sea lions during the breeding and pupping season. In 1990 and 1991, increased numbers of sea lions at Rogue and Orford Reefs suggest that this action combined with the cooperation by the urchin fishery resulted in reduced disturbance at these sites.

From Brown, R.F. and S.D. Riemer. 1992. Steller Sea Lion Counts in Oregon During June and July. NOAA, NMFS contract report NA88-ABD-00103.

#### California Survey

The Southwest Fisheries

Science Center, La Jolla, and the University of California, Santa Cruz, (under contract to the SWFC), conducted ground and aerial surveys to census Steller sea lions on Año Nuevo Island, California. Censuses were conducted at peak season in July and August, during the period of 1961-90 and 1991-92. Five of the nine aerial surveys were conducted within 2 days of ground counts. All age and sex classes declined by 85% or more, from high censuses in the early 1960s to the lowest counts in 1980. On 26 July 1991, 693 sea lions were counted from the aerial survey, and 358 sea lions were counted by ground survey crews. Between 7-9 July 1992, an average of 487 sea lions were seen from aerial counts, while 264 sea lions were counted from the ground.

Pup production stabilized at 75-125 per year in the last decade, down from an annual pup production rate of over 700 in 1962. In 1991, aerial surveys counted 287 pups, while ground survey counts were 97 pups. In 1992, three aerial surveys were conducted averaging a count of 263 pups, while ground surveys counted 127 pups. The magnitude of the decline in Steller sea lions at Año Nuevo is of the same order as that reported for most parts of Alaska and the Soviet Union during the period 1956 to 1989.

From Le Boeuf, B.J., K. Ono and J. Reiter. 1990. History of the Steller Sea Lion Population at Año Nuevo Island, 1961-1991. NMFS, SWFC Admin. Rep. LJ-91-45C and NMFS, Southwest Fisheries

Center, La Jolla, CA.

Southwest Fisheries Center, La Jolla, also conducted aerial surveys over the Farallon Islands, CA, and in Southeast Alaska at Sea Lion Rock near Amak Island, Forrester Island, and Hazy Island. Between 7-11 June 1991, a total of 968 sea lions were counted at Hazy Island, and a total of 2,933 were counted at Forrester Island. At Hazy Island 339 pups were counted, while 845 pups were counted at Forrester Island.

An aerial survey was conducted on 8 June 1992 at Sea Lion Rock near Amak Island, however no counts are available at this time. On 8 July 1992 flights over the Farallon Islands were conducted, and a total of 143 Steller sea lions were counted including 5 pups.

From NMFS, Southwest Fisheries Center, La Jolla, CA.

#### FORAGING STUDIES

A SLTDR was developed and deployed to study the foraging of Steller sea lions. The instrument collects data on dive depths and durations, surface times, and water temperatures. At-sea and on-land locations are calculated from transmissions received by the satellite. While the animal is at sea, the SLTDR transmits histograms of dive depths and durations. When the sea lion returns to land, the instrument transmits detailed dive and temperature profiles, in addition to summaries of durations,



maximum depths, and water temperatures for all dives during the trip. Twenty three SLTDRs were attached to adult postpartum females during summer-winter 1990-92 by NMFS biologists in the Gulf of Alaska and Aleutian Islands. Of these instruments, 19 were attached to postpartum females, and 4 were attached to pups. Eight additional SLTDR's were deployed during 1991 in the Kuril Islands, Russia. Results of these deployments indicated that during the summer, females with pups foraged close to rookeries (20 nmi), made relatively short trips (< 2 days), and made brief, shallow dives. Animals in the winter had much longer trips both in time and space (> 250 nmi), and dove deeper (> 250 m) than summer animals.

In 1992 six adult females and four pups were tracked. During the summer two adult females continued to forage relatively close to the rookery, usually within 20 nmi. In winter, four adult females were wide ranging, and continued to show preferences for different foraging areas. Both female and male pups moved long distances (60 to >250 nmi) as early as their fifth month. They appeared to forage over a similar range as adult females. Pups through their 11th month (May) appear to be shallow divers (>20 m). Consequently, even though they may range widely, they can exploit prey in a very limited portion of the water column. All of the eastern Aleutian Islands animals (with the exception of one pup who went to the Pribilof Islands)

generally foraged on the shelf area (<200 m) within the Krenitzen Islands, as well as to the east on the north and south sides of Unimak Island.

These data are helping to define summer and winter foraging radius and depths around rookeries, and have disclosed specific foraging areas.

From Merrick, R.L. et al. In press. A Satellite-Linked Time-Depth Recorder to Study Steller Sea Lion Foraging.

In 1992 the Alaska Department of Fish and Game (ADF&G) attached satellite linked transmitters (PTT's) to six sea lions. The first PTT was attached to the first adult female to be anesthetized with gas. Drug experimentation and immobilization research by the ADF&G is continuing. A total of five adult females were fitted with PTT's which transmitted from 1 to 2 months until mid-July during the time of the normal molt. The sixth PTT was attached to a yearling female on Forrester Island rookery. Molt patterns are not fully understood so this PTT was programmed to last 3 months with the assumption that this animal would molt on the same schedule as the adults. However, the PTT stayed on and transmitted for the full 3 months, suggesting that this and possibly other yearlings do not molt on the same schedule as adults.

Satellite data from all of the PTTs remains unanalyzed. Brief reviews of incoming data indicated that the adults remained in the

vicinity of tagging. The yearling probably left the Forrester Island rookery soon after tagging. It appeared to move a short distance north, and diving behavior may have been somewhat deeper than expected. Full analysis of this data will be completed in the next several months.

From Calkins, D.G., Alaska Department of Fish and Game, Anchorage, AK.

NMFS conducted echo integration-midwater trawl surveys during winter and summer 1992 to assess Steller sea lion prey availability within 10 nmi of rookeries and haul-outs during winter and summer. Rookery sites at Forrester, Marmot, Atkins and Akun Islands and a haul-out site at Cape Sarichef (as a control site) were surveyed. Analysis of these data is underway.

From Merrick, R.L., National Marine Mammal Lab, Seattle, WA.

#### PHYSIOLOGICAL STUDIES

Blood chemistry and body condition work on Steller sea lions was conducted in 1990-91 with cooperative studies between NMFS (NMML), the University of Alaska, and Texas A & M University. The hypothesis tested was that disease or malnutrition could impact newborn animals and that their survival as juveniles would therefore be compromised. Four separate levels of health status which

might be seriously altered by disease or malnutrition were identified in newborn pups: hydration state, blood metabolite chemistry, blood oxygen chemistry and blubber mass. Newborn (2-3 weeks postpartum) pups were captured on Marmot Island, northeast of Kodiak Island, and Lowrie Island in the Gulf of Alaska in late June and early July 1990-91. The pups were weighed, measured, blood samples were collected, and blubber thickness was measured. The apparently normal values obtained for blood chemistries and blubber mass in the pups do not indicate disease or malnutrition but suggest several conclusions about relationships between health status and the population decline of Steller sea lions. First, that pups nursed by successfully breeding females are healthy. Second, that there appears to be no indication at either Marmot Island or Lowrie Island of a disease in neonatal animals that impacts blood metabolite chemistry, blood chemistry associated with iron metabolism and oxygen carrying capacity, or circulatory water content.

Health and nutritional studies on the status of Steller sea lion pups on Marmot Island and Lowrie Island, Alaska were conducted during June and July of 1990 and 1991. Pups on both Marmot Island and Lowrie Island appeared healthy, strong, and agile for the first month after birth. There was no indication of wide-spread malnutrition, disease,

metabolic disorders, or mortality.

A series of blood indices that reflect hydration state, blood oxygen transport and metabolism of protein, lipid and carbohydrates was used for detecting dehydration, anemia, and malnutrition.

Body mass, blubber thickness, and cutaneous thermal conductance were measured for 18 pups on Marmot Island and 13 pups on Lowrie Island. Body mass was estimated from measurements of standard length and girth. Body weights of male and female pups were 26 to 39% lower for pups on Marmot Island than on Lowrie Island. Because the pups on Marmot were, on average, 1 week younger than those on Lowrie Island, the differences may reflect normal growth patterns. The pups on Lowrie Island may be larger because they are better fed and grow faster. Pup growth rate and body composition from birth to weaning need to be measured at both locations to determine any significance in the difference in growth rates between the two sites. The larger pups on Lowrie Island had thicker blubber and were better insulated than those on Marmot Island. Thermal conductance for blubber increased exponentially for blubber less than 1 cm in thickness. Because heat transfer is 25 times greater in water than in air, malnourished sea lions with less than 1 cm of blubber may be unable to maintain their core temperature. This is especially true if the animal decreases metabolic heat

production during rest periods. Sea lions that become hypothermic at sea will be unable to forage effectively, which further exacerbates their poor body condition.

From Castellini, M.A., et al. In press. Blood Chemistries and Body Condition of Steller Sea Lion Pups at Marmot Island, Alaska. Marine Mammal Science.

From Davis, R., Texas A&M University, Galveston, TX.

In summer 1991 NMFS biologists measured physiological condition of 1-to-2 month old Steller sea lion pups. Blood was drawn from 58 pups at nine sites in the area from southeastern Alaska through the eastern Aleutian Islands. In addition, pups were weighed at Ugamak and Atkins Islands. Ugamak Island pups were heavier in 1991 than pups weighed there in 1990. While there were no 1990 data for Atkins Island, pups weighed there in 1991 were similar in size to the 1991 Ugamak Island pups. These preliminary results indicate pups in all areas generally appeared healthy without signs of anemia or malnourishment.

Weights of pups measured in 1989-91 are at least as great as those tagged and weighed in the Gulf of Alaska in the 1970s. Foetal weights from the 1980s were compared to the 1970s weights and again no differences were found. These data further support the hypothesis that pups today are

as healthy as were Gulf of Alaska pups in the 1970s.

From Merrick, R.L., National Mammal Lab., Seattle, WA.

#### GENETICS STUDIES

Stock differentiation studies using mitochondrial and nuclear DNA (MtDNA) analysis were begun during summer 1991. Blood was collected from adults and pups at sites from southeastern Alaska, the Gulf of Alaska, the Aleutian Islands, and the Pribilof Islands.

During summer 1992 stock differentiation studies using MtDNA continued. Tissue samples were collected from flippers of 5 adults and 39 pups at sites in the Gulf of Alaska and the Aleutian Islands. Analysis of these samples and those collected in 1991 is presently under way. Initial results indicate that Steller sea lions have adequate variation in MtDNA, therefore hypotheses can be developed about the genetic relationships of populations based upon maternal lineages.

From Bickham, J.W., J.C. Patton and T.R. Loughlin, In review. Studies of genetic variation in the Steller Sea Lion (Eumetopias jubatus). Conservation Biology.

#### FISHERY INTERACTIONS

Weekly beachcast carcass surveys were conducted on the Copper River Delta, Alaska, from May through September 1991-92. In 1991 seven

Steller sea lion carcasses were examined or necropsied during the survey. Of these seven animals, two died from suspected gunshot wounds, and the remaining five were listed as having an undetermined cause of death. In 1992 seven Steller sea lion carcasses were surveyed. Two of these animals died from gunshot wounds, one probably died from gunshot, and the remaining four were listed as having an undetermined cause of death.

The Marine Mammal Protection Act observer program observed marine mammal and gillnet fishery interactions in Prince William Sound and South Unimak Island fisheries. In 1991 observers monitored Steller sea lion interactions with active nets. Data were collected on sea lion encounters (<10 m from the net), harassment, and entanglements. Of the 182 observed net encounters in the Prince William Sound driftnet fishery, 266 sea lions were encountered in 587 net retrievals. Of 19 sets, 21 sea lions were entangled and 2 died. During 1992 there was no observer work in Prince William Sound.

From Wynne, K., D. Hicks and N. Munro. 1992. 1991 Marine Mammal Observer Program for the Salmon Driftnet Fishery of Prince William Sound, Alaska, Final Report to NMFS.

The incidental take of Steller sea lions in the domestic and joint-venture groundfish fisheries of the Bering Sea and Gulf of Alaska reported by observers during

1991 totaled 26 animals. In the Bering Sea and Gulf of Alaska longline fishery, six sea lions were "deterred" or not caught in fishing gear but were harassed to prevent the animal from being caught or interacting with the catch or gear. In the Bering Sea and Gulf of Alaska trawl fishery, 2 animals were listed as "deterred", 1 was taken alive, 14 were observed dead, and 3 were decomposed.

#### **SUMMARY OF ADMINISTRATIVE ACTIONS: 1990-1992**

##### Alaska Region

On 5 April 1990 the NMFS issued an Emergency Interim Rule (55 FR 12645) that listed the Steller sea lion as a threatened species throughout its range under the provisions of the Endangered Species Act. Several protective regulations were established including prohibited shooting at or near Steller sea lions; prohibited vessel travel from entering within 3 nmi; prohibited individuals on land from approaching within one-half mile or within sight of listed rookeries in the Gulf of Alaska, Bering Sea, and Aleutian Islands; reduced allowable annual take of Steller sea lions incidental to commercial fisheries from 1,350 to 675 animals in Alaskan waters and adjacent areas of the EEZ west of 141° W long. These protective regulations are intended to reduce sea lion mortality, restrict opportunities for

unintentional and intentional harassment of sea lions, and minimize disturbance and interference with sea lion behavior, especially at pupping and breeding sites.

Since the Emergency Interim Rule was only effective for 240 days, an expeditious permanent rulemaking process was undertaken to avoid any lapse in ESA status. On 20 July 1990 NMFS published an Advanced Notice of Proposed Rulemaking (55 FR 29792) stating the agency's intention to consider the designation of critical habitat and a broader range of protective measures. A Proposed Rule (55 FR 29793) was published to list Steller sea lions as a threatened species, and comments were requested on the listing. The Proposed Rule added a buffer zone at Walrus Island (Pribilof Islands) (Table 1) to the list published in the Emergency Rule.

On 4 December 1990, the Final Rule (55 FR 49204) to list the Steller sea lion as a threatened species under the ESA became effective. This rule finalized the provisions of the previous rules, while adding four new buffer zones on Buldir, Agattu (two rookeries), and Attu islands (Table 1).

A Steller sea lion Recovery Team was appointed by the NMFS Assistant Administrator for Fisheries, Dr. William W. Fox, Jr., and met for the first time in Anchorage, Alaska on 27 April 1990. On 18 September 1990, the Recovery Team sent out a Draft Recovery Plan for scientific review. On 15 February 1991, the Recovery

Team submitted a draft Recovery Plan to NMFS which was released for public review and comment. Following review and comment, a final draft of the Recovery Plan was submitted to NMFS on 3 October 1991, for review and approval. The final draft Recovery Plan incorporated comments that were submitted to NMFS during the technical review process. The plan discusses the natural history and current status of the species, as well as the known and potential human impacts on the species, and recommends management and research actions to aid the species' recovery. On 10 November 1992, the Recovery Team convened in Seattle to discuss ongoing and proposed research and management programs. Topics of discussion included the future role of the Recovery Team, directions for the information and education program, scientific research programs accomplished, enforcement of protective measures, commercial fishery harvest and Steller sea lion abundance, and the status of the Recovery Plan and critical habitat designation. This was preceded by a meeting of researchers, NMFS management, recovery team members, a native corporation representative, and others on 9-10 November 1992, to review present and future Steller sea lion research.

The NMFS Alaska Region submitted a draft Steller Sea Lion Critical Habitat Designation Proposed Rule to the Office of Protected Resources in Washington D.C. The draft included the

recommendations of the Steller Sea Lion Recovery Team. A proposal to designate critical habitat for Steller sea lions is anticipated in 1992.

In 1991, Endangered Species Act Section 7 consultations were completed on the overall effects of the BSAI (Bering Sea Aleutian Island)/Gulf of Alaska (GOA) fisheries and management program, and on all GOA and BSAI fishery management actions taken since the Steller sea lion listing. NMFS completed formal consultation on the 1991 and 1992 BSAI and GOA total allowable catch specifications, 1991 GOA fourth quarter pollock fishery, and Amendments 18/23 to BSAI/GOA Fisheries Management Plan (FMPs) (inshore/offshore allocation). These consultations concluded that the fishery and management actions considered were not likely to jeopardize the continued existence and recovery of Steller sea lions. However, as a result of Section 7 consultations, NMFS determined that additional management measures were necessary to better protect Steller sea lions from the possible adverse effects of these fisheries.

In January 1992, NMFS amended the BSAI and GOA FMPs to prohibit trawling within 10 nmi of Steller sea lion rookeries in the Bering Sea, Aleutian Islands, and Gulf of Alaska. Seasonally expanded trawl closures within 20 nmi during the BSAI winter pollock fishery were established at five of these rookeries - three sites in the Bering Sea

and two in the Aleutian Islands. NMFS has proposed to implement a 20 nmi seasonally expanded trawl fishery closure around the Ugamak Island rookery during the pollock fishery "A" season conducted in the BSAI area (7 December 1992; 57 FR 57726). The closure around Ugamak, in conjunction with the closures around Akun and Akutan Islands, would create a large contiguous area where groundfish trawling could not occur. This region appears to be an important feeding area for Steller sea lions in the eastern Aleutian Islands, particularly for juveniles whose foraging depth and range and prey appear more limited than for adults. The proposed closed area will further reduce the amount of fish, including bycatch, harvested from an area that appears to be particularly important for Steller sea lion foraging.

A temporary exemption for vessel transit through the 3 nmi no entry buffer zones around the Akutan Island and Clubbing Rocks rookeries was granted by NMFS. While traveling through the buffer zones at these two locations, vessels must remain at least 1 nmi from the boundaries of the rookeries at all times. This exemption is to provide for safe, continuous travel through these two buffer zones only; all other activities within these buffer zones, such as fishing or setting anchor, are prohibited. Existing prohibitions on entry within the buffer zones around all other listed Steller sea lion rookeries remain unchanged. A proposed rule to

permanently amend the Steller sea lion buffer zone regulations to reflect this exemption for navigation was published on 9 November 1992 (57 FR 53312).

NMFS also amended the GOA FMP to spatially and temporally allocate GOA pollock harvests. These management actions were taken to reduce the potential adverse effects of groundfish fishery removals that are temporally or spatially compressed and/or occur in important Steller sea lion foraging habitats. Maps were developed depicting trawl closure areas around sea lion rookeries and distributed to the fishing community. From Sue Mello, Steller Sea Lion Coordinator, NMFS Alaska Region.

From Mello S., National Marine Fisheries Service, Alaska Region, Juneau, AK.

Table 1. Buffer zones established at Steller sea lion rookeries in the Gulf of Alaska, Bering Sea, and Aleutian Islands, as listed in the Emergency Rule (5 FR 12645, April 5, 1990), Proposed Rule (55 FR 29793, July 20, 1990), and Final Rule (55 FR 49204, November 26, 1990).

Sites listed in April 5, 1990 Emergency Rule

Gulf of Alaska

Outer Island  
Sugarloaf Island  
Marmot Island  
Chirikof Island  
Chowiet Island  
Atkins Island  
Chernabura Island  
Pinnacle Rock  
Clubbing Rock, north  
Clubbing Rock, south

Aleutian Islands

Sea Lion Rocks (Amak Island)  
Bogoslof Island  
Ugamak Island  
Akun Island  
Akutan Island  
Ogchul Island  
Adugak Island  
Yunaska Island  
Seguam Island  
Agligadak Island  
Kasatochi Island  
Adak Island  
Gramp Rock  
Tag Island  
Ulak Island  
Semisopochnoi Island (Pochnoi Point, Tuman Point)  
Amchitka Island (East Cape, Column Rocks)  
Ayugadak Point, Rat Island  
Kiska Island (Lief Cove, Cape St. Stephens)

Sites listed in July 20, 1990 Proposed Rule

Bering Sea

Walrus Island

Sites listed in November 26, 1990 Final Rule

Aleutian Islands

Buldir Island  
Agattu Island (Cape Sabak, Gillon Point)  
Attu Island



3. ASME Boiler and Pressure Vessel Code, Section I "Power Boilers" (1992 with Interpretations, Volume 30, dated July 1992).

4. On page 14522, in the first column, appendix A to part 192, section II, paragraph E. is corrected by redesignating subparagraphs 1., 2., and 3. as 2., 3., and 4. respectively; and by adding subparagraph 1. as follows:

1. ANSI/NFPA 30 "Flammable and Combustible Liquids Code" (1990).  
 Issued in Washington, DC, on August 20, 1993.

Rose A. McMurray,  
 Acting Administrator for the Research and Special Programs Administration.  
 [FR Doc. 93-20649 Filed 8-26-93; 8:45 am]  
 BILLING CODE 4910-60-M

**DEPARTMENT OF COMMERCE**

National Oceanic and Atmospheric Administration

50 CFR Part 226

[Docket No. 930236-3210; LD. 011293A]

**Designated Critical Habitat; Steller Sea Lion**

AGENCY: National Marine Fisheries Service (NMFS), NOAA, Commerce.

ACTION: Final rule.

**SUMMARY:** Pursuant to the Endangered Species Act (ESA), NMFS is designating critical habitat for the Steller (northern) sea lion (*Eumetopias jubatus*) in certain areas and waters of Alaska, Oregon and California. The direct economic and other impacts resulting from this critical habitat designation, over and above those arising from the listing of the species under the ESA, are expected to be minimal.

The primary benefit of this designation of critical habitat is that it provides notice to Federal agencies that a listed species is dependent on these areas and features for its continued existence and that any Federal action that may affect these areas or features is subject to the consultation requirements of section 7 of the ESA.

**EFFECTIVE DATE:** September 27, 1993.

**ADDRESSES:** Requests for copies of this rule or the Environmental Assessment should be addressed to the Director, Office of Protected Resources, National Marine Fisheries Service, 1335 East-West Highway, Silver Spring, MD 20910.

**FOR FURTHER INFORMATION CONTACT:** Dr. Steven Zimmerman, National Marine Fisheries Service, Alaska Region, P.O. Box 21668, Juneau, AK 99802, (907) 586-7235, or Mr. Michael

Payne, Office of Protected Resources, National Marine Fisheries Service, 1335 East-West Highway, Silver Spring, MD 20910, (301) 713-2322.

**SUPPLEMENTARY INFORMATION:**

**Background**

Counts of Steller sea lions on rookeries and major haulouts during the breeding season have indicated that extensive declines have occurred within the Alaskan and the Russian portions of their range over the last 30 years. A 1989 range-wide survey of Steller sea lions indicated that about 70 percent of the Steller sea lion population during the summer resides in Alaska (Loughlin, Perlov and Vladimirov 1992). A series of counts in the Gulf of Alaska (GOA) and the Bering Sea/Aleutian Islands (BSAI) between the mid-1970s and 1991 indicated a 70 percent decline in the Alaskan portion of the population over this time period (Merrick, Calkins, and McAllister 1992). Counts in Southeast Alaska, British Columbia, and Oregon have remained stable over the same period; Steller sea lion numbers in California have declined. The causes of the Steller sea lion population decline are unknown. Potential causative factors include disease, incidental takes in fishing gear, direct mortality (shooting), and natural or human induced changes (through fishing) in the abundance and species composition of the sea lion prey (Merrick, Loughlin and Calkins 1987, Loughlin and Merrick 1989).

Because of the drastic population decline, NMFS issued an emergency interim rule on April 5, 1990, (55 FR 12645), which listed the Steller sea lion as a threatened species throughout its range and imposed protective measures. The final rule listing the Steller sea lion as threatened (55 FR 49204, Nov. 26, 1990) became effective on December 4, 1990, and imposed protective measures very similar to those established by the emergency interim rule (50 CFR 227.12). These protective measures were intended to reduce sea lion mortality, to restrict opportunities for unintentional harassment of sea lions, and to minimize disturbance and interference with sea lion behavior, especially at pupping and breeding sites.

On April 1, 1993 (58 FR 17181), NMFS published a proposed rule to designate critical habitat for the Steller sea lion. NMFS also completed an environmental assessment (EA) pursuant to the National Environmental Policy Act (NEPA), to evaluate both the environmental and economic impacts of the proposed critical habitat designation. The preamble to the proposed rule outlines previous federal

actions, including the recovery plan, and describes the procedures and criteria used to designate critical habitat.

After consideration of public comments, NMFS is designating critical habitat for the Steller sea lion as described in the proposed rule.

**Essential Habitat of the Steller Sea Lion**

Available biological information for the listed Steller sea lion can be found in the final recovery plan (NMFS 1992). The physical and biological habitat features that support reproduction, foraging, rest, and refuge are essential to the conservation of the Steller sea lion. For the Steller sea lion, essential habitat includes terrestrial, air and aquatic areas.

**Terrestrial Habitat**

Because of their traditional use and the relative ease of observation, terrestrial habitats are better known than aquatic habitats. Steller sea lion rookeries and haulouts are widespread throughout their geographic range (figure 1) and the locations used change little from year to year. Factors that influence the suitability of a particular area include substrate, exposure to wind and waves, the extent and type of human activities and disturbance in the region, and proximity to prey resources (Mate 1973).

The best known Steller sea lion habitats are the rookeries (Table 1), where adult animals congregate during the reproductive season for breeding and pupping. Rookeries are defined as those sites where males defend a territory and where pupping and mating occurs on a consistent annual basis. Rookeries typically occur on relatively remote islands, rocks, reefs, and beaches, where access by terrestrial predators is limited. A rookery may extend across low-lying reefs and islands, or may be restricted to a relatively narrow strip of beach by steep cliffs. Rookeries are occupied by breeding animals and some subadults throughout the breeding season, which extends from late May to early July throughout the range. Female sea lions frequently return to pup and breed at the same rookery in successive years (Gentry 1970), and this site may be the same rookery, or approximate rookery (same island) as the female's natal site (Calkins and Pitcher 1982).

Steller sea lion rookeries are found from the central Kuril Islands around the Pacific Rim of the Aleutian Islands to Prince William Sound (Seal Rocks, at the entrance to Prince William Sound, Alaska, is the northernmost rookery) and south along the coast of North

America to Ano Nuevo Island, California, the southernmost rookery (figure 1). Loughlin, Rugh and Fiscus (1984) identified 51 Steller sea lion rookeries; since that time two additional rookeries have been identified in southeastern Alaska (Hazy Islands and White Sisters), bringing the total to 53 (43 of which are within U.S. borders). Historically, the largest rookeries occurred in the central and eastern Aleutian Islands, and the western and central GOA (Kenyon and Rice 1961; Loughlin, Rugh and Fiscus 1984; Loughlin, Perex and Merrick 1987). Because of drastic declines in pup production at the GOA and Aleutian Islands rookeries, the Forrester Island rookery in southeastern Alaska has been the largest annual producer of pups in recent years.

Haulouts (Table 2) are areas used for rest and refuge by all ages and both sexes of sea lions during the non-breeding season and by non-breeding adults and subadults during the breeding season. Sites used as rookeries in the breeding season may also be used as haulouts during other times of the year. Many rocks, reefs, and beaches are used as haulout sites; Steller sea lions are also occasionally observed hauled out on sea ice and manmade structures, such as breakwaters, navigational aids, and floating docks.

A total of 105 major haulouts have been identified in Alaska. Major haulouts were defined by the Recovery Team as sites where more than 200 animals have been counted at least once since 1970. There are many more haulout sites throughout the range that are used by fewer animals or may be used irregularly.

#### Aquatic Habitat

Although they are most commonly seen and studied while on land, Steller sea lions spend most of their time at sea. The principal, essential at-sea activity presumably is feeding.

#### Nearshore Waters Around Rookeries and Haulouts

For regulatory purposes, the waterward boundary of rookeries and haulouts has been defined as the mean lower-water mark. However, biologically, the boundaries are not easily delineated. Nearshore waters surrounding rookeries and haulouts are an integral component of these habitats. Animals must regularly transit this region as they go to, and return from, feeding trips. As pups mature, they spend an increasing amount of time in waters adjacent to rookeries, where they develop their swimming ability and other aquatic behaviors. Waters

surrounding rookeries and haulouts also provide a refuge to which animals may retreat when they are displaced from land by disturbance.

#### Rafting Sites

In addition to rookeries and haulouts, sea lions also use traditional rafting sites. These are locations where the animals rest on the ocean surface in a tightly-packed group (Bigg 1985). Although the reasons for rafting are not fully understood, the widespread use and traditional nature of these sites indicate that they are an essential part of Steller sea lion habitat.

#### Food Resources

Adequate food resources are an essential component of the Steller sea lion's aquatic habitat. Steller sea lions are opportunistic carnivores that prey predominantly upon demersal and off-bottom schooling fishes. Invertebrates, e.g., squid and octopus, also appear to be regular components of their diet (Pitcher 1981). Prey consumption is expected to vary geographically, seasonally, and over years in response to fluctuations in prey abundance and availability (Pitcher 1981; Hoover 1988).

Data on Steller sea lion prey consumption are fairly limited. Results of limited diet studies conducted in Alaska since 1975 indicate that walleye pollock (*Theragra chalcogramma*) has been the principal prey in most areas over this time period, with Atka mackerel (*Pleurogrammus monopterygius*), Pacific cod (*Gadus macrocephalus*), octopus (*Octopus* sp.), squid (*Gonatidae*), Pacific herring (*Clupea harengus*), Pacific salmon (*Onchorhynchus* spp.), capelin (*Mallotus villosus*), and flatfishes (*Pleuronectidae*) also consumed (Pitcher 1981; Calkins and Pitcher 1982; Calkins and Goodwin 1988; Lowry et al. 1989). In recent years Atka mackerel appears to be the principal prey consumed in the Aleutian Islands (Merrick 1993 unpublished data). Few data are available on Steller sea lion prey preferences in Alaska prior to 1975; however, those data available indicate that pollock may have been a less important component of the diet in previous years (Fiscus and Baines 1966; Pitcher 1981). Limited food habitat data from California and Oregon show a predominance of rockfish (*Scorpaenidae*) and hake (*Merluccius productus*) in the diet, with flatfish, squid, octopus, and lamprey (*Lampetra tridentatus*) also eaten.

#### Foraging Habitats

Specific foraging areas, and their constancy over time, have not been well

defined. NMFS' ongoing studies in the central GOA and Aleutian Islands using satellite telemetry are providing more detailed information on feeding areas and diving patterns in Alaskan waters. The following summarizes the findings to date: NMFS has deployed 52 satellite-linked time depth recorders on Steller sea lions since 1989. The results of this tagging indicate that waters in the vicinity of rookeries and haulouts are important foraging habitats, particularly for post-parturient females and young animals. These investigations strongly suggest that sea lion foraging strategies and ranges change seasonally, and according to the age and reproductive status of the animal.

Summertime foraging by postpartum females, whose foraging range is probably restricted by the need to return to the rookery to nurse pups, appears to occur mainly in relatively shallow waters within 20 nm of the rookeries. Data from tagged animals without pups and females with pups during the winter indicate that adult sea lions have the ability to forage at locations far removed from their rookeries and haulout sites, and at great depths. Sea lion pups by their sixth month are also capable of traveling extended distances from land. However, dive depth appears to be more limited, and may restrict foraging success. Few observed dives (juvenile sea lions (younger than 11 months) have exceeded 20 meters (m), whereas adults have been observed diving to depths greater than 250 m.

#### Need for Special Management Considerations or Protection

The following discussion outlines specific essential habitats that may require special management considerations or protection. In particular, rookeries, haulouts, and prey availability in certain areas may require special management considerations. Under separate rulemakings, NMFS has already determined that certain Steller sea lion habitats require special management protection, and has limited human activities in these areas. These management actions and the essential habitats they protect are also described below.

#### Terrestrial Habitats

The use of traditional sites by Steller sea lions, and the link of territorial males, postpartum females, and pups to rookery sites during the breeding season make them particularly vulnerable to harassment. Observed responses to human disturbance vary from no reaction at all to mass stampedes into the water. In some cases, haulout sites have been completely abandoned after

repeated disturbances, whereas in other cases sea lions have continued to use sites even after extreme harassment (Hoover 1988). The remote locations of most rookeries and haulouts help to reduce the frequency of harassment, but disturbance of sea lions by air and water craft continues to occur. Steller sea lions are vulnerable to harassment and disruption of essential life functions (e.g., breeding, pup care, and rest) at rookeries and haulouts throughout their range.

#### Aquatic Habitats

##### Nearshore Waters Around Rookeries and Haulouts

Nearshore waters associated with terrestrial habitats are subject to the same types of disturbance as rookeries and haulouts. NMFS has prohibited vessel entry within 3 nm of all Steller sea lion rookeries west of 150° W. longitude, the area where the greatest population decline has occurred, primarily to protect sea lions using these habitats from intentional and unintentional harassment. The Recovery Team recommended that waters extending 3,000 feet (0.9 km) from rookeries and major haulouts throughout the range of Steller sea lions be considered essential habitat that merits special management consideration.

##### Rafting Sites

Available information is not sufficient to identify any specific rafting sites that are in need of special management consideration. Therefore, rafting sites are not included in this critical habitat designation.

##### Prey Resources and Foraging Habitats

Reduction in food availability, quantity, and/or quality is considered to be a possible factor in the Steller sea lion population decline (Calkins and Goodwin 1988; Merrick, Loughlin and Calkins 1987; Loughlin and Merrick 1989; Lowry, Frost and Loughlin 1989). Most of the data on proximate causes of the Alaska sea lion decline point to reduced juvenile survival as a significant causative agent. There are also indications that decreased juvenile survival is due to a lack of food post-weaning and during the winter/spring of the first year. Calkins and Goodwin (1988) found that Steller sea lions collected in the GOA in 1985-1986 were significantly smaller (girth, weight, and standard length) than same-aged animals collected in the GOA in the 1970s. Reduced body size at age was interpreted as an indicator of nutritional stress.

Conservation and management of prey resources and foraging areas appears essential to the recovery of the Steller sea lion population. The quality and quantity of these resources may be degraded by human activities, e.g., pollutant discharges, habitat losses associated with human development, and commercial fisheries. Available data indicate that contamination of sea lion food resources by anthropogenic pollutants has not been a significant factor in the Steller sea lion decline. Changes in prey base due to physical habitat alteration also appear insignificant. Local degradation of sea lion food resources may occur near human population centers, along shipping lanes, and near drill sites. Presently, there is insufficient information to identify any specific geographic areas where additional management measures to protect sea lion food resources from contaminant inputs and habitat loss, beyond the existing state and Federal regulations, are necessary.

The relationship between commercial fisheries and the ability of Steller sea lions to obtain adequate food is unclear. The BSAI/GOA geographic region where Steller sea lions have experienced the greatest population decline is also an area where large commercial fisheries have developed. Many of the Steller sea lion's preferred prey species are harvested by commercial fisheries in this region, and food availability to Steller sea lions may be affected by fishing. At present, NMFS believes that the exploitation rates in federally managed fisheries are unlikely to diminish the overall abundance of fish stocks important to Steller sea lions. However, spatial and temporal regulation of fishery removals in some areas has been determined to be necessary to ensure that local depletion of prey stocks does not occur.

No definitive description of Steller sea lion foraging habitat is possible. However, available data from satellite telemetry studies indicate that nearshore waters proximal to rookeries and haulouts are important foraging zones for females with pups during the breeding season and yearlings in the non-breeding season. Because of concerns that commercial fisheries in these essential sea lion habitats could deplete prey abundance, NMFS amended the BSAI and GOA groundfish fishery management plans. Under the Magnuson Act, NMFS: (1) Prohibited trawling year-round within 10 nm of listed GOA and BSAI Steller sea lion rookeries; (2) prohibited trawling within 20 nm of the Akun, Akutan, Sea Lion Rock, Agligadak, and Seguam rookeries

during the BSAI winter pollock roe fishery to mitigate concentrated fishing effort on the southeastern Bering Sea shelf and in Seguam Pass; and (3) placed spatial and temporal restrictions on the GOA pollock harvest to divert some fishing effort away from sea lion foraging areas and to spread effort over the calendar year. NMFS has seasonally expanded the 10 nm no-trawl zone around Ugamak Island in the eastern Aleutians to 20 nm (58 FR 13561, Mar. 12, 1993). The expanded seasonal "buffer" at Ugamak Island better encompasses Steller sea lion winter habitats and juvenile foraging areas in the eastern Aleutian Islands region during the BSAI winter pollock fishery.

Three large aquatic foraging areas have been identified through foraging studies, historical observations of Steller sea lions, and current observations of the distribution of their prey. Seguam Pass, in the Aleutian Islands, is a major area of concentration of Atka mackerel. Prior to the implementation of trawl prohibition areas around rookeries near Seguam Pass, a large portion of the Atka mackerel harvest occurred there. The Bogoslof area, including the Unimak Pass and eastern Bering Sea shelf, is known to support dense aggregations of spawning walleye pollock. Shelikof Strait, in some years, also supports large spawning concentrations of walleye pollock. Survival of pollock larvae and juveniles in the Gulf of Alaska is thought by some to be dependent upon the southwestward transport of larvae from spawning grounds in Shelikof Strait to suitable nursery grounds along the Alaska Peninsula (Lloyd and Davis 1989). These areas also contain, or are adjacent to, Steller sea lion rookeries and haulouts.

Through past regulatory actions, NMFS determined that aquatic habitats and prey resources in the vicinity of GOA and BSAI sea lion rookeries, in Seguam Pass, and on the southeastern Bering Sea shelf are essential to Steller sea lions, and are in need of special management considerations and/or protection. These aquatic habitats are identified as critical habitat.

NMFS is also designating other foraging habitats, e.g., within 20 nm of major haulouts and Shelikof Strait, that may be in need of management although no specific restrictions are being considered at this time. Monitoring of fishery harvests and Steller sea lion research in these habitats will continue.

Essential Steller sea lion prey resources and foraging habitats also occur outside of the GOA and BSAI. However, declines in Steller sea lions generally are less severe in the areas to the east of 144° W. longitude and

information concerning specific foraging areas and special management needs does not exist at this time.

#### Activities That May Affect Essential Habitat

A wide range of activities by several private, state, and Federal agencies may affect the essential habitats of Steller sea lions. Specific human activities that occur within or in the vicinity of the essential sea lion habitat defined above, and that may disrupt the essential life functions that occur there, include, but are not limited to: (1) Wildlife viewing (primarily south-central and southeastern Alaska and California); (2) boat and airplane traffic (throughout the range of the Steller sea lion); (3) research activities (on permitted sites and during specified times throughout the year); (4) commercial, recreational, and subsistence fisheries for groundfish, herring, salmon, and invertebrates, e.g., crab, shrimp, sea urchins/cucumbers (throughout the range of the Steller sea lion); (5) timber harvest (primarily southeastern and south-central Alaska); (6) hard mineral extraction (primarily southeastern Alaska); (7) oil and gas exploration (primarily Bering Sea and GOA); (8) coastal development, including pollutant discharges (specific sites throughout range); and (9) subsistence harvest (Alaska).

Federal agencies whose actions may affect essential sea lion habitats and will most likely be affected by this critical habitat designation include, but are not necessarily limited to: (1) The U.S. Department of Interior, Bureau of Land Management, Minerals Management Service (MMS), National Park Service, and U.S. Fish and Wildlife Service; (2) the U.S. Department of Agriculture, Forest Service; (3) the U.S. Environmental Protection Agency (EPA); (4) the U.S. Department of Transportation, Coast Guard; (5) the U.S. Department of Defense, including the Navy and Air Force; and (6) primarily, the U.S. Department of Commerce, NMFS. Other users will not be affected by critical habitat designation unless their activities are authorized or carried out by Federal agencies.

#### Expected Impacts of Designating Critical Habitat

There are no inherent restrictions on human activities in an area designated as critical habitat. A critical habitat designation directly affects only those actions authorized, funded, or carried out by Federal agencies. Under section 7 of the ESA, Federal agencies in consultation with NMFS, are required to ensure that their actions are not likely

to result in the destruction or adverse modification of Steller sea lion critical habitat. It should be noted that activities conducted outside of designated critical habitat that may affect critical habitat and could be subject to the consultation requirement. Such effects should be anticipated if the activity may impact an essential feature identified in the critical habitat designation.

In many cases, the primary benefit of the designation of critical habitat is that it provides specific notification to Federal agencies that a listed species is dependent on a particular area or feature for its continued existence and that any Federal action that may affect that area or feature is subject to the consultation requirements of section 7 of the ESA. This designation would require Federal agencies to evaluate their activities with respect to Steller sea lion critical habitat and to consult with NMFS prior to engaging in any action that may affect the critical habitat. This designation may assist Federal agencies in evaluating the potential environmental impacts of their activities on Steller sea lions and their critical habitat, and in determining when consultation with NMFS would be appropriate.

Regardless of this critical habitat designation, Federal agencies active within the range of the Steller sea lion are required to consult with NMFS regarding projects and activities that may affect the species pursuant to the jeopardy clause of section 7 of the ESA. Under that provision, Federal agencies are required to ensure that their actions are not likely to jeopardize the continued existence of the species.

It is difficult to separate the concept of jeopardy from the destruction or adverse modification of critical habitat. Activities that result in the destruction or adverse modification of critical habitat are also very likely to jeopardize the continued existence of the species, given the definitions specified in 50 CFR 402.02, regardless of any official critical habitat designation or the absence of such a designation. NMFS has already reinitiated ESA section 7 consultation on Federal actions that occur within the range of the Steller sea lion, including those that occur within the critical habitat areas. Federal activities for which ESA section 7 consultations have been reinitiated/ conducted include: (1) Federally managed fisheries; (2) MMS Outer Continental Shelf (OCS) lease sales (areas being considered by MMS for oil and gas lease sales during the 1992-1997 period include portions of critical habitat in Shelikof Strait and the Bogoslof Island area); (3) U.S. Forest

Service timber harvest and mineral extraction proposals; (4) EPA waste discharge permits; (5) U.S. Army Corp of Engineers section 10/404 permits; and (6) U.S. military activities.

ESA section 7 consultations on the Federally managed groundfish fisheries of the BSAI and GOA management areas have resulted in changes in the manner in which these fisheries are prosecuted, specifically to protect Steller sea lions and their essential habitats. Economic effects attributable to these regulations were analyzed in the environmental assessments and other regulatory documents produced in support of those decisions.

The designation of critical habitat will not directly affect state and local government activity, or private actions unless there is some Federal involvement. The designation will help, however, to inform these agencies and the public of the importance of these habitat areas to Steller sea lions.

NMFS prepared an Environmental Assessment (EA), based on the best available information, that describes the environmental and economic impacts of alternative critical habitat designations.

This action identifies and delineates critical habitat for the Steller sea lion. Designation of these areas as critical habitat is intended to maintain and/or enhance, rather than to use, a resource. No adverse environmental impacts from the designation of critical habitat are expected. Rather, the designation may enhance the long-term productivity of these areas by ensuring that a Federal agency's actions will not result in the adverse modification or destruction of critical habitat for the Steller sea lion.

#### Designated Critical Habitat: Essential Features

NMFS, by this final rule, designates certain rookeries and haulouts and associated areas, as well as three special foraging areas as critical habitat for the Steller sea lion. These areas are considered essential for the health, continued survival, and recovery of the Steller sea lion population, and may require special management consideration and protection.

In Alaska, major Steller sea lion rookeries, haulouts and associated terrestrial, air, and aquatic zones are designated as critical habitat. Critical habitat includes a terrestrial zone extending 3,000 feet (0.9 km) landward from each major rookery and haulout. Critical habitat also includes air zones extending 3,000 feet (0.9 km) above these terrestrial zones and aquatic zones. Aquatic zones extend 3,000 feet (0.9 km) seaward from the major rookeries and haulouts east of 144° W.

longitude. The aquatic zone extends 20 nm (37 km) seaward for major rookeries and haulouts west of 144° W. longitude.

Rookeries and haulouts in Alaska are within the historical center of Steller sea lion abundance, and have experienced the greatest decline. Aquatic areas surrounding major rookeries and haulout sites provide foraging habitats, prey resources, and refuge considered essential to the conservation of Steller sea lions. The critical habitat surrounding each BSAI and GOA rookery and major haulout site includes not only the aquatic areas adjacent to rookeries that are essential to lactating females and juveniles, but also encompasses aquatic zones around major haulouts, which provide foraging and refuge habitat for non-breeding animals year-round and for reproductively mature animals during the non-breeding season. These areas are considered critical to the continued existence of the species throughout their range since they are essential for reproduction, rest, and refuge from predators and human-related disturbance.

In California and Oregon, major Steller sea lion rookeries and associated air and aquatic zones are designated as critical habitat. Critical habitat includes an air zone extending 3,000 feet (0.9 km) above rookery areas historically occupied by sea lions. Critical habitat also includes an aquatic zone extending 3,000 feet (0.9 km) seaward.

There are no rookeries in Washington state waters. A 3,000 foot "buffer zone" landward of rookeries in Oregon and California would not be appropriate, generally, for these sites. These rookeries are, for the most part, small offshore rocks and outcroppings where upland boundaries are not applicable due to the small size of the site. Haulout sites in Washington, Oregon and California have not been identified as Steller sea lion critical habitat.

Critical habitat designations for rookeries, haulouts, and associated areas are consistent with recommendations of the Recovery Team, except that rookeries and haulouts outside of U.S. waters have not been included (50 CFR 424.12(h)) and 20 nm aquatic zones around rookeries and haulouts west of 144° W. have been designated. The designations are also consistent with the intent of protective measures developed by NMFS at the time the species was listed as threatened (55 FR 49204, Nov. 26, 1990).

In addition to rookeries, haulouts, and associated areas, NMFS designates three special aquatic foraging areas as critical habitat for the Steller sea lion. The first is located in the GOA (Shelikof Strait)

(figure 2), and the other two are located in the BSAI area (Bogoslof Island area and Segum Pass) (figures 3 and 4). These sites were selected because of their geographic location relative to Steller sea lion abundance centers, their importance as Steller sea lion foraging areas, their present or historical importance as habitat for large concentrations of Steller sea lion prey items that are essential to the species' survival, and because of the need for special consideration of Steller sea lion prey and foraging requirements in the management of the large commercial fisheries that occur in these areas.

The aquatic foraging sites in the GOA and BSAI are the same as those that were recommended by the Recovery Team for critical habitat designation with one modification. The designated area on the southeastern Bering Sea shelf that includes Bogoslof Island is larger than that recommended by the Recovery Team. This enlarged area better incorporates the walleye pollock spawning area to the north and east of Unimak Pass and encompasses a diverse oceanographic region with high concentrations of important sea lion food resources, e.g., walleye pollock, eulachon, capelin, and migrating herring, as well as intense commercial fisheries for these prey resources.

Modifications to this critical habitat designation may be necessary in the future as additional information becomes available.

#### References

A list of references is included in the Environmental Assessment (EA) and available upon request (see ADDRESSES).

#### Comments and Responses

On April 1, 1993, NMFS proposed to designate critical habitat for the Steller sea lion under the ESA, and provided a 60-day comment period (58 FR 17181). NMFS convened a public hearing in Anchorage, Alaska, on July 9, 1993, and extended the comment period on the proposed rule to designate critical habitat for the Steller sea lion until July 19, 1993 (58 FR 34238, June 24, 1993).

During the comment periods and at the public hearing, a total of 28 sets of comments were received. Commenters represented 29 organizations, including 9 government agencies, 4 private groups, 15 fishing industry organizations and 1 private oil company. A compilation of these comments are addressed below.

#### Comments on Designation of Rookeries and Haulouts

**Comment 1:** The State of Alaska Division of Governmental Coordination

(ADoGC) and Department of Fish and Game (ADF&G) supported Steller sea lion critical habitat designation, and agreed that all Steller sea lion rookeries and major haulouts constitute critical habitat. However, they urged adoption of a seaward boundary of 3000 feet for rookeries and haulouts throughout the range, as proposed by the Steller Sea Lion Recovery Team. The ADoGC suggested the 20 nm zones west of 144° W. longitude placed a greater burden on Alaska despite the lack of human habitation in the area as compared to other parts of the Steller sea lion's range. The ADF&G suggested that the 20 nm zones around rookeries and haulouts were inappropriate because they were based on satellite telemetry data from only a few locations. They indicated these zones did not represent the areas in coastal and offshore waters that contain appropriate environmental and biological characteristics to provide important feeding habitats for sea lions from several rookeries and haulouts. ADF&G recommended critical habitat be of sufficient size to be meaningful while allowing appropriate controls on human activities that may affect sea lion habitat. ADF&G suggested NMFS identify foraging areas, such as the 3 large marine areas proposed, according to ecological factors rather than proximity to haulouts or existing regulatory mechanisms. Both agencies indicated NMFS did not supply sufficient documentation to justify the designation of 20 nm areas around rookeries and haulouts as critical habitat.

ADoGC recommended NMFS designate critical habitat at Steller sea lion rookeries and haulouts, seaward to 3000 feet, and recommended withdrawal of the extended areas around haulouts and rookeries until: (1) A firm scientific basis can be shown which justifies additional designations and (2) NMFS conforms with all procedural requirements. Additionally, an illustration of the areas identified as critical habitat was suggested to assist in envisioning the way the haulout and rookery areas relate to the marine foraging areas. Three additional commenters supported this suggestion.

**Response:** With respect to the first point, NMFS has determined that the 20 nm aquatic zones around major rookeries and haulouts in Alaska west of 144° W. longitude are warranted given the geographic concentration and distribution of Steller sea lions, the rates of observed declines in Steller sea lions in various areas, the importance of prey resources in aquatic areas, possible impacts of commercial fishing operations, and the fact that these

extended areas may be in need of management.

NMFS agrees that critical habitat designation needs to represent meaningful areas. Consequently, NMFS is not designating the Steller sea lion's entire range, but rather is focusing attention on particular areas that have essential features and that may be in need of management.

The Steller sea lion recovery team recommended two types of habitat for designation, terrestrial (rookeries and haulouts) and aquatic areas. The team indicated an area of minimal disturbance near rookeries and haulouts was an important physical feature to be considered in designating critical habitat. Thus, a 3000 ft aquatic zone around rookeries and haulouts was suggested as a sufficient "buffer" area to minimize disturbance or harassment of the Steller sea lions at rookeries and haulouts. However, availability of prey resources is also an essential biological feature of aquatic habitat that NMFS believes must be considered in designating critical habitat. The importance of prey resources, as well as other features, is summarized in the "Essential Habitat of the Steller sea lion" section of this preamble and in the proposed rule.

The foraging habits and food needs of Steller sea lions is not completely understood, however, ongoing satellite telemetry studies indicate Steller sea lions forage in shallow waters within 20 nm of rookeries in summer months (NMML unpublished data). Concerns about the availability of prey resources and the relationship between these resources and commercial fishing operations, especially in areas near rookeries and haulouts, are summarized in the "Need for Special Management Considerations or Protection" section of this preamble and in the proposed rule.

Furthermore, NMFS has determined that the 20 nm aquatic zones around major rookeries and haulouts in Alaska west of 144° W. longitude may be in need of management. It is important to emphasize that in designating these extended aquatic zones, NMFS is not attempting to justify or prove that these areas, in fact, actually do need special management or specific regulation, but rather that these areas may be in need of management. Of course, currently the commercial groundfish fisheries throughout the BSAI and GOA are being managed under the Magnuson Fishery Conservation and Management Act and associated fishery management plans and regulations. Specific fishery management restrictions near certain rookeries are described in the proposed rule.

At this point, NMFS is not recommending additional special management measures for these extended aquatic zones except for further research and monitoring. For example, research is planned concerning Steller sea lion foraging behavior proximal to rookeries and haulouts, including additional satellite telemetry studies. Modification of critical habitat designation or specific management measures may be considered based upon this research.

This final rule does not include specific management measures and no additional burden on the State of Alaska is anticipated as a result of the designation of these extended aquatic zones as critical habitat. If and when specific management measures are proposed, it is anticipated that the proposed rule will explain the scientific basis and justification for the measures.

With respect to the second point, NMFS acknowledges that certain procedural requirements were not followed upon publication of the proposed rule. All notification requirements of 50 CFR 424.16(b) have now been satisfied.

Finally, NMFS agrees with ADoGC and others' recommendation that illustrations of critical habitat should be prepared. This final rule contains an illustration of the range of the Steller sea lion population (figure 1) and the aquatic foraging habitats (figures 2, 3 and 4) and provides tables listing the latitude and longitude of all haulouts and rookeries designated as critical habitat. There was insufficient time available prior to publication of this final rule in the Federal Register to prepare additional detailed illustrations. Further graphics will be prepared and will be disseminated with associated information in the near future.

*Comment 2:* One commenter was "especially pleased" with the proposal to designate critical habitat 20 nm seaward of rookeries and major haulouts west of 144° W. longitude, as well as the 3 large aquatic foraging habitats. However, this commenter questioned the definition of a major haulout and suggested NMFS revisit the criterion of 200 or more animals due to drastic reduction in the population and resultant low numbers of observations at some haulouts.

*Response:* The Steller sea lion Recovery Team recommended designating only major haulouts, which they defined as those used by 200 or more Steller sea lions at least once since 1970, as critical habitat. The Team acknowledged the difficulty selecting a finite number to designate critical habitat, but concluded that occupation

by 200 Steller sea lions reflected significant use of a site.

The decline in Steller sea lions was first detected in the eastern Aleutian Islands in the mid-1970's, and spread east and west from there by the late 1970's. The use of 1970 as the baseline year should preclude the omission of major haulouts due to the subsequent decline in the population.

*Comment 3:* ADoGC suggested a designation of a haulout on the outer coast of the Kachemak Bay State Wilderness Park as critical habitat.

*Response:* Information received from ADF&G indicated 70 to 100 male Steller sea lions use the outer coast of the Kachemak Bay State Wilderness Park as a haulout. This level of use does not meet the standard for a major haulout (at least 200 Steller sea lions observed on at least one occasion since 1970) for critical habitat designation.

*Comment 4:* One commenter opposed the designation of the terrestrial zones as critical habitat on the grounds that the designation would constitute a "taking" of private property rights through potential restrictions regarding land use.

*Response:* As stated in the proposed rule, the only direct impact of a critical habitat designation is through the provisions of section 7 of the ESA. That section applies only to those actions authorized, funded or carried out by Federal agencies. Federal activities that would affect areas designated as critical habitat are subject to the section 7 consultation process to determine if those activities are likely to destroy or adversely modify the critical habitat. Of course, in almost all cases those Federal activities would also affect listed species and would be subject to consultation under the jeopardy standard, regardless of whether critical habitat was or was not designated.

This final rule contains no special land use regulations. This critical habitat designation will not directly affect private or State land use activities unless there is some Federal nexus or involvement. Even where there is Federal involvement, NMFS anticipates that this final critical habitat designation, by itself, will not restrict private land use activities in a manner or to an extent that these activities are not already circumscribed as a result of the listing of this species, under the Marine Mammal Protection Act, or by other laws.

*Comment 5:* ADoGC and another commenter stated that NMFS is required to conduct an analysis pursuant to section 810 (16 U.S.C. 3120) of the Alaska National Interest Lands Conservation Act (ANILCA) concerning

the impacts to subsistence uses as a result of designating public lands as critical habitat. Because the State of Alaska asserts that designation of public lands as critical habitat is a form of withdrawal or reservation covered by section 810, NMFS should conduct the analysis required by section 810 before designating those areas as critical habitat.

**Response:** Section 810(a) of ANILCA provides that, in determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands under any provision of law authorizing such actions, the head of the Federal agency having primary jurisdiction over such lands or his designee shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes.

It is unlikely that NMFS would be considered the Federal agency having primary jurisdiction over Federal public lands included in the critical habitat designation. Furthermore, this rule, by itself, does not restrict the use of public lands although NMFS may subsequently consult with other agencies to ensure compliance with the requirements of section 7. Consequently, NMFS has concluded that the requirements contained in section 810(a) are not applicable to the designation of critical habitat for Steller sea lions.

**Comment 6:** One commenter suggested Beehive and Matushka Islands be included as critical habitats if not already included under the Chiswell Islands listing. The commenter indicated staff at Kenai Fjords National Park observed 1100 to 1300 Steller sea lions hauled out at Beehive Island on January 16, 1985.

**Response:** Beehive and Matushka Islands are within the critical habitat identified at Chiswell Islands.

#### *Comments on Designation of Special Aquatic Foraging Habitats*

**Comment 7:** The ADoGC recognized the importance of Shelikof Strait, Bogoslof and Seguam foraging areas, but suggested that NMFS did not present adequate justification in the proposed rule or EA. ADF&G recommended designation of these three foraging areas based on the needs of sea lions and other ecological factors, rather than proximity to haulouts.

**Response:** NMFS has concluded that there is adequate justification for designation of the three special aquatic

foraging areas in Alaska for Steller sea lions based on biological and ecological needs of the species and the potential need for special management consideration. The ESA and associated regulations require designation of critical habitat that contain "features essential to the conservation of Steller sea lions and that may require special management considerations or protection" (50 CFR 424.12(b)). The sections of this preamble entitled, "Essential Habitat of the Steller sea lion" and "Need for Special Management Consideration" summarize the justification for the designation of these three special areas. Likewise much of the response to comment 1 is also applicable to this comment. Again, the potential need for special management considerations does not necessarily mean restrictions or elimination of activities. Close monitoring of activities and additional research also constitute "special management considerations".

**Comment 8:** One commenter, representing nine fishery organizations, identified existing protective measures resulting from the cooperation between the fishing industry, the North Pacific Fishery Management Council (the Council) and NMFS, despite limited available data. This commenter suggested that the benefits of designating the large aquatic areas are not clear unless they are related to anticipated future regulatory measures. The commenter indicated future measures are not necessary due to: (1) Existing regulations, (2) NMFS presentations to the Council that the population reduction is due to loss of pups, which are not impacted by commercial fisheries, (3) questions regarding linkages between commercial fisheries and the health of Steller sea lion population, and identification of other factors that may have contributed to the decline, (4) lack of incidental take in groundfish trawl fisheries, and (5) need for completion of NMFS studies of feeding ecology, energetics and effects of fishing on sea lion prey prior to implementation of these regulations. Ten other commenters supported these observations, and wanted NMFS to clarify its intent regarding anticipated future regulations resulting from designation.

**Response:** NMFS appreciates the cooperation of the Council and the fishing industry in the development of and adherence to regulations modifying fishing activities to reduce impacts of the groundfish trawl fisheries on the Steller sea lion population. Existing regulations include 3 nm buffer zones, 10 nm trawl prohibition areas around rookeries, and 20 nm seasonal

expansion of some of the trawl prohibition areas.

The Steller sea lion recovery team first recommended the designation of aquatic critical habitats in 1991, noting that "since nutritional factors appear to be involved in the population decline the Team felt that it would not be satisfactory to wait for additional information before recommending designation of some areas that are critical habitat for feeding" (Lowry April 1, 1991). NMFS agrees with this observation, and believes that designation of these foraging areas will assist the Council and fishing industry in identifying areas where modifications in fishing effort may be necessary to protect Steller sea lions.

No additional regulatory actions are anticipated for fisheries conducted under the BSAI and GOA groundfish management plans as a result of critical habitat designation. Alaskan groundfish fisheries are considered under ESA section 7 consultations at least once a year when the total allowable catch specifications are determined. Past consultations have resulted in changes in the manner in which these fisheries are prosecuted and, as a result of these modifications, NMFS has determined that Alaskan groundfish fisheries are not likely to jeopardize the continued existence of Steller sea lions or essential habitat. New information regarding Steller sea lions or their prey, or changes in fishing practices that may affect Steller sea lions, could result in a modification of regulations regardless of critical habitat designation.

NMFS will continue to collect and analyze data regarding Steller sea lion feeding ecology and energetic needs. NMFS believes existing information, discussed in the preamble to this final rule, is adequate to allow the designation of critical habitat including aquatic zones and the three special aquatic foraging areas.

**Comment 9:** One commenter suggested the Shelikof Strait foraging area be extended northward along the Cape Douglas coast to include Shaw Island, which lies in waters the commenter has observed as important for foraging Steller sea lions.

**Response:** NMFS believes the most important foraging areas near Shelikof Strait are within the boundaries identified as critical habitat, although clearly sea lions may forage outside this area. Critical habitat boundaries can be modified in the future if NMFS receives additional information or observes other areas that are critical to Steller sea lions.

**Comment 10:** Three commenters questioned the proposed designation of the entire Shelikof Strait as critical

habitat for Steller sea lions. They suggested actions already taken through ESA section 7 consultations and associated management actions taken under the Magnuson Act precluded the need to designate Shelikof Strait as critical habitat. One of the commenters indicated data in the recovery plan and proposed rule did not support the designation of the entire Shelikof Strait as critical habitat, and suggested data on satellite-tagged Steller sea lions indicated Steller sea lions forage offshore in winter and are therefore not found in Shelikof Strait during winter months. During the breeding season, they suggest Steller sea lions are found only marginally at the northeast and southeast portions of Shelikof Strait near rookeries.

*Response:* Shelikof Strait was proposed as critical habitat because it contains "features essential to the conservation of Steller sea lions and that may require special management considerations or protection" (50 CFR 424.12(b)). These features include large spawning concentrations of walleye pollock. Survival of pollock larvae and juveniles in the Gulf of Alaska is thought by some to be dependent upon the southwestward transport of larvae from spawning grounds in Shelikof Strait to suitable nursery grounds along the Alaska Peninsula (Lloyd and Davis 1989). Additionally, Shelikof Strait contains or is adjacent to a number of haulouts and is proximal to major rookeries.

During intensive harvest of pollock between 1982 and 1984, a total of 901 Steller sea lions were observed killed in Shelikof Strait and a total of 2115 were estimated to have been killed. Stomach contents from 36 animals taken in 1983 and 1984 indicated the sea lions were feeding on pollock similar in size to that being harvested in the fishery (Loughlin and Nelson 1986). These observations confirmed ADF&G aerial survey results which identified Shelikof Strait as an important foraging area for Steller sea lions in the Central Gulf in the late winter, especially in years when pollock are abundant in those waters.

The need to continue to monitor and manage activities which impact fishery resources in Shelikof Strait through the section 7 consultation process illustrates the appropriateness of designation of this area as critical habitat. Seasonal use of the area will be considered during the ESA section 7 process in a case by case basis, rather than through seasonal designation. Impacts to habitat during seasons of low occurrence of sea lions which may affect Steller sea lions returning to the area, such as physical destruction of haulouts, could be

averted as a result of identification of the critical habitat.

#### General Comments

*Comment 11:* ADoGC suggested critical habitat designation may affect lease sales in the Shelikof Strait area proposed by Alaska's Division of Oil and Gas by increasing the scrutiny and mitigation measures resulting from that designation. ADoGC indicated these possible impacts are not adequately addressed in the proposed rule.

*Response:* NMFS does not anticipate any special or increased restrictions regarding lease sales in the Shelikof Strait area to result from this critical habitat designation separate or apart from restrictions which would have occurred as a result of listing Steller sea lions in 1990 as a threatened species.

Currently, Federal agencies permitting, funding or carrying out activities that may affect Steller sea lions are required to consult with NMFS regarding these activities. Even without this critical habitat designation, Federal agencies are required to consult with NMFS in most, if not all, situations which may affect Steller sea lion habitat, since actions affecting the habitat would also be expected to affect the species. Likewise, the protection provided by a critical habitat designation, therefore, usually only duplicates the protection provided under the ESA section 7 jeopardy provision.

Initiation of consultation, pursuant to section 7 of the ESA, is the responsibility of the action agency since NMFS cannot know when actions that may affect Steller sea lions are planned. Appropriate scrutiny resulting from heightened awareness of Steller sea lion's needs due to the designation of critical habitat would be a benefit to the species. Agencies are provided with a clearer indication as to when consultation under section 7 will be required. This is most important in cases where the action would not result in direct mortality or injury to individuals of a listed species (e.g., an action occurring within the critical area when a migratory species is not present).

*Comment 12:* One commenter indicated NMFS did not offer evidence that activities other than commercial fishing affect the Steller sea lion population, and therefore the existing biological opinion regarding activities such as Outer Continental Shelf (OCS) lease sales should not be modified.

*Response:* NMFS has identified features, including established rookeries and haulouts and prey availability, that are essential to the conservation of

Steller sea lions. Section 7 of the ESA requires Federal action agencies to ensure that their activities are not likely to jeopardize Steller sea lions or result in destruction or adverse modifications of their critical habitat. Consultation must be reinitiated any time significant new information becomes available regarding the biology of the species or the effects of the Federal action, or when critical habitat is designated. NMFS does not anticipate that reinitiated consultation will result in changes to the opinion based on the designation unless there is new information available not previously considered in the opinion.

*Comment 13:* One commenter indicated NMFS should take meaningful action, in addition to critical habitat designation, to prevent impacts from OCS oil and gas activities. Suggested actions included excluding OCS oil and gas leasing, exploration, development and transportation activities within Shelikof Strait, lower Cook Inlet and the St. George Basin and canceling other Alaska OCS and state offshore oil and gas lease sales to allow time for a review of threats posed to the Steller sea lion population and the marine ecosystem. This commenter indicated transport of oil from other sale areas presented an increased risk to the Steller sea lion at its habitat.

*Response:* NMFS believes that specific management measures, such as proposed by this commenter, are better considered during the consultation process rather than in this designation of critical habitat. During the consultation process, NMFS will evaluate whether or not specific activities are likely to destroy or adversely modify critical habitat. Further, NMFS will continue to work with other Federal agencies, such as MMS (the Federal agency responsible for OCS lease sales), toward completion of Recovery Plan goals.

*Comment 14:* One commenter representing nine fishing organizations and supported by 9 additional commenters took exception to claims that overfishing, incidental take in fishing gear, shooting and other fishing activities were causes of the Steller sea lion population decline.

*Response:* The Alaskan groundfish fisheries have developed in the geographic area that has historically supported the bulk of the Steller sea lion population, and this area has experienced substantial declines in the number of Steller sea lions counted on breeding sites over the last 30 years. Although the relationship between the Steller sea lion population and the harvest of billions of pounds of



groundfish is unclear, Steller sea lions may compete with commercial fisheries for food resources, and are occasionally taken incidental to commercial fishing operations. Trawl fisheries are suspected to be especially competitive for Steller sea lion prey resources due to both the species targeted and the ability of trawls to catch concentrated patches of fish. Mid-water trawl fisheries, such as the pollock fishery, may particularly affect juvenile sea lions due to their ability to capture fish within the water column at depths accessible to juveniles. Regardless of the causes of the decline of this threatened species, however, modifications of fishing practices have been identified as one of the few mechanisms available that would be likely to reduce human impacts on Steller sea lions and promote the recovery of the species.

**Comment 15:** Two commenters recommended NMFS take additional actions to manage commercial fishing operations in critical habitat and elsewhere, either as part of critical habitat designation or as a separate action accompanying critical habitat designation. One of these commenters suggested: (1) Taking precautions when determining the amount of fish to be harvested, (2) providing temporal and spatial limits in areas where competition between fisheries and sea lions may occur, and (3) developing an ecosystem approach to reflect biological interaction.

**Response:** NMFS is currently managing fisheries in a manner consistent with the recommendations listed by this commenter. Amounts of groundfish total allowable catches (TACs) available for harvest each fishing year are based on stock assessments prepared annually for each species or species group. The assessments are prepared and peer-reviewed annually, and provide the basis for recommendations of TAC provided by the Council to the Secretary of Commerce (Secretary) for implementation. Stock assessments use the best historical and current information available. These assessments incorporate a host of biological parameters related to the size and health of each exploited population and its relationship to other parts of the marine ecosystem, such as: total fishing mortality, predator-prey relationships and expected predation mortality, and groundfish biomass distribution. Proposed TACs are further reviewed for impacts to threatened and endangered species through annual section 7 consultations. Existing year-round and seasonal restrictions on trawl fishing operations in certain areas were

developed as a result of this consultation process. In addition to annual consultations, consultations are reinitiated whenever NMFS receives new information regarding Steller sea lions or fishery activities which may change the basis of previous determinations regarding impacts to Steller sea lions.

**Comment 16:** ADOGC and 3 other commenters indicated additional information regarding the potential impacts of critical habitat designation on non-Federal activities was needed. Commenters questioned the justification for subjecting commercial and recreational users of these areas to heightened inquiry associated with critical habitat designation.

**Response:** Heightened public awareness due to critical habitat designation may indirectly result in reduced impact to Steller sea lions and critical habitat. The direct economic and other impacts on non-federal activities resulting from this critical habitat designation are expected to be minimal.

**Comment 17:** One commenter representing nine fishing organizations suggested NMFS designate critical habitat that reflects the seasonal nature of Steller sea lion habitat use.

**Response:** Some activities that occur within the designated critical habitat areas when Steller sea lions are not present could have a permanent or long-term impact on the habitat or essential features and, thus, would affect Steller sea lions returning to the area. As a result of this possibility, NMFS believes it would not be practical or beneficial for the conservation of the species to establish seasonal critical habitat designation. Federal actions that take place in critical habitat will be evaluated individually through the section 7 consultation process, and impacts to Steller sea lions seasonally occupying an area will be considered on a case-by-case basis.

**Comment 18:** One commenter requested Steller sea lion critical habitat designation not be used to alter the vessel transit area that have been established through buffer zones at Akutan, Clubbing Rock and Outer Island Steller sea lion rookeries. Two commenters expressed concern that designation of critical habitat may unnecessarily restrict traditional or emergency activities in the vicinity of the designated sites without the opportunity for public review or comment.

**Response:** Designation of Steller sea lion critical habitat will not change existing regulations or exemptions. As noted in the proposed rule, the designation of critical habitat does not,

in itself, restrict human activities within the area or mandate any specific management or recovery action. The final rule does not contain further protective regulations or restrictions, beyond the designation of critical habitat. If, at some future time, it is determined that further restrictions are necessary to protect Steller sea lions or critical habitat, NMFS will initiate the rulemaking process which provides opportunity for public review and comment.

**Comment 19:** One commenter believed that protective measures taken by the State of Oregon to limit disturbance of Steller sea lion rookeries have been successful, and that industry cooperation and public education efforts there have been effective in protecting the rookeries.

**Response:** NMFS agrees that the steps taken by the State of Oregon and constituent groups have been positive. NMFS believes that the designation of Steller sea lion rookeries off the southern coast of Oregon will provide further guidance for Federal agencies in evaluating the potential effects of any future Federal actions which may be considered in the areas adjacent to the Steller sea lion rookeries in Oregon.

**Comment 20:** One commenter recommended further research to evaluate the effects of disturbance on Steller sea lions in order to provide additional information for use by resource agencies and the public in resolving potential resource use conflicts.

**Response:** Research is currently being conducted concerning the effects of disturbance on Steller sea lions under the guidance of the Steller Sea Lion Recovery Plan.

#### Classification

The Assistant Administrator for Fisheries, NOAA (Assistant Administrator), has determined that this is not a "major rule" requiring a regulatory impact analysis under E.O. 12291. The regulations are not likely to result in: (1) An annual effect on the economy of \$100 million or more; (2) a major increase in costs or prices for consumers, individual industries, Federal, state, or local government agencies, or geographic regions; or (3) a significant adverse effect on competition, employment, investment, productivity, innovation, or on the ability of U.S.-based enterprises to compete with foreign-based enterprises in domestic or export markets.

The economic impacts specifically result from the designation of critical habitat, above the impacts attributable to listing the species or from other

authorities, are expected to be minimal. The General Counsel of the Department of Commerce certified when this rule was proposed, that this rule, if adopted as proposed, would not have a significant economic impact on a substantial number of small entities as defined in the Regulatory Flexibility Act; therefore, a regulatory flexibility analysis is not required.

This rule does not contain a collection-of-information requirement for purposes of the Paperwork Reduction Act of 1980. NOAA Administrative Order 216-6 states that critical habitat designations under the ESA, generally are categorically excluded from the requirements to prepare on EA or Environmental Impact Statement. However, in order to more clearly evaluate the minimal environmental and economic impacts of critical habitat designation versus the alternative of a no-critical habitat designation, NMFS has prepared an EA. Copies of the EA are available on request (see ADDRESSES).

This rule does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under E.O. 12612.

The Assistant Administrator has determined that the designation of critical habitat for Steller sea lions is consistent with the maximum extent practicable with the approved Coastal Zone Management Programs of the states of Alaska, Washington, Oregon, and California. The responsible state agencies concurred with this determination, as required by section 7 of the Coastal Zone Management Act.

**List of Subjects in 50 CFR Part 226**

Endangered and threatened wildlife.

Dated: August 23, 1993.

Nancy Foster,  
Acting Assistant Administrator for Fisheries.

For the reasons set forth in the preamble, 50 CFR part 226 is amended as follows:

**PART 226—DESIGNATED CRITICAL HABITAT**

1. The authority citation for part 226 continues to read as follows:

Authority: 16 U.S.C. 1533.

2. New § 226.12 is added to subpart B to read as follows:

**§ 226.12 North Pacific Ocean.**

**Steller Sea Lion (*Eumetopias jubatus*)**

(a) *Alaska rookeries, haulouts, and associated areas.* In Alaska, all major Steller sea lion rookeries identified in Table 1 and major haulouts identified in Table 2 and associated terrestrial, air, and aquatic zones. Critical habitat includes a terrestrial zone that extends 3,000 feet (0.9 km) landward from the baseline or base point of each major rookery and major haulout in Alaska. Critical habitat includes an air zone that extends 3,000 feet (0.9 km) above the terrestrial zone of each major rookery and major haulout in Alaska, measured vertically from sea level. Critical habitat includes an aquatic zone that extends 3,000 feet (0.9 km) seaward in State and Federally managed waters from the baseline or basepoint of each major rookery and major haulout in Alaska that is east of 144° W. longitude. Critical habitat includes an aquatic zone that extends 20 nm (37 km) seaward in State and Federally managed waters from the baseline or basepoint of each major rookery and major haulout in Alaska that is west of 144° W. longitude.

(b) *California and Oregon rookeries and associated areas.* In California and Oregon, all major Steller sea lion rookeries identified in Table 1 and associated air and aquatic zones. Critical habitat includes an air zone that extends 3,000 feet (0.9 km) above areas historically occupied by sea lions at each major rookery in California and Oregon, measured vertically from sea level. Critical habitat includes an aquatic zone that extends 3,000 feet (0.9 km) seaward in State and Federally managed waters from the baseline or basepoint of each major rookery in California and Oregon.

(c) *Three special aquatic foraging areas in Alaska.* Three special aquatic foraging areas in Alaska, including the Shelikof Strait area, the Bogoslof area, and the Seguam Pass area.

(1) Critical habitat includes the Shelikof Strait area in the Gulf of Alaska which is identified in Figure 2 and

consists of the area between the Alaska Peninsula and Tugidak, Sitkinak, Aiaktlik, Kodiak, Raspberry, Afognak and Shuyak Islands (connected by the shortest lines); bounded on the west by a line connecting Cape Kumlik (56°38'N/157°27'W) and the southwestern tip of Tugidak Island (56°24'N/154°41'W) and bounded in the east by a line connecting Cape Douglas (58°51'N/153°15'W) and the northernmost tip of Shuyak Island (58°37'N/152°22'W).

(2) Critical habitat includes the Bogoslof area in the Bering Sea shelf which is identified in Figure 3 and consists of the area between 170°00'W and 164°00'W, south of straight lines connecting 55°00'N/170°00'W and 55°00'N/168°00'W; 55°30'N/168°00'W and 55°30'N/166°00'W; 56°00'N/166°00'W and 56°00'N/164°00'W and north of the Aleutian Islands and straight lines between the islands connecting the following coordinates in the order listed:

- 52°49.2'N/169°40.4'W
- 52°49.8'N/169°06.3'W
- 53°23.8'N/167°50.1'W
- 53°18.7'N/167°51.4'W
- 53°59.0'N/166°17.2'W
- 54°02.9'N/166°03.0'W
- 54°07.7'N/165°40.6'W
- 54°08.9'N/165°38.8'W
- 54°11.9'N/165°23.3'W
- 54°23.9'N/164°44.0'W

(3) Critical habitat includes the Seguam Pass area which is identified in Figure 4 and consists of the area between 52°00'N and 53°00'N and between 173°30'W and 172°30'W.

3. Tables 1 and 2 and Figures 1 through 4 are added to part 226 to read as follows:

**Table 1 to Part 226 [Added]**

Major Steller sea lion rookery sites are identified in the following table. Where two sets of coordinates are given, the baseline extends in a clockwise direction from the first set of geographic coordinates along the shoreline at mean lower-low water to the second set of coordinates. Where only one set of coordinates is listed, that location is the base point.

State/region/site	Boundaries to—			
	Latitude	Longitude	Latitude	Longitude
Alaska:				
Western Aleutians:				
Agattu I.:				
Cape Sabak <sup>1</sup> .....	52 23.5N .....	173 43.5E .....	52 22.0N .....	173 41.0E
Gillon Point <sup>1</sup> .....	52 24.0N .....	173 21.5E .....		
Attu I. <sup>1</sup> .....	52 54.5N .....	172 28.5E .....	52 57.5N .....	172 31.5E

State/region/site	Boundaries to—			
	Latitude	Longitude	Latitude	Longitude
Buldir I. <sup>1</sup> .....	52 20.5N .....	175 57.0E .....	52 23.5N .....	172 51.0E
Central Aleutians:				
Adak I. <sup>1</sup> .....	51 36.5N .....	176 59.0W .....	51 38.0N .....	176 59.5W
Agligadak I. <sup>1</sup> .....	52 06.5N .....	172 54.0W .....		
Amchitka I.: <sup>1</sup>				
Column Rock <sup>1</sup> .....	51 32.5N .....	178 49.5E .....		
East Cape <sup>1</sup> .....	51 22.5N .....	179 28.0E .....	51 21.5N .....	179 25.0E
Ayugadak I. <sup>1</sup> .....	51 45.5N .....	178 24.5E .....		
Gramp Rock <sup>1</sup> .....	51 29.0N .....	178 20.5W .....		
Kasatochi I. <sup>1</sup> .....	52 10.0N .....	175 31.5W .....	52 10.5N .....	175 29.0W
Kiska I.:				
Lief Cove <sup>1</sup> .....	51 57.5N .....	177 21.0E .....	51 58.5N .....	177 20.0E
Cape St. Stephen <sup>1</sup> .....	51 52.5N .....	177 13.0E .....	51 53.5N .....	177 12.0E
Seguam I./Saddleridge <sup>1</sup> .....	52 21.0N .....	172 35.0W .....	52 21.0N .....	172 33.0W
Semisopochnoi I.:				
Pochnoi Pt <sup>1</sup> .....	51 58.5N .....	179 45.5E .....	51 57.0N .....	179 46.0E
Petrel Pt <sup>1</sup> .....	52 01.5N .....	179 37.5E .....	52 01.5E .....	179 39.0E
Tag I. <sup>1</sup> .....	51 33.5N .....	178 34.5W .....		
Ulak I. <sup>1</sup> .....	51 20.0N .....	178 57.0W .....	51 18.5N .....	178 59.5W
Yunaska I. <sup>1</sup> .....	52 42.0N .....	170 38.5W .....	52 41.0N .....	170 34.5W
Eastern Aleutian:				
Adugak I. <sup>1</sup> .....	52 55.0N .....	169 10.5W .....		
Akun I./Billings Head <sup>1</sup> .....	54 18.0N .....	165 32.5W .....	54 18.0N .....	165 31.5W
Akutan I./Cape Morgan <sup>1</sup> .....	54 03.5N .....	166 00.0W .....	54 05.5N .....	166 05.0W
Bogoslof I. <sup>1,2</sup> .....	53 58.0N .....	168 02.0W .....		
Ogchul I. <sup>1</sup> .....	53 00.0N .....	168 24.0W .....		
Sea Lion Rocks. (Amak) <sup>1</sup> .....	55 28.0N .....	163 12.0W .....		
Ugamak I. <sup>1</sup> .....	54 14.0N .....	164 48.0W .....	54 13.0N .....	164 48.0W
Bering Sea:				
Wainus I. <sup>1</sup> .....	57 11.0N .....	169 56.0W .....		
Western Gulf of Alaska:				
Atkins I. <sup>1</sup> .....	55 03.5N .....	159 18.5W .....		
Chemabura I. <sup>1</sup> .....	54 47.5N .....	159 31.0W .....	54 45.5N .....	159 33.5W
Clubbing Rocks (N) <sup>1</sup> .....	54 43.0N .....	162 28.5W .....		
Clubbing Rocks (S) <sup>1</sup> .....	54 42.0N .....	162 26.5W .....		
Pinnacle Rock <sup>1</sup> .....	54 48.0N .....	161 46.0W .....		
Central Gulf of Alaska:				
Chirikof I. <sup>1</sup> .....	55 46.5N .....	155 39.5W .....	55 46.5N .....	155 43.0W
Chowiet I. <sup>1</sup> .....	56 00.5N .....	156 41.5W .....	56 00.5N .....	156 42.0W
Marmot I. <sup>1</sup> .....	58 14.5N .....	151 47.5W .....	58 10.0N .....	151 51.0W
Outer I. <sup>1</sup> .....	59 20.5N .....	150 23.0W .....	59 21.0N .....	150 24.5W
Sugarloaf I. <sup>1</sup> .....	58 53.0N .....	152 02.0W .....		
Eastern Gulf of Alaska:				
Seal Rocks <sup>1</sup> .....	60 10.0N .....	146 50.0W .....		
Fish I. <sup>1</sup> .....	59 53.0N .....	147 20.5W .....		
Southeast Alaska:				
Forrester I. ....	54 51.0N .....	133 32.0W .....	54 52.5N .....	133 35.5W
Hazy I. ....	55 52.0N .....	134 34.0W .....	55 51.5N .....	134 35.0W
White Sisters .....	57 38.0N .....	136 15.5W .....		
Oregon:				
Rogue Reef: Pyramid Rock .....	42 26.4N .....	124 28.1W .....		
Orford Reef:				
Long Brown Rock .....	42 47.3N .....	124 36.2W .....		
Seal Rock .....	42 47.1N .....	124 35.4W .....		
California:				
Ano Nuevo I. ....	37 06.3N .....	122 20.3W .....		
Southeast Farallon I. ....	37 41.3N .....	123 00.1W .....		
Sugarloaf I. & Cape Mendocino .....	40 28.0N .....	124 24.0W .....		

<sup>1</sup> Includes an associated 20 NM aquatic zone.

<sup>2</sup> Associated 20 NM aquatic zone lies entirely within one of the three special foraging areas.

#### Table 2 to part 226 [Added]

Major Steller sea lion haulout sites in Alaska are identified in the following table. Where two sets of coordinates are

given, the baseline extends in a clockwise direction from the first set of geographic coordinates along the shoreline at mean lower-low water to

the second set of coordinates. Where only one set of coordinates is listed, that location is the basepoint.

State/region/site	Boundaries to—			
	Latitude	Longitude	Latitude	Longitude
<b>Alaska:</b>				
<b>Western Aleutians:</b>				
Alaid I. <sup>1</sup> .....	52 45.0N .....	173 56.5E .....	52 46.5N .....	173 51.5E
Attu/Chirikof Pt. <sup>1</sup> .....	52 30.0N .....	173 26.7E .....	.....	.....
Shemya I. <sup>1</sup> .....	52 44.0N .....	174 09.0E .....	.....	.....
<b>Central Aleutians:</b>				
Amatignak I. <sup>1</sup> .....	51 13.0N .....	179 08.0E .....	.....	.....
<b>Amila I.:</b>				
East <sup>1</sup> .....	52 05.0N .....	172 58.5W .....	52 06.0N .....	172 57.0W
Sviech. Harbor <sup>1</sup> .....	52 02.0N .....	173 23.0W .....	.....	.....
Amukta I. & Rocks <sup>1</sup> .....	52 31.5N .....	171 16.5W .....	52 26.5N .....	171 16.5W
Anagaksik I. <sup>1</sup> .....	51 51.0N .....	175 53.5W .....	.....	.....
Atka I. <sup>1</sup> .....	52 23.5N .....	174 17.0W .....	52 24.5N .....	174 07.5W
Bobrof I. <sup>1</sup> .....	51 54.0N .....	177 27.0W .....	.....	.....
Chagulak I. <sup>1</sup> .....	52 34.0N .....	171 10.5W .....	.....	.....
Chuginadak I. <sup>1</sup> .....	52 46.5N .....	169 44.5W .....	52 46.5N .....	169 42.0W
Great Sitkin I. <sup>1</sup> .....	52 08.0N .....	176 10.5W .....	52 07.0N .....	176 08.5W
Kagamil I. <sup>1</sup> .....	53 02.5N .....	169 41.0W .....	.....	.....
<b>Kanaga I.:</b>				
North Cape <sup>1</sup> .....	51 56.5N .....	177 09.0W .....	.....	.....
Ship Rock <sup>1</sup> .....	51 47.0N .....	177 22.5W .....	.....	.....
Kavaiga I. <sup>1</sup> .....	51 34.5N .....	178 51.5W .....	51 34.5N .....	178 49.5W
Kiska I./Sirius Pt. <sup>1</sup> .....	52 08.5N .....	177 36.5E .....	.....	.....
Kiska I./Sobaka & Vega <sup>1</sup> .....	51 50.0N .....	177 20.0E .....	51 48.5N .....	177 20.5E
Little Sitkin I. <sup>1</sup> .....	51 59.5N .....	178 30.0E .....	.....	.....
Little Tanaga I. <sup>1</sup> .....	51 50.5N .....	176 13.0W .....	51 49.0N .....	176 13.0W
Sagigik I. <sup>1</sup> .....	52 00.5N .....	173 08.0W .....	.....	.....
<b>Seguam I.:</b>				
South <sup>1</sup> .....	52 10.0N .....	172 37.0W .....	52 19.5N .....	172 18.0W
Finch Pt. <sup>1</sup> .....	52 23.5N .....	172 25.5W .....	52 23.5N .....	172 24.0W
Segula I. <sup>1</sup> .....	52 00.0N .....	178 06.5E .....	52 03.5N .....	178 09.0E
Tanaga I. <sup>1</sup> .....	51 55.0N .....	177 58.5W .....	51 55.0N .....	177 57.0W
Tanadak I. (Amila) <sup>1</sup> .....	52 04.5N .....	172 57.0W .....	.....	.....
Tanadak I. (Kiska) <sup>1</sup> .....	51 57.0N .....	177 47.0E .....	.....	.....
Ugidak I. <sup>1</sup> .....	51 35.0N .....	178 30.5W .....	.....	.....
Uliaga I. <sup>1</sup> .....	53 04.0N .....	169 47.0W .....	53 05.0N .....	169 46.0W
Unaigla & Dinkum Rocks <sup>1</sup> .....	51 34.0N .....	179 04.0W .....	51 34.5N .....	179 03.0W
<b>Eastern Aleutians:</b>				
Akutan I./Reef-Lava <sup>1</sup> .....	54 10.5N .....	166 04.5W .....	54 07.5N .....	166 06.5W
Amak I. <sup>1</sup> .....	55 24.0N .....	163 07.0W .....	55 26.0N .....	163 10.0W
Cape Sedanka & Island <sup>1</sup> .....	53 50.5N .....	166 05.0W .....	.....	.....
Emerald I. <sup>1</sup> .....	53 17.5N .....	167 51.5W .....	.....	.....
Old Man Rocks <sup>1</sup> .....	53 52.0N .....	166 05.0W .....	.....	.....
Polivnoi Rock <sup>1</sup> .....	53 16.0N .....	167 58.0W .....	.....	.....
Tanginak I. <sup>1</sup> .....	54 13.0N .....	165 19.5W .....	.....	.....
Tigalda I. <sup>1</sup> .....	54 08.5N .....	164 58.5W .....	.....	.....
Umnak I./Cape Aslik <sup>1</sup> .....	53 25.0N .....	168 24.5W .....	.....	.....
<b>Bering Sea:</b>				
Cape Newenham <sup>1</sup> .....	58 39.0N .....	162 10.5W .....	.....	.....
Hall I. <sup>1</sup> .....	60 37.0N .....	173 00.0W .....	.....	.....
Round I. <sup>1</sup> .....	58 36.0N .....	159 58.0W .....	.....	.....
<b>St. Paul I.:</b>				
Northeast Point <sup>1</sup> .....	57 15.0N .....	170 06.5W .....	.....	.....
Sea Lion Rock <sup>1</sup> .....	57 06.0N .....	170 17.5W .....	.....	.....
<b>St. George I.:</b>				
S Rookery <sup>1</sup> .....	56 33.5N .....	169 40.0W .....	.....	.....
Dainol Point <sup>1</sup> .....	56 36.0N .....	169 46.0W .....	.....	.....
<b>St. Lawrence I.:</b>				
S Puntut I. <sup>1</sup> .....	64 04.0N .....	168 51.0W .....	.....	.....
SW Cape <sup>1</sup> .....	63 18.0N .....	171 26.0W .....	.....	.....
<b>Western Gulf of Alaska:</b>				
Bird I. <sup>1</sup> .....	54 49.0N .....	159 46.0W .....	.....	.....
Castle Rock <sup>1</sup> .....	55 17.0N .....	159 30.0W .....	.....	.....
Caton I. <sup>1</sup> .....	54 23.5N .....	162 25.5W .....	.....	.....
Jude I. <sup>1</sup> .....	55 16.0N .....	161 06.0W .....	.....	.....
Lighthouse Rocks <sup>1</sup> .....	55 47.5N .....	157 24.0W .....	.....	.....
Nagai I. <sup>1</sup> .....	54 52.5N .....	160 14.0W .....	54 56.0N .....	160 15.0W
Nagai Rocks <sup>1</sup> .....	55 50.0N .....	155 46.0W .....	.....	.....
Sea Lion Rocks (Unga) <sup>1</sup> .....	55 04.5N .....	160 31.0W .....	.....	.....
South Rock <sup>1</sup> .....	54 18.0N .....	162 43.5W .....	.....	.....
Spritz I. <sup>1</sup> .....	55 47.0N .....	158 54.0W .....	.....	.....
The Whaleback <sup>1</sup> .....	55 16.5N .....	160 06.0W .....	.....	.....

State/region/site	Boundaries to—			
	Latitude	Longitude	Latitude	Longitude
<b>Central Gulf of Alaska:</b>				
Cape Barnabas <sup>1</sup>	57 10.0N	152 55.0W	57 07.5N	152 55.0W
Cape Chiniak <sup>1</sup>	57 35.0N	152 09.0W	57 37.5N	152 09.0W
Cape Gull <sup>1,2</sup>	58 13.5N	154 09.5W	58 12.5N	154 10.5W
Cape Ikolk <sup>1,2</sup>	57 17.0N	154 47.5W		
Cape Kuliak <sup>1,2</sup>	58 08.0N	154 12.5W		
Cape Sitkinak <sup>1</sup>	56 32.0N	153 52.0W		
Cape Ugat <sup>1,2</sup>	57 52.0N	153 51.0W		
Gore Point <sup>1</sup>	59 12.0N	150 58.0W		
Gull Point <sup>1</sup>	57 21.5N	152 36.5W	57 24.5N	152 39.0W
Latax Rocks <sup>1</sup>	58 42.0N	152 28.5W	58 40.5N	152 30.0W
Long I. <sup>1</sup>	57 45.5N	152 16.0W		
Nagahut Rocks <sup>1</sup>	59 06.0N	151 46.0W		
Puale Bay <sup>1,2</sup>	57 41.0N	155 23.0W		
Sea Lion Rocks (Marmot) <sup>1</sup>	58 21.0N	151 48.5W		
Sea Otter I. <sup>1</sup>	58 31.5N	152 13.0W		
Shakun Rock <sup>1,2</sup>	58 33.0N	153 41.5W		
Sud I. <sup>1</sup>	58 54.0N	152 12.5W		
Sutwik I. <sup>1</sup>	56 32.0N	157 14.0W	56 32.0N	157 20.0W
Taki I. <sup>1,2</sup>	58 03.0N	154 27.5W	58 03.0N	154 30.0W
Two-headed I. <sup>1</sup>	56 54.5N	153 33.0W	56 53.5N	153 35.5W
Ugak I. <sup>1</sup>	57 23.0N	152 15.5W	57 22.0N	152 19.0W
Ushagak I. <sup>1</sup>	58 54.5N	152 18.5W		
<b>Eastern Gulf of Alaska:</b>				
Cape Fairweather	58 47.5N	137 54.0W		
Cape St. Elias <sup>1</sup>	59 48.0N	144 36.0W		
Chiswell Islands <sup>1</sup>	59 36.0N	149 34.0W		
Graves Rock	58 13.0N	136 39.0W		
Hook Point <sup>1</sup>	60 20.0N	146 15.5W		
Middleton I. <sup>1</sup>	59 26.5N	146 20.0W		
Perry I. <sup>1</sup>	60 39.5N	147 56.0W		
Point Eleanor <sup>1</sup>	60 35.0N	147 34.0W		
Point Elrington <sup>1</sup>	59 56.0N	148 13.5W		
Seal Rocks <sup>1</sup>	60 10.0N	146 50.0W		
The Needle <sup>1</sup>	60 07.0N	147 37.0W		
<b>Southeast Alaska:</b>				
Benjamin I.	58 33.5N	134 54.5W		
Blail Rock	56 43.0N	135 20.5W		
Biorka I.	56 51.0N	135 32.0W		
Cape Addington	55 26.5N	133 48.5W		
Cape Cross	57 55.5N	136 33.0W		
Cape Ommaney	56 09.5N	134 39.5W		
Coronation I.	55 49.5N	134 16.5W		
Ledge Point	58 48.5N	130 45.5W		
Lull Point	57 18.0N	134 48.5W		
Sunset I.	57 30.5N	133 35.0W		
Timbered I.	55 42.0N	133 48.0W		

<sup>1</sup> Includes an associated 20 NM aquatic zone.

<sup>2</sup> Associated 20 NM aquatic zone lies entirely within one of the three special foraging areas.

Figures to Part 226

Figure 1: Map of the North Pacific Ocean showing the general range of Steller sea lions (stippled area) and the location of major rookeries (arrows).

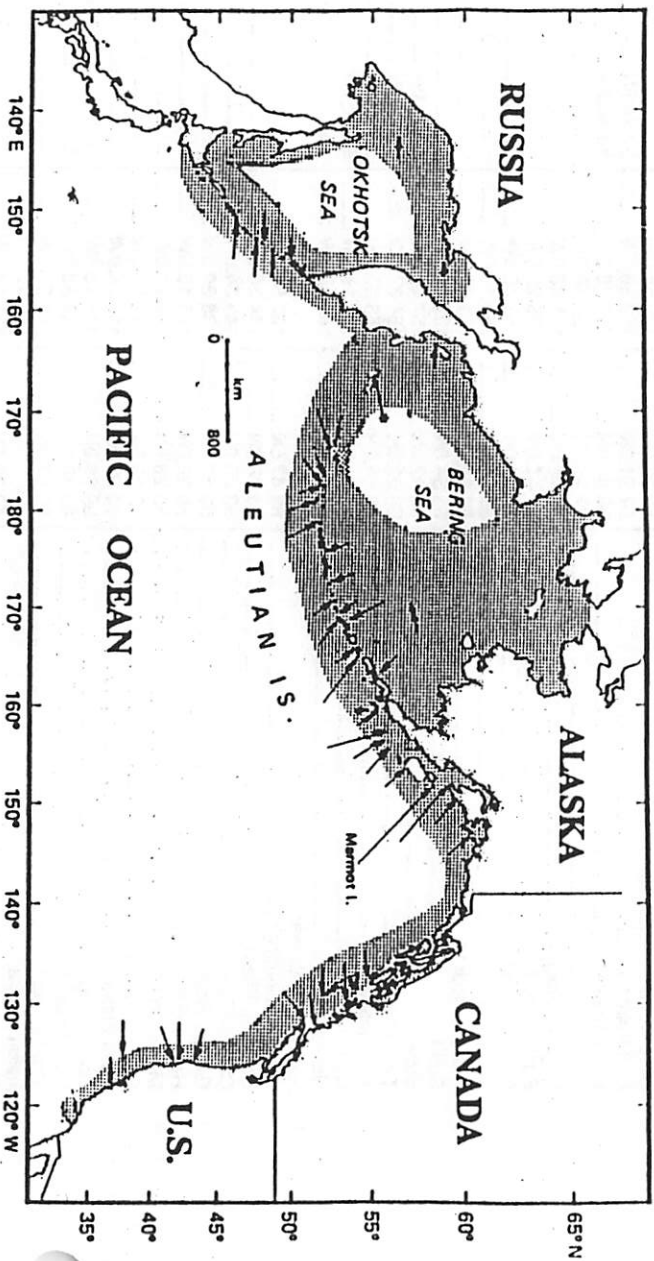


Figure 2: Steller sea lion critical habitat in Shelikof Strait. Locations indicated are major Steller sea lion rookeries.

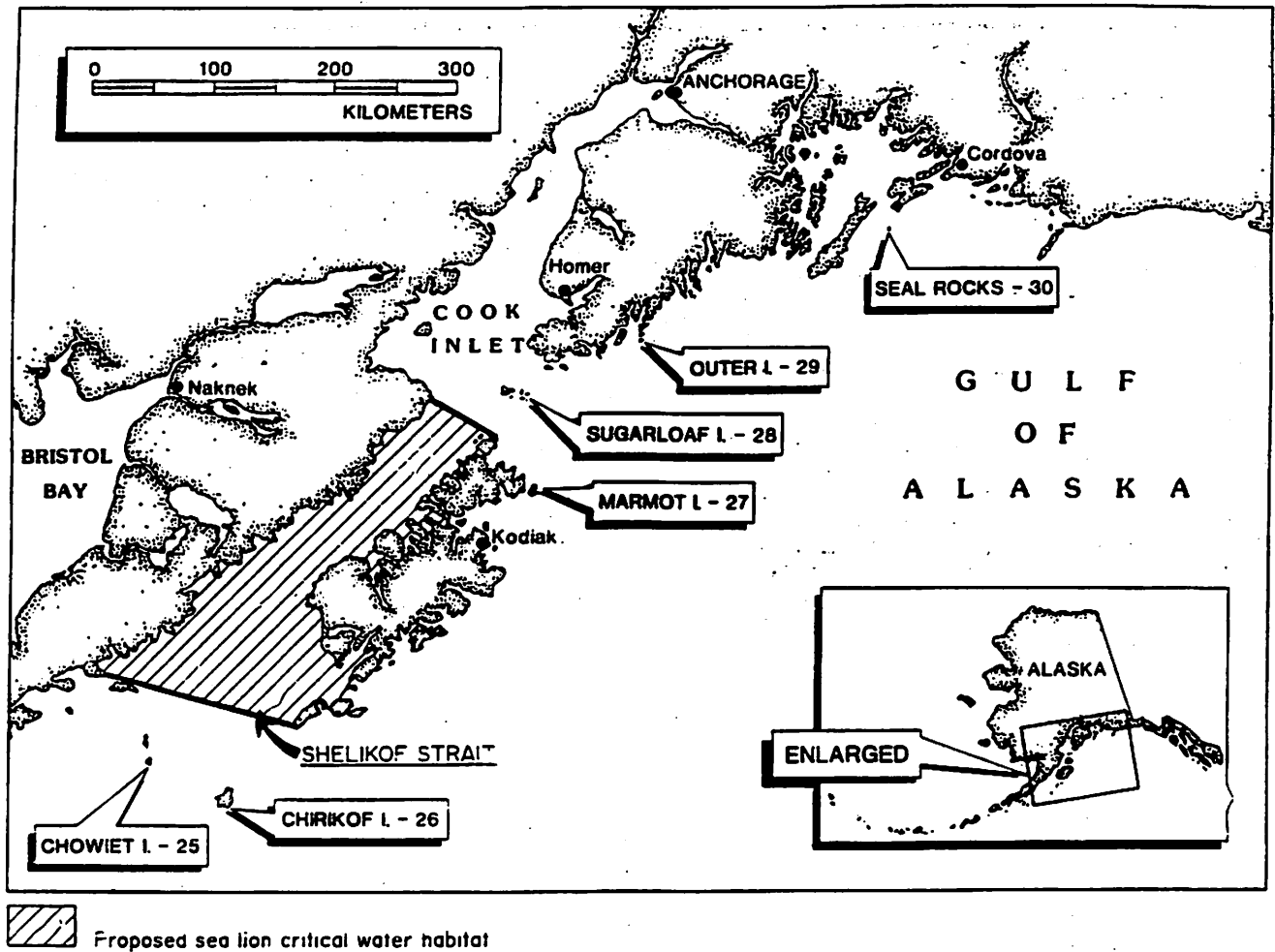
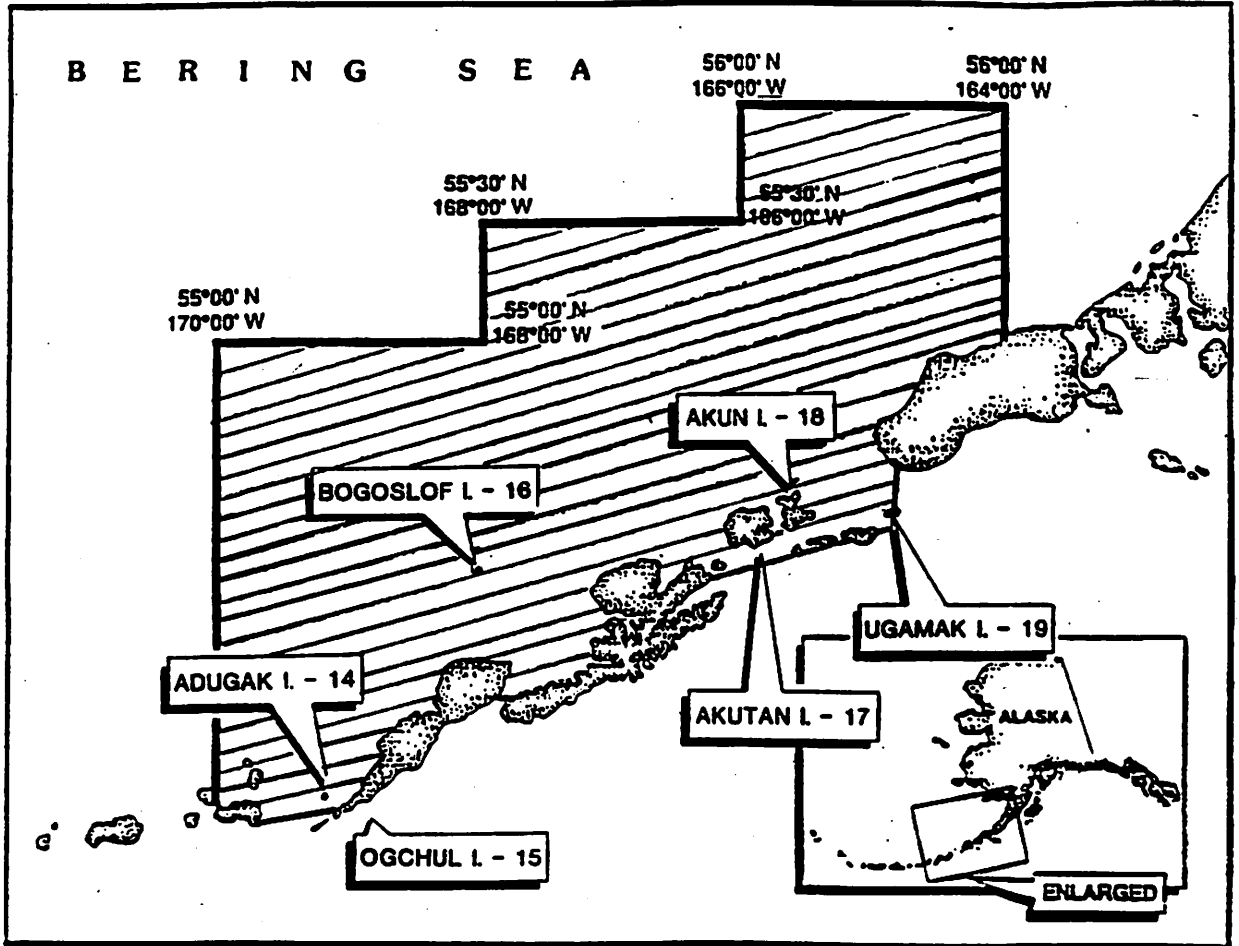


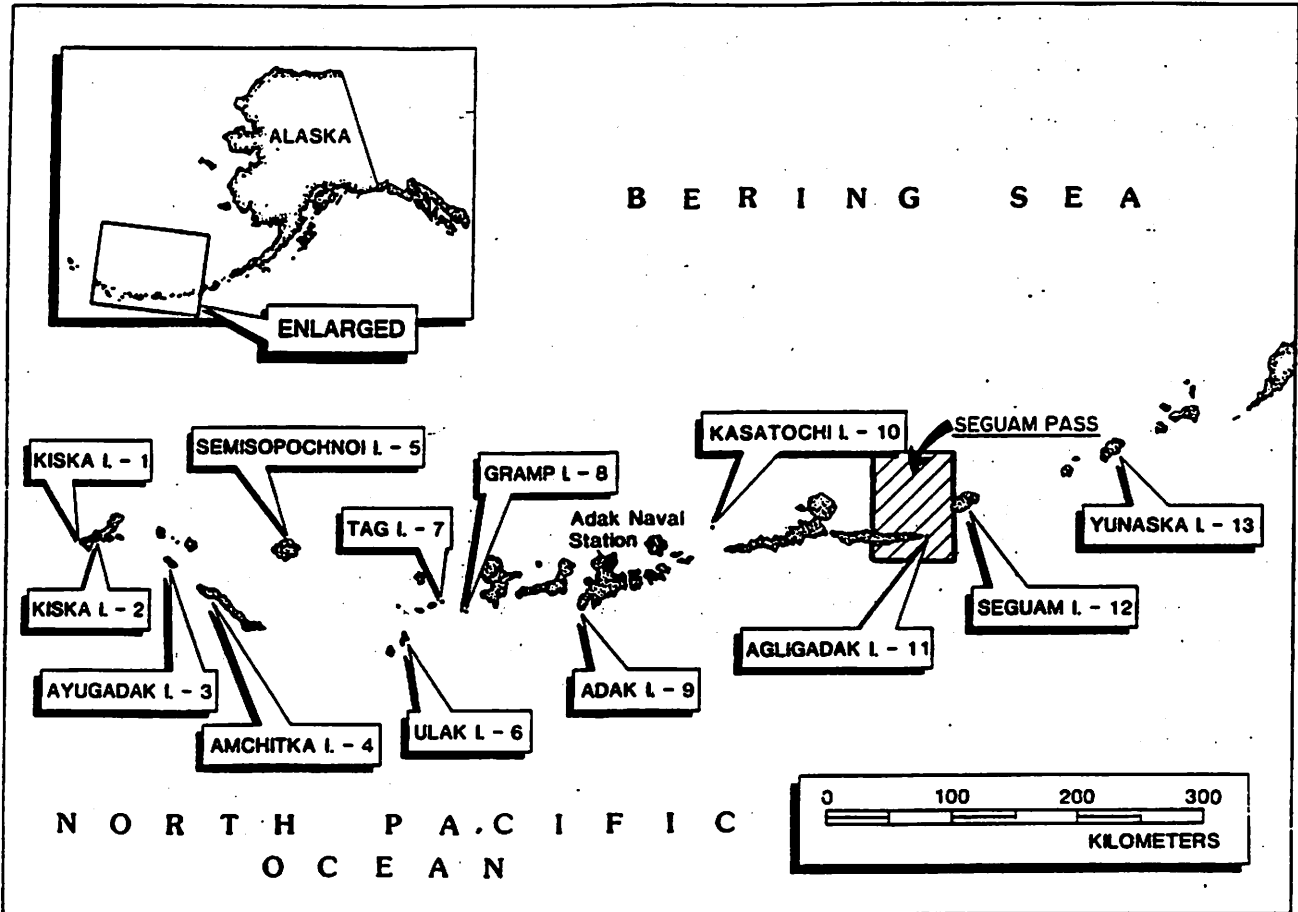
Figure 3: Steller sea lion critical habitat in the vicinity of Bogoslof Island. Locations indicated are major Steller sea lion rookeries.



 Proposed sea lion critical water habitat.



Figure 4: Steller sea lion critical habitat in vicinity of Sequam Pass. Locations indicated are major Steller sea lion rookeries.



 Proposed sea lion critical water habitat.