UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL MARINE FISHERIES SERVICE

NORTHWEST FISHERIES CENTER

FUR SEAL INVESTIGATIONS, 1973

by

Marine Mammal Division

National Marine Fisheries Service

February 1974

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Frontispiece.--Northern fur seal populations are located on Castle Rock and at Adams Cove.

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by
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Seattle, Washington 98115

INTRODUCTION

The National Marine Fisheries Service is responsible for conservation of the northern fur seal because of its role in harvesting the resource on St. Paul Island (Pribilof Islands) and because of terms set forth in the Interim Convention on Conservation of North Pacific Fur Seals (1957) and its amending Protocol (1963). More recently, the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973 have reinforced obligations of the National Marine Fisheries Service with respect to the northern fur seal.

This report includes five summaries of research carried out on the northern fur seal by the National Marine Fisheries Service during field seasons in 1973 on the subjects of Management and Monitoring, Behavior, Physiology and Medicine, and Pelagic.

The frontispiece shows San Miguel Island and Castle Rock; figures 1 and 2 give the locations of breeding grounds on the Pribilof Islands, and terms having special meanings in fur seal research are described in the glossary. In this report, "Pribilof Islands" includes St. Paul and St. George Islands, and, occasionally, Sea Lion Rock. "San Miguel Island" includes Castle Rock. Two of the five Pribilof Islands, Otter and Walrus, do not have fur seal rookeries.

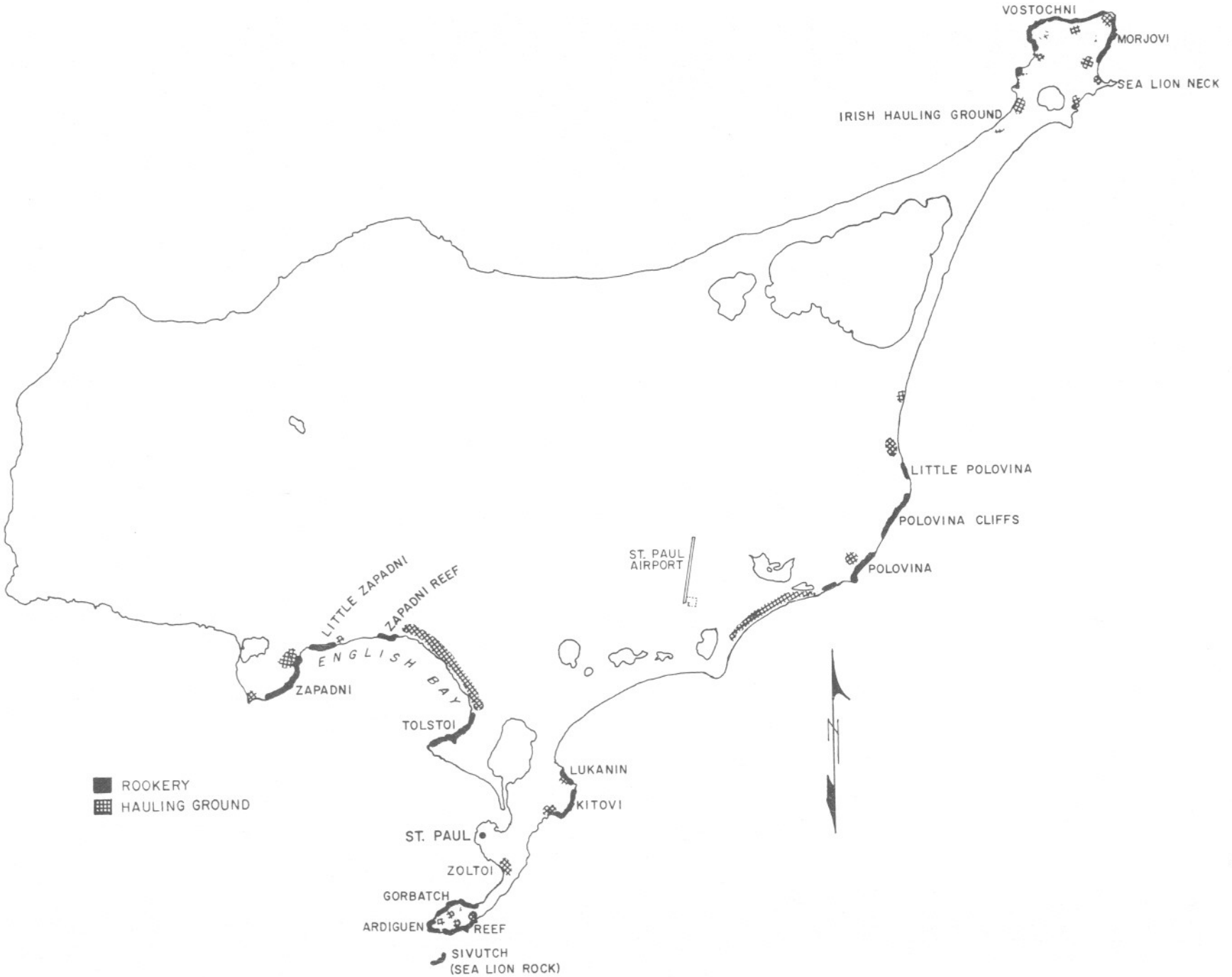


Figure 1.--Location of rookeries and hauling grounds, St. Paul Island.

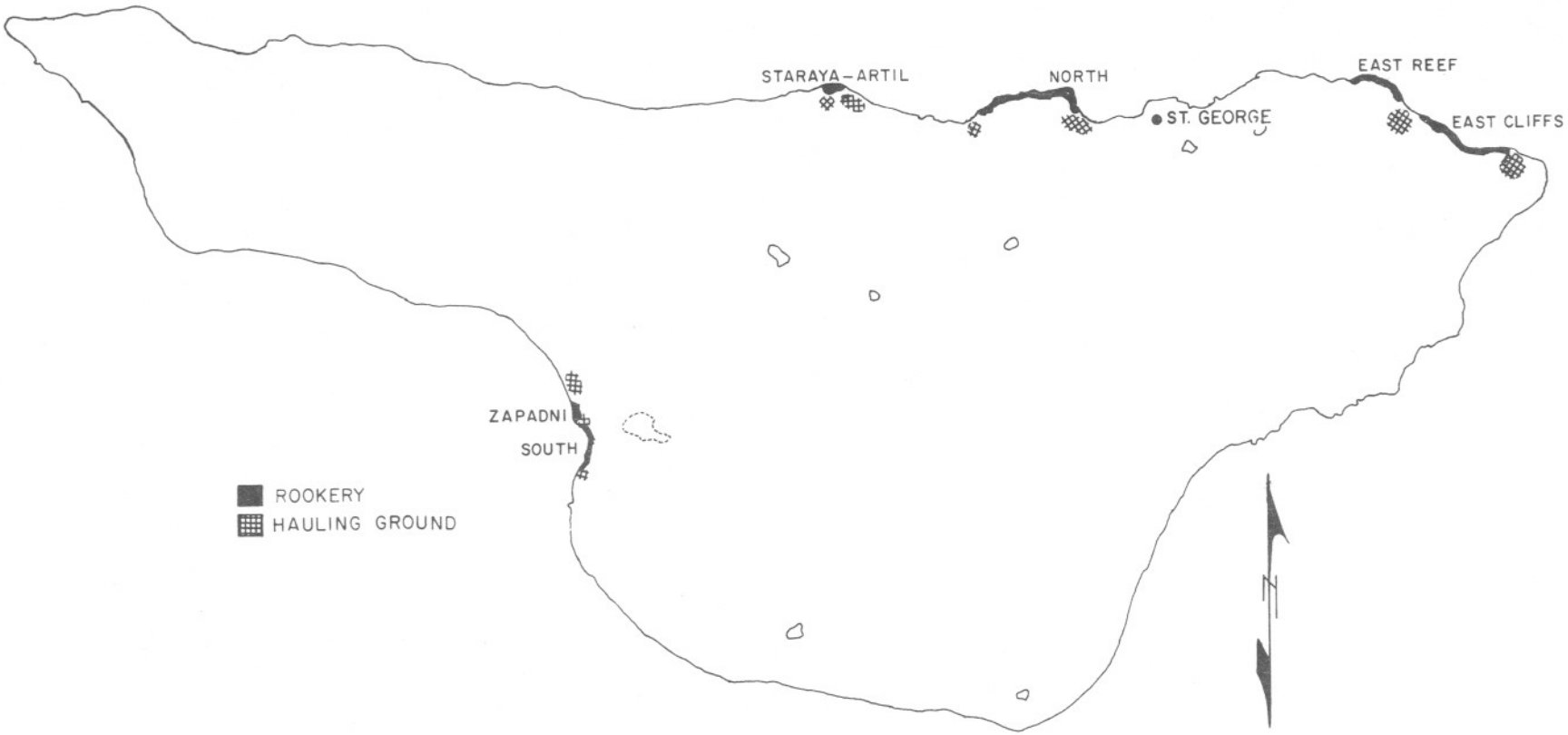


Figure 2.--Location of rookeries and hauling grounds, St. George Island.

Part I. MANAGEMENT AND MONITORING, PRIBILOF ISLANDS

The objective of the management and monitoring phase of the fur seal investigations is to provide information needed to manage a harvested resource and to determine the level at which the herd will produce a maximum sustainable yield.

Alton Y. Roppel
Patrick Kozloff

AGE CLASSIFICATION AND NUMBER OF SEALS KILLED, BY SEX

A maximum length limit of 46 inches (116.8 cm) (tip of nose to tip of tail) was prescribed for the commercial harvest of male seals on St. Paul Island in 1973 to increase recruitment into the breeding reserve through escapement. The limit in 1972 was 49 inches (124.5 cm). Female seals were not intentionally killed in 1973.

From 25 June to 28 July, the harvest began at 6 a.m. Monday through Saturday of each week on St. Paul Island. Seals were not harvested on St. George Island in 1973.

The seal harvest on St. Paul Island included 28,457 males in ages 2 to 6 years (tables A-1 and A-2) and 25 females, the ages of which were not determined. Right upper canine teeth collected from 20% of the males killed were used to determine the age composition daily by rookery.

Figure 3 shows the trends in the availability of 3- and 4-year-old males harvested on St. Paul Island in 1973. Males killed on St. Paul Island from year classes 1959 to 1971 are given in figure 4 and table 1.

SURVEY DATA

Data collected in 1973 and evaluated as a way of measuring the reaction of the fur seal herd to management techniques included counts of living adult males and dead seals of both sexes and all ages.

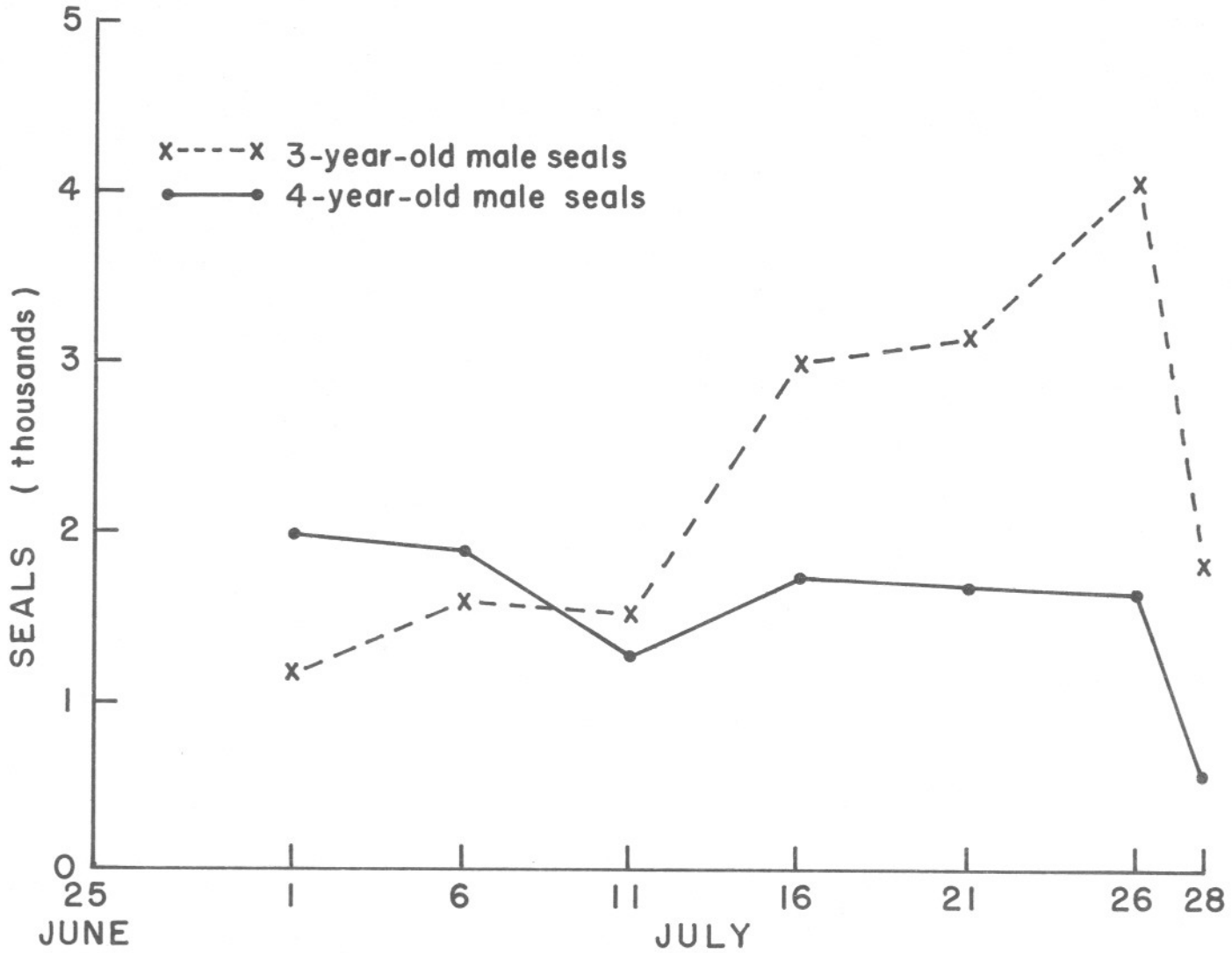


Figure 3.--Three- and four-year-old male seals killed, St. Paul Island, 25 June to 28 July 1973

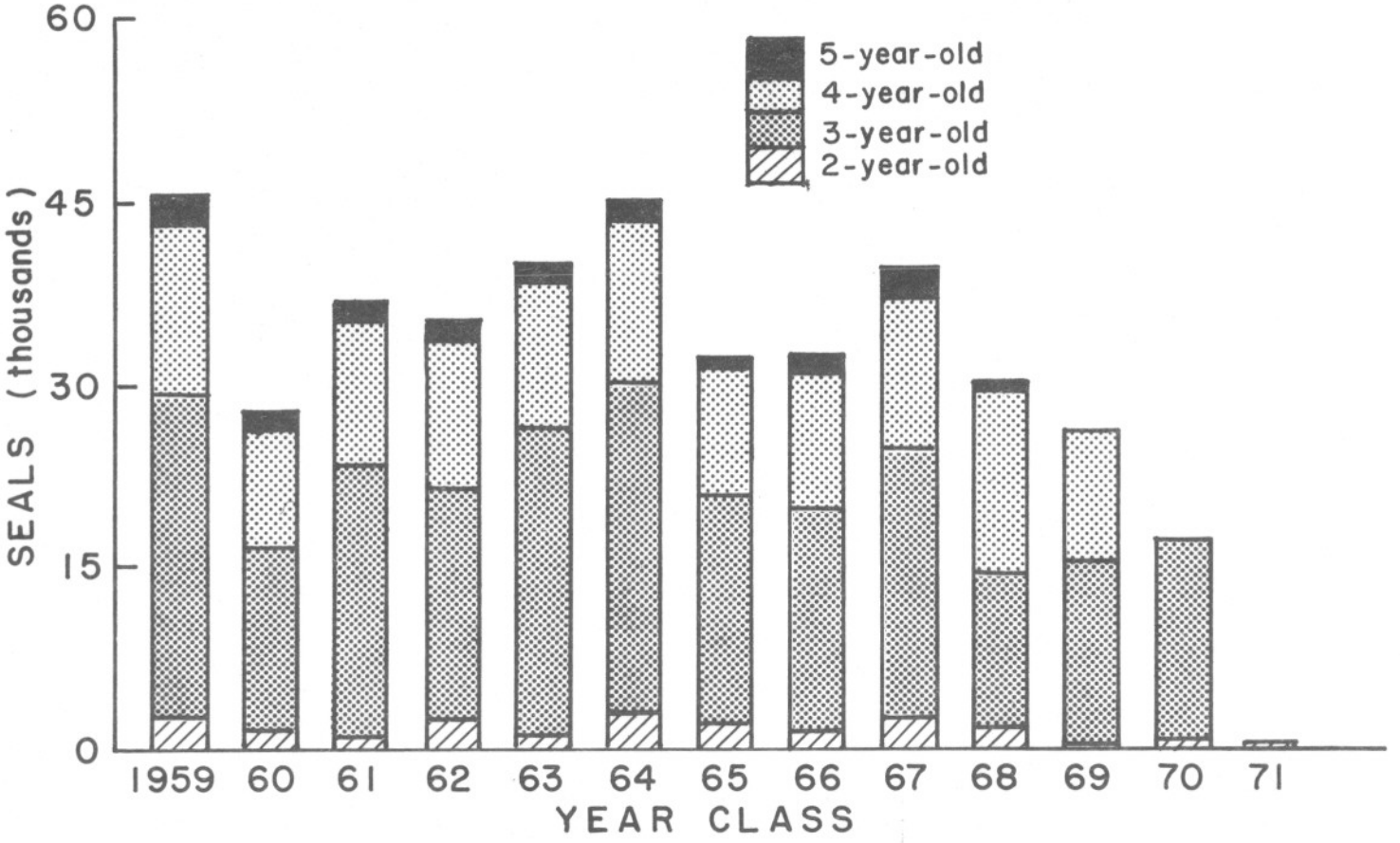


Figure 4.--Kill of male seals, by year class, St. Paul Island, 1959-71.

Table 1. --Kill of male seals, [1] by year class, St. Paul Island, 1959-71

Year class	Age When Killed				Total
	2	3	4	5	
1959	2,820	26,456	14,184	1,764	45,224
1960	1,619	14,310	10,533	1,240	27,702
1961	1,098	22,468	12,046	1,270	36,882
1962	2,539	19,009	12,156	1,287	34,991
1963	1,264	25,535	11,785	1,542	40,126
1964	3,143	26,991	13,279	1,469	44,882
1965	2,200	18,706	10,565	731	32,202
1966	1,673	17,826	11,548	1,338	32,385
1967	2,640	22,176	12,503	2,185	39,504
1968	1,725	12,888	14,932	721	30,266
1969 [2]	323	15,024	10,800	---	26,147
1970 [2]	916	16,337	---	---	17,253
1971 [2]	577	----	---	---	577
Total	22,537	237,726	134,331	13,547	408,141
Mean	1,734	19,811	12,212	1,355	[3] 36,416

[1] Includes only 2-to 5-year-old seals taken during the kill of male seals. From 1956 through 1971, 131 1-year-olds and 967 6-year-olds were harvested. In addition, age was not determined for 4,919 males taken on St. Paul Island.

[2] Incomplete returns.

[3] 1969, 1970 and 1971 year classes not included.

Living Adult Male Seals Counted

In 1973 the number of living adult males counted on St. Paul Island increased slightly to 5,437 in June and an estimated 7,456 animals in July, whereas the total count in July on St. George Island declined to 1,250 animals (tables A-3 to A-8). The total number of living adult males counted each year in June on St. Paul Island since 1966 is presented in table A-9.

Dead Seals Counted That Were Older Than Pups

In 1973 the count of males and females found dead on the Pribilof Islands totaled 68 and 95, respectively. Canine teeth were collected from most of these seals for studies of age and mortality. The number of dead seals counted each year since 1965 is listed by sex and island in table 2.

Dead Pups Counted

The number of dead pups counted from 20 to 26 August in 1973 on all rookeries of St. George Island and on selected rookeries of St. Paul Island totaled 2,611 and 9,908, respectively (table A-10). On St. George Island, the number of dead pups counted was 103.4% of the count in 1972. The selected rookeries on St. Paul Island showed a 7.2% increase in the number of dead pups counted on the same rookeries in 1972. However, in 1973, the death rate of pups on land was less than in 1970, the most recent year for which comparative data on living and dead pups are available. Table A-11 summarizes the number of dead pups counted each year since 1964 plus an estimated 5% addition for animals overlooked.

MARKING

Estimates of year-class size and studies of growth, survival, mortality, distribution at sea, homing tendency, and behavior are based on data from recoveries of marked seals.

Application of Marks

Since 1941, several kinds of marks have been used on fur seals of both sexes and at various ages. The number of pups marked by cryogenic (freeze) branding from 1966 to 1970 is shown in table A-12. Table A-13 also lists the number of pups given tags or other marks since 1964. A record of male seals selected as 1- and 2-year-olds and given tags is shown in table A-14. Figures 5 and 6 illustrate examples of mark locations.

Table 2. --Dead seals counted that were older than pups, Pribilof Islands, Alaska, 1965-73.

Year	St. Paul Island		St. George Island		Total	
	Males	Females	Males	Females	Males	Females
	Number					
1965	158	No Count	No Count	No Count	158	No Count
1966	181	172	41	55	222	227
1967	108	157	41	28	149	185
1968	98	141	33	22	131	163
1969	94	141	22	29	116	170
1970	52	124	4	53	56	177
1971	39	91	5	37	44	128
1972	46	111	22	30	68	141
1973	61	65	7	30	68	95

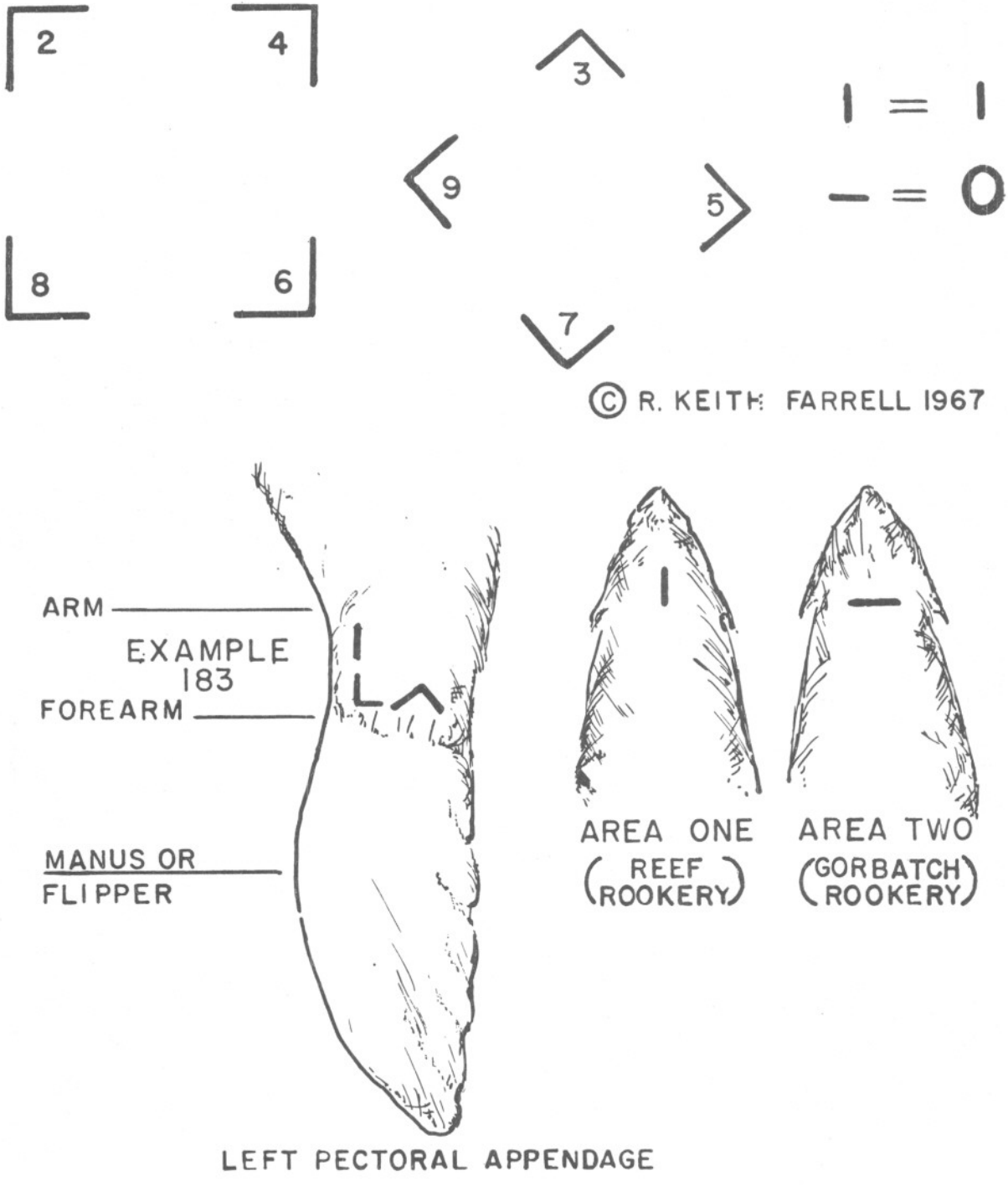
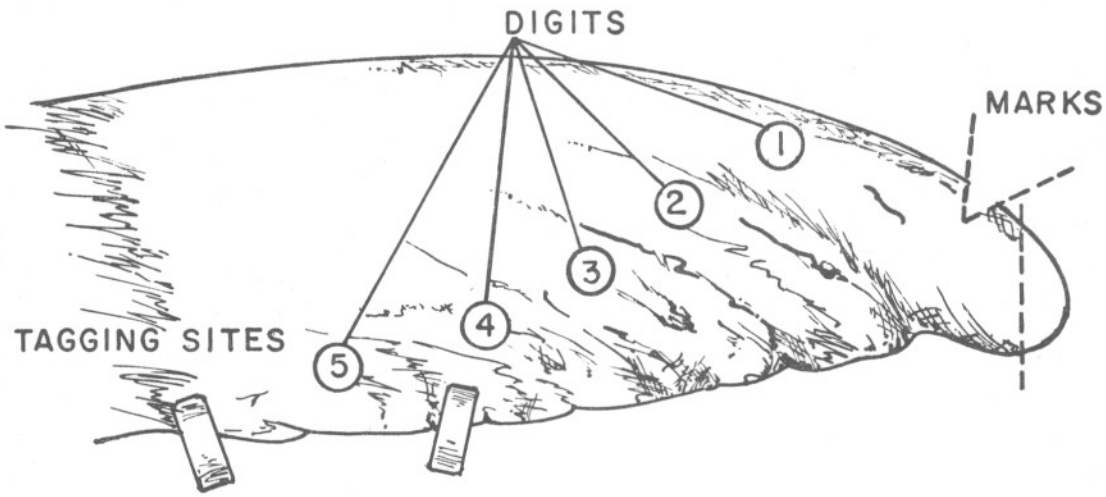


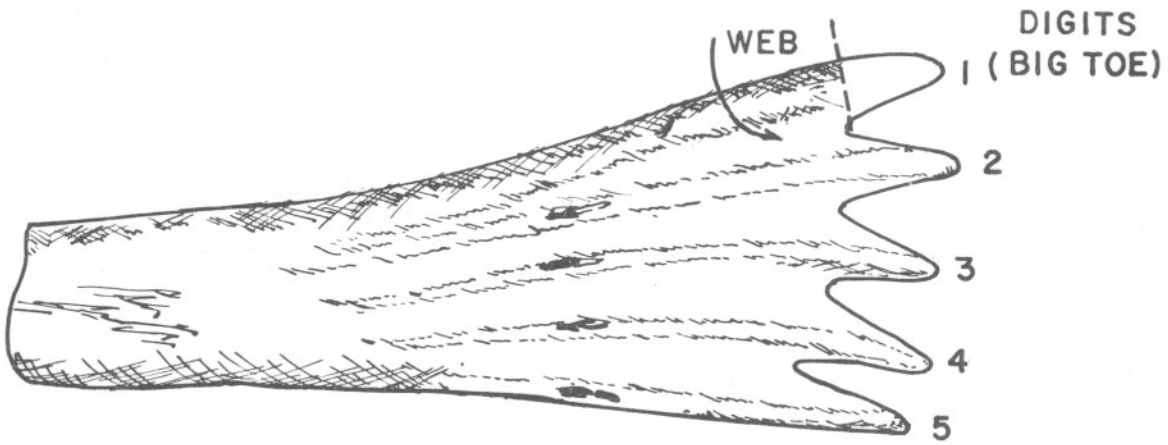
Figure 5. --System of identification symbols used as cryogenic brands applied to pups, Reef and Gorbatch Rookeries, St. Paul Island, Alaska



FRONT FLIPPER

TAGS CLINCHED AT THE HAIRLINE AND BETWEEN THE FOURTH AND THE FIFTH DIGIT.

MARKS MADE BY CUTTING A V-NOTCH AND REMOVING THE TIP.



HIND FLIPPER

MARK MADE BY REMOVING THE TIP OF THE FIRST DIGIT.

Figure 6.--Examples of mark locations used on fur seals, Pribilof Islands, Alaska.

Pups

In mid-September 1973, 20,000 pups on St. Paul Island and 5,000 pups on St. George Island were marked on the right and left hind flipper, respectively, by removing the tip of the second digit beyond the cartilage. Marking quotas were distributed among the rookeries of their respective islands, according to the distribution of class 3 males counted in mid-July of 1969 and 1970 on St. George Island and of 1970 on St. Paul Island.

Marking and Recapture

Marked seals recovered in 1973 are listed in tables A-15 to A-17. The incidence of tag loss, based on recovery of animals given two tags at age 1 year or older, is shown in table 3. Pups were last marked with metal tags in 1968. Seals tagged as pups were also given a checkmark (fig. 6) so that the rate of tag loss could be determined. In 1973, recoveries of animals given U-series tags as pups included three with tags and seven without tags. One seal which had lost a T-series tag was also recovered in 1973.

POPULATION ESTIMATES

Estimates of the number of pups born and the number of males of ages 1, 2, and 3 years are calculated from data developed from the recoveries of marked seals. Permanent marks have been applied to fur seal pups nearly every year since 1947 as a basis for estimating the number living at the time of marking. The method of shearing temporary marks on a proportion of the living pups on several or all rookeries, then sampling the total populations 1-2 weeks later for sheared-to-unsheared ratios, has also been used to estimate year class size. From 1961 to 1971, several thousand male seals of ages 1-3 years were individually marked with two tags in late September or October, and recovered in subsequent fur seal harvests to provide estimates of the number of males for these year classes.

In addition to the usual assumptions required for estimating population abundance from mark-recapture data, we have assumed that equal proportions of pups have been marked on St. Paul and St. George Islands. Animals have been marked as pups on both islands, but male seals were not harvested on St. George Island in 1973.

Table 3.--Summary of tag loss for male seals tagged at age 1 or older, Pribilof Islands, Alaska

Tag series	Time elapsed since tagging	Both tags recovered (n_2)	One tag lost (n_1)	Incidence of tag loss (p)[1/]
	Years	Number	Number	
1W	1	519	158	0.13
1W	2	630	254	0.17
1W	3	48	36	0.27
Total		1,197	448	0.16
1Y	1	639	355	0.22
1Y	2	207	234	0.36
Total		846	589	0.26

1/ $p = \frac{n_1}{2n_2+n_1}$; where n_1 = number recovered with one tag lost;
n_2 = number recovered with no tag loss.

The estimates based on recoveries on St. Paul Island from males of ages 2-6 years in 1973 are for the total Pribilof Islands population (table 4). Estimates of the size of several recent year classes, based on pooled recoveries at ages 2 through 5, are compared with estimates based on shearing and sampling in table 5.

Estimates of the seal pup population at the time of shearing in 1973 on all rookeries of St. George Island and on selected rookeries of St. Paul Island show increases of 13% and 32%, respectively, since 1970 (table 6).

The mark-recapture data for the 1967-70 year classes are summarized in table 7. Estimates of the number of males at ages 0, 1, 2, and 3 years are presented in table 8. The estimates for ages 1, 2, and 3 years are for the number of males in the population at the time of tagging, late September, which is after the harvest. The estimates for ages 1 and 2 years for the 1968 and 1969 year classes are inconsistent; the estimated number at age 2 is greater than the estimate for age 1. An explanation for this inconsistency is not obvious.

Table 4. --Estimates of the seal pup population, year classes 1967-71, at time of marking from recoveries in 1973 of marked male seals in ages 2 to 6, Pribilof Islands, Alaska

Year class	Age	Killed (C)	Marked (M)	Recovered (R)	Estimate of population at time of marking [1] ($\hat{N}$) [2]
	Years				
1967	6	22	[3] 12,472	1	143,440
1968	5	721	[3] 11,675	10	766,370
1969	4	10,800	[4] 25,000	715	377,145
1970	3	16,337	[4] 25,030	853	478,872
1971	2	577	[4] 24,995	49	288,954

[1] Estimates do not include counts of dead pups.

[2] $\hat{N} = \frac{(C+1)(M+1)}{(R+1)}$

[3] Marked by tagging.

[4] Marked by removing the tip of a hind digit.

Table 5.--Estimates of the number of seal pups born, [1] year classes 1961-71, from mark-recapture among males ages 2 through 5 and from shearing and sampling of live pups, Pribilof Islands, Alaska

Year class	Estimate from mark-recaptures ages 2 through 5	Estimates from shearing and sampling of live pups
	Number	Number
1961	544,000	438,000
1962	477,000	362,000
1963	443,000	343,000
1964	421,000	370,000
1965	387,000	347,000
1966	432,000	388,000
1967	446,000	---
1968	555,000	---
1969	[2] 383,000	304,000
1970	[3] 512,000	306,000
1971	[4] 343,000	---

1/ Estimate includes counts of dead pups.

2/ Based on recoveries through age 4.

3/ Based on recoveries through age 3.

4/ Based on recoveries at age 2 only.

Table 6.--Estimates of the seal pup population, year class 1973, at time of shearing, Pribilof Islands, Alaska

Island and rookery	Number of pups sheared	Counted			Estimated number of pups at time of shearing[2/] ($\hat{N}$)
		Sample[1/]	Sheared	Total	
		Number			
St. Paul Island[3/]					
Zapadni	4,408	213	698	5,325	33,628
Zapadni Reef	1,056	48	164	1,200	7,727
Little Zapadni	2,488	120	327	3,000	22,826
Tolstoi	4,704	191	637	4,775	35,262
Total					99,443
St. George Island					
East Reef	220	34	64	850	2,922
East Cliffs	580	66	93	1,650	10,290
North	1,360	184	313	4,600	19,987
Staraya Artil	490	63	118	1,575	6,540
Zapadni	665	96	234	2,400	6,821
South	1,060	91	216	2,275	11,164
Total					57,724

1/ Each sample contained 25 pups.

2/ $N = \frac{MC}{R}$; where M = number of pups sheared;
C = total number of pups counted in samples;
R = number of sheared pups counted in samples.

3/ Pups sheared on selected rookeries only.

Table 7. -- Summary of mark recapture data for year classes 1967-1970, Pribilof Islands, Alaska

Year class	Statistics 1/					
	i	M_i	C_i	R_{0i}	R_{1i}	R_{2i}	R_{3i}
1967							
	0	12,472	0	-	-	-	-
	1	489	0	-	-	-	-
	2	2,805	3,051	108	35	-	-
	3	166	25,092	733	132	963	-
	4	0	15,020	427	41	491	55
	5	0	2,744	67	2	85	22
1968							
	0	11,675	0	-	-	-	-
	1	269	0	-	-	-	-
	2	3,093	1,823	45	32	-	-
	3	593	14,344	303	75	674	-
	4	0	17,057	398	38	779	233
	5	0	721	10	0	34	15
1969							
	0	25,000	0	-	-	-	-
	1	409	0	-	-	-	-
	2	2,971	355	56	10	-	-
	3	0	16,466	1,108	131	809	-
	4	0	10,800	715	50	399	-
1970							
	0	25,030	0	-	-	-	-
	1	148	0	-	-	-	-
	2	0	973	35	7	-	-
	3	0	16,337	853	49	-	-

1/ Definition of symbols:
i = age in years
M_i = number effectively marked at age i. For i greater than 0 the number effectively marked has been corrected for double-tag loss.
C_i = number of males harvested at age i.
R_{0i}, R_{1i}, R_{2i}, R_{3i} = number of males marked at age 0, 1, 2, 3, respectively, recovered at age i.

Table 8. --Number of male fur seals ages 0 to 3 years estimated from mark-recapture data, year classes 1/ 1967-70, Pribilof Islands, Alaska

Age	Year class			
	1967	1968	1969	1970
0 2/	223,000	278,000	192,000	256,000
	-	-	152,000	153,000
1 3/	106,898	61,636	59,147	45,748
2 3/	78,110	66,815	67,059	
3 3/	38,296	42,509		

1/ All estimates not available for some year classes.

2/ Number of pups born in table , divided by 2; first value from mark-recapture estimate and second from shearing and sampling.

3/ $\hat{N}_i = \frac{M_i C_i^*}{r_i^*}$; where $\hat{N}_i$ = estimated number of males at age i; Mi = number of males effectively marked at age i; C_i^* = total kill of males from year class after age i; r_i^* = total number of recaptured of M_i.

ACKNOWLEDGMENTS

The research in 1973 was completed with the cooperation of William L. Peck, Program Director; Alan Groves, Management Staff Officer; and Harold A. Thayer, Program Construction Supervisor. Others who cooperated on St. Paul Island were Nicolai Stepetin, Village Foreman; Alexander Melovidov, Sealer Foreman; and Lee Paola, Superintendent, Oregon-Alaska Marine Products. On St. George Island, the fur seal investigations were completed with the cooperation of Nicolai S. Merculief, Village Foreman.

GLOSSARY

The following terms used in fur seal research and management on the Pribilof Islands have special meaning or are not readily found in standard dictionaries.

Checkmark A notch, slit, hole, or other mark made on a seal flipper when a tag is applied, to ensure later recognition of an animal that has lost its tag. See mark and lost tag.

Drive The act of surrounding and moving groups of seals on land from one location to another.

Escapement Seals that were not killed because they were too old, too large, or were not available.

Flipper mark See mark.

Hauling Ground An area, usually near a rookery, on which nonbreeding seals congregate. See rookery.

Haul Out The act of seals moving from the sea to a rookery or hauling ground on shore.

Known-age Refers to a seal whose age is known because the animal bears an inscribed tag or has a certain combination of tag-scar and checkmark.

Lost-tag Refers to a seal known to have been tagged as a pup because it bears a checkmark.

Male Seals, Adult Class 1 Shoreline - Full-grown males about age 10 and older without females but apparently with established territories at the high-tide mark.

Class 2 Territorial without females - Full-grown males about age 10 and older without females but with established territories on the rookery.

Class 3 Territorial with females - Full-grown males about age 10 and older with females and established territories on the rookery.

Class 4 Back fringe - Full-grown and partly grown males about age 7 and older without females and territories that are along the inland fringe of the rookery.

Class 5 Hauling ground - Full-grown and partly grown males about age 7 and older without females that are on traditional hauling grounds.

Mark Examples of marks are the tip of a digit from a hind flipper removed, a V-notch cut into the leading edge of a front flipper near the tip, or the tip of a front flipper sliced off.

Rookery An area on which breeding seals congregate.

Round The sequence in which hauling grounds on St. Paul Island are visited to harvest seals. When used, a circuit or round of the hauling grounds is completed in 5 days and the procedure is repeated throughout the kill of males. The mean round of the kill is calculated by multiplying the round number by the number killed in that round and dividing the cumulative product by the cumulative kill.

Tagged Describes a seal having an inscribed metal tag or tags attached to one or more of its flippers.

Tag Recoveries Includes tags recovered, marked seals recovered, and seals identified from checkmarks as having lost their tags. See checkmark, marked, and lost tag.

Part II. BEHAVIOR--ST. GEORGE ISLAND

Initial field studies were conducted on St. George Island in 1973 in accordance with research plans approved at the March 1973 meeting of the North Pacific Fur Seal Commission. Research in the first year of the harvest ban was directed mainly at obtaining baseline information on which future comparisons can be made. Quantitative and observational studies of the St. George Island fur seal population were made in the following categories: abundance and distribution; sex ratio; reproduction; survival; behavior and activity patterns.

Predictably, as the harvest ban continues, changes will occur in sex ratio and herd abundance. These changes, in turn, singly or in combination, can be expected to cause changes in herd distribution, reproduction, survival, and perhaps in other density-dependent areas not presently anticipated.

Counts and Estimates

Population counts and estimates were a continuation, in large part, of procedures established to support Pribilof Island fur seal management prior to the harvest ban on St. George Island. On two rookery areas, East and South, beginning 3 June and continuing through September, twice-weekly counts were made of the following:

Adult males, territorial, with harems (class 3)
Adult males, territorial, without harems (class 2)
Adult males, nonterritorial (classes 1, 4, and 5)
Young males (primarily ages 3 and 4 years)
Subadult males (ages 5 through 9 years)
Northern sea lions

These counts, plus the counts of adult females, were made daily at the intensive research area on Zapadni Rookery (see below) from 8 June through mid-August. In addition, on 12 July, all adult males on the island were counted by class and rookery section (table A-6).

Thirty percent of the adult males on St. George Island in 1973 were classified idle (classes 1, 4, and 5) (tables A-7 and A-8). Over the past 13 years the only lower level (22%) was recorded in 1972. The 13-year mean level of idle adult males is 37.6%.

The number of pups born on St. George Island in 1973 is estimated to be 60,385. In early August, 4,375 pups distributed proportionately through all rookeries were marked by shearing a patch of guard hairs from the back of the head. Sample counts for marked-to-unmarked ratios, by rookery, were made a week later. To the total shown in table 6 was added 2,661, the number of dead pups counted in late August, to give the above total population estimate.

From the dead pup counts conducted in August (tables (A-10 and A-11), the 1973 pup mortality on land was estimated to be 4.41%. In the most recent year for which comparable data are available, 1970, the St. George Island pup mortality was estimated at 6.39%.

Thirty-seven dead animals older than pups were counted on the island in November, and one canine tooth was collected from each for determining age. Comparative counts in this category since 1966 are given in table 2.

Behavior Studies

At the beginning of the season, in late May, a 126-foot catwalk and blind were erected at a point overlooking Zapadni Rookery and hauling ground. Twenty adult males were marked with irregular splotches of orange paint as they established territories near the blind. Intensive observations averaging 10 hours a day were made from the blind during the period when females arrived on the rookery in large numbers, gave birth, and were bred, roughly 20 June to 15 July.

Daily observations of several hours duration continued from the blind through mid-August, then intermittently until the end of the season in November. Counts taken daily within the observation area included those of adult males, territorial (classes 2 and 3); harems; adult females; young males (primarily ages 3 and 4); and subadult males (ages 5 through 9). An effort was made daily to locate all marked seals, to record all copulations by marked seals, and of time each animal spent copulating. The territorial activities of adult males (such as fighting, boundary display, and patroling) were also recorded.

Marking

Future behavior observations, with particular reference to establishing nursing cycles, will be aided because of the marking in October of 500 adult females on Zapadni Rookery. These animals were each given an individually identifiable mark by singeing through the guard hair coat

in the area of the left shoulder. We estimate that the marks will be visible 2 to 3 years. Additionally, each animal was marked with a green metal tag (cattle-ear type, series X-1101 to 1600) affixed to the trailing edge of the left front flipper at the hairline. Whisker color (white, dark, or mixed) of each marked female was recorded.

Captive Animals

A section of the unused skin processing washhouse in the St. George Island village was converted to an indoor holding area for captive animals. Two fenced enclosures were constructed, each containing a wooden tank 19 x 10 x 3 feet deep, filled with seawater, with a 4-foot wide platform adjoining the longer side. Several additional tanks in the same building are available for increasing animal holding capacity if needed.

Three young males and five adult females were captured and held in this facility for varying periods of time during the 1973 season. Some of the animals were used for testing marking techniques and as models for developing a radio telemetry harness.

A planned reproductive physiology experiment could not be performed because nursing females could not be held longer than 2 weeks, due to their refusal to feed in captivity. Captive males were easily induced to feed.

One instance was observed, possibly for the first time, of northern fur seals breeding in captivity.

Fur Seal Pup Predation by Northern Sea Lions

In the past, we have received occasional accounts of predation on fur seal pups by northern sea lions. During September-October 1973, over 130 sightings were recorded of sea lions apparently attacking seal pups swimming close to shore. Over half of the incidents were witnessed by a National Marine Fisheries Service scientist, who photographed several of them. The remainder were reported to the scientist by island residents. The possibility that fur seal mortality from this source is significant must be investigated further.

Construction

Two additional blinds were prefabricated for erection on rookeries in 1974. Construction was also begun on a photography dark room in the basement of research living quarters.

James H. Johnson

Part III. BEHAVIOR--SAN MIGUEL ISLAND

The northern fur seal population of San Miguel Island breeds on two rookeries. One rookery is in Adams Cove on San Miguel Island and the other is on Castle Rock, a small rocky islet located about 2 miles north of the west end of San Miguel Island.

Adams Cove

An observational study begun in 1969 of the small breeding colony of northern fur seals in Adams Cove was continued in 1973. Some important observations are listed in table . An increase in the number of females ashore here in 1971 was followed by an increase in the number of pups born in 1972. Although a small increase in the number of females ashore occurred in 1972, the number of pups born in 1973 was about the same as in 1972. The highest count of females in 1973 was obtained 4 August when 394 females were ashore. Growth of the Adams Cove population is supplemented partly by a continual influx of females from the Bering Sea populations, as indicated by the appearance of new animals that had been tagged as pups on the Pribilof and Commander Islands and on Robben Island.

Castle Rock

Northern fur seals (except pups) on Castle Rock were counted from aerial photographs taken on 4 days during the pupping and breeding season in 1973 (table). The pups were counted here from foot on 28 July; 160 living and 33 dead pups counted suggest that at least 193 were born.

San Miguel Island

The total fur seal population (Adams Cove and Castle Rock) undoubtedly exceeds the counts made 11 July. The counts on 11 July are used because they were the latest made of the Castle Rock population. This count, however, does not necessarily reflect the maximum number of females. Counts of the Adams Cove population were made from a blind overlooking the rookery, and the population on Castle Rock was counted from aerial photographs. Minimum counts were 21 adult males and 609 females. The latter number may include a few young males. A minimum count of 261 pups born was obtained, using the estimate of 193 made for Castle Rock on 28 July.

Of 25 fur seals tagged elsewhere as pups and observed on San Miguel Island since 1968, 21 were from the Pribilof Islands (1-J, 1-M, 8-N, 2-O, 1-Q, 2-R, 5-T, and 1-U), 3 from the Commander Islands (BB1364, E2818, T19022) and 1 from Robben Island (Y7104, with one tag missing).

Table 9.--Counts[1/] of northern fur seals on Castle Rock, San Miguel Island, 1973

Date	Weather[2/]	Seals	
		Male	Female
31 May	Stormy, cool	9	21
12 June	Moderate wind, broken clouds and sun	14	98
26 June	Warm	11	102
11 July	Stormy, cool	14	345

1/ From aerial photographs. The fur seal pups could not be counted because of difficulty in differentiating them from northern sea lion pups.

2/ Under conditions of warm and light winds (15 mph), the animals normally enter the water about midday. Thus, the most accurate counts are taken on cool stormy days when temperatures are low and the animals stay ashore.

Table 10.--Summary of some observations of northern fur seals on Adams Cove, San Miguel Island, California, 1969-73

Observation	1969	1970	1971	1972	1973
Beginning date[1/]	12 May	23 May	15 May	16 May	9 May
Ending date[1/]	1 Oct.	20 Sept.	6 Sept.	7 Sept.	15 Aug.
First male	16 May	29 May	24 May	16 May	26 May
First female	27 May	28 May	25 May	22 May	17 May
First birth	6 June	28 May	31 May	22 May	7 June[2/]
Mean birth date	24 June	21 June	26 June	22 June	24 June
Total births	28	33	45	70	68
Total pup deaths	2	14	15	21	17
Total females (maximum counted and date)[3/]	175 23 Aug.	179 23 Aug.	274 2 Sept.	310 16 Aug.	394 4 Aug.
Total large adult males	4	2	4	6	6
Total small adult males	4	4	6	7	5
Total young males[4/]	4	5	6	>10	6

1/ Beginning and ending dates of continuous observations.

2/ One pup was stillborn 19 May.

3/ A few 2-, 3-, and 4-year-old males may have been included because they are about the same size as adult females.

4/ Animals about 41-50 inches (104-127 cm) in body length, tip of nose to tip of tail.

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Part IV. PHYSIOLOGY AND MEDICINE

Pathology

Since 1964 we have monitored the magnitude and causes of mortality among newborn fur seals on a section of Reef Rookery designated as study area 1 (Marine Mammal Biological Laboratory, 1969) and two additional study areas since 1967 designated as study areas 2 and 3. 1/ The pups found dead on these areas in 1973 were counted but not all were necropsied. Counts through 15 August were: Area 1, 90; area 2, 36; and area 3, 150. These data are similar to those recorded for these areas in 1969 and 1970, and consistent with an established mortality pattern of a sharp increase every 3 years as has been most noticeable in 1965, 1968, and 1971. Accordingly, we anticipate a sharp increase in 1974.

In 1973, as in 1972, emphasis was placed on microbiological investigations of infectious disease agents in cooperation with a team of microbiologists from the Naval Biomedical Research Laboratory, Oakland, Calif.

A total of 31 seals were necropsied and certain tissues taken for histopathology. Of these 31 animals, 29 were pups that were found dead on the study areas. All tissues collected were fixed in 10% buffered formalin, embedded in paraffin, sectioned, and stained with hematoxylin and eosin, and with Giemsa. Of the 800 sections prepared so far, 60 were special silver stains necessary for demonstrating bacteria of the genus Leptospira.

Three samples of flipper vesicles and five enlarged mesenteric lymph nodes were prepared for electron microscopy.

Microbiology

Leptospirosis

Since 1972, when Leptospira pomona was first cultured from California sea lion pups and a fur seal pup displaying liver damage-multiple hemorrhage-perinatal complex (MHPC) the cause of this condition has been presumed to be leptospirosis. Ten of the twenty-nine pups necropsied showed typical lesions of MHPC. The liver, kidney, and placenta (when still attached) from each pup were cultured using special procedures to recover Leptospira. In all, 305 tubes of special media were incubated and examined four times by dark field microscopy. Live Leptospira were not recovered from any of these cases, although they were recovered from the liver of one case in 1972.

1/ Marine Mammal Biological Laboratory, 1972. Fur Seal Investigations, 1971. National Marine Fisheries Service, Seattle, Wash. [Processed report, 132 p.]

In addition, the sera of 26 seals were checked for antibodies to L. pomona and 5 were positive. It should be kept in mind that in some acute cases, leptospiral antibodies may not be detected if death occurs within about 60 days of birth. Most of the MHPC cases are pups that died about the time of birth, so a negative result on testing is not conclusive.

Virology

Swab samples were taken from the nose, throat, and rectum of all animals necropsied. The enlarge lymph nodes and hookworms from four additional animals were sampled to follow up on indications in 1972 that some of these animals were affected by a condition similar to Hodgkin's disease in man. Vesicular lesions from the flippers of seven animals were also cultured for virus isolation.

All of these samples were placed in tubes containing monolayers of six different live cell lines so that a total of 641 tissue cultures were inoculated. These were examined under a light microscope up to six times, and then subcultured two or more times so that approximately 10,000 microscopic examinations of cell cultures were made. So far, 18 presumptive virus isolations have been made, including several from vesicular lesions on flippers.

General Bacteriology and Mycology

The midgut of 29 normal fur seals killed in the harvest were cultured for anaerobic bacteria and enteric pathogens. No Salmonella or Shigella bacteria were isolated but several clostridial organisms were isolated.

Throat samples from apparently normal juvenile males were taken and cultured. One species of the genus Neisseria and six species of the genus Moraxella were isolated from these samples.

Six flipper vesicles were cultured for bacteria, and all were negative.

Stagnant water from Reef Rookery was cultured. One strain of Escherichia coli and two fungi were isolated.

Serology

A total of 200 individual serum samples were collected and frozen for specific antibody testing, and 4 liters of pooled sera were collected and frozen for immunoglobulin fractionation.

Twenty pools of sera from juvenile males taken in the 1972 harvest were tested for two serotypes of San Miguel sea lion virus (SMSV) which has recently been determined by the U.S. Department of Agriculture at the Plum Island Disease Station to be Vesicular Exanthema of Swine Virus (VESV). All pools of sera were positive for serotype 2MR, and all were negative for serotype 1MR. Serotype 1MR was isolated from a fur seal pup in 1972. The necropsy diagnosis had been apparent malnutrition, the cause most responsible for the cyclical peaks in pup mortality. We will be exploring the possibility of this virus being responsible for a share of this category of death causes.

Four juvenile male fur seals were kept in cages and injected with bovine serum albumin (BSA) to evaluate their humoral antibody response. The subjects were bled every third day for serology and hemograms. On the 9th day they were freeze branded and released. Results are being evaluated.

Physiology

Hematology

Packed cell volumes (PCV's), RBC's, WBC's and differential white counts were made on 29 juvenile males.

Blood Chemistry

Sera from 16 animals were analyzed for 12 components. The results of hematology and blood chemistry will be reported separately.

Management Considerations

Carcass Disappearance Rates

In 1973 from 2 July to 15 August, 133 pups found dead on study area 3 at Northeast Point were tagged through the carpus with sea lion pup tags and left in place. On 20 August, 128 tags were removed from those dead pups still in the study area, indicating disappearance of 5 carcasses, a rate of 3.7%. In 1972 a similar study[2/] showed a disappearance rate of 17.2%.

Cryogenic Marking Experiments

Cryogenic depigmentation of fur seals on the unhaired portion of the flipper was tried in 1966. It was unsuccessful because of migration of pigment back into the treated areas, and attention was turned to depigmentation of hair follicles only. Some excellent results were obtained in 1967, but the critical variables of time, temperature, and mass to surface area ratio

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2/ Marine Mammal Division, 1973. Fur seal investigations, 1972. National Marine Fisheries Service, Seattle, Wash. [Processed report, 93 p.]

of the branding head have not been positively identified for fur seals.

Since the Marine Mammal Division successfully depigmented the skin of Tursiops with cryogenic techniques, this method was tried again on the flipper skin of fur seals. Applying the knowledge developed by R. K. Farrell that repigmentation results from disrupting the natural barriers to pigment migration, we modified our technique to reduce damage to the dermis, primarily by the use of rapid thawing of the treated areas.

On 5 July, nine healthy pups were freeze branded on the left flipper using the same instruments and coolant as in 1969 and 1970 (Marine Mammal Biological Laboratory, 1971) for a time of 10 seconds, immediately followed by fast thawing with warm water applied with a sponge. Nine other pups were freeze branded on the right flipper by the same method, only the time was extended to 15 seconds.

Interpretation of the results was hampered by the difficulty of recapturing the subjects from the rookeries, but some excellent white marks of the flipper skin were observed from the catwalks on three pups near the water on 18 July, only 13 days after the treatment. The 10-second brands were more visible than the 15-second brands.

It is probable that temperatures not as cold as -70°C, used in this experiment, would produce improved results.

Mark C. Keyes, Alvin W. Smith, and Richard J. Brown 3/

3/ Dr. Smith, Veterinary Virologist, and Dr. Brown, Certified Pathologist, are with the Naval Biomedical Research Laboratory, Oakland, California

Part V. PELAGIC, BERING SEA

Pelagic fur seal research was carried out in the eastern Bering Sea from 18 July through 11 September 1973 from the chartered vessel M/V Mark I.[1] The objectives were to (1) locate major feeding areas and food species of the fur seal, and (2) increase the information base for determining age specific pregnancy and ovulation rates.

Distribution and Abundance

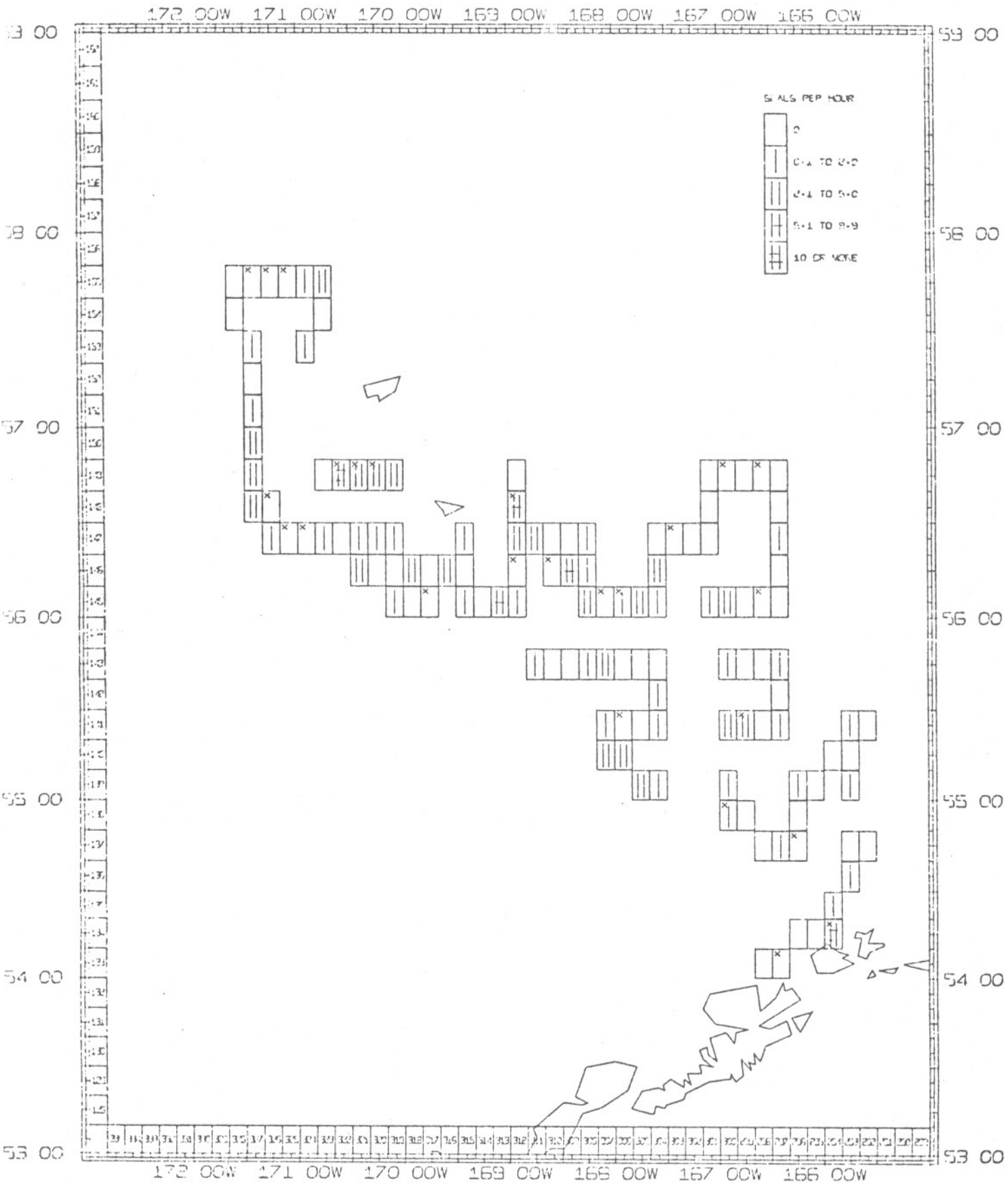
The seals collected were taken within a 20- to 100-mile radius around the Pribilof Islands of St. George and St. Paul. The animals were generally found in greater numbers along the edge of the Continental Shelf south and west of St. George Island during the third 10-day period in July (fig. 7, table B-1) and August (fig. 8, table B-2). During the first 10-day period in September (fig. 9, table B-3) seals were abundant west and north of St. Paul Island on the Continental Shelf in about 60 fathoms of water. A good distribution of seals was observed between St. George Island and Dutch Harbor in the Aleutian Islands.

The first 10-day period in September and the last 10-day period in July and August were the most productive in terms of seals collected. The average number of seals collected (20.6) per boat-hunting day (BHD[2]) in 1973 exceeded previous collections made in the Bering Sea. Of 1,765 seals sighted in 1973, 675 (74 males and 601 females) were collected. The numbers and percentages of seals sighted, collected, and lost (wounded and killed) during the pelagic cruises since 1958 are shown in tables B-4 and B-5.

Solitary seals comprised over half (59%) of the animals sighted in 1973. Seals in pairs were the second largest group, contributing 25% of seals sighted (table B-6). Two groups containing 10 seals each were the largest aggregations sighted. Rare exceptions to groups exceeding 10 animals occurred 21 July and 4 September when 393 and 150 seals, respectively, were counted around the vessel.

1/ Registered length 87.7 ft., 138 tons net, 750 horsepower, cruising speed 10 knots.

2/ BHD = a boat-hunting day is a day in which a vessel is used for 8 hours or more, units of boat-hunting days are 0.25, 0.50, 0.75, and 1.00 (see tables B-7 and B-8).



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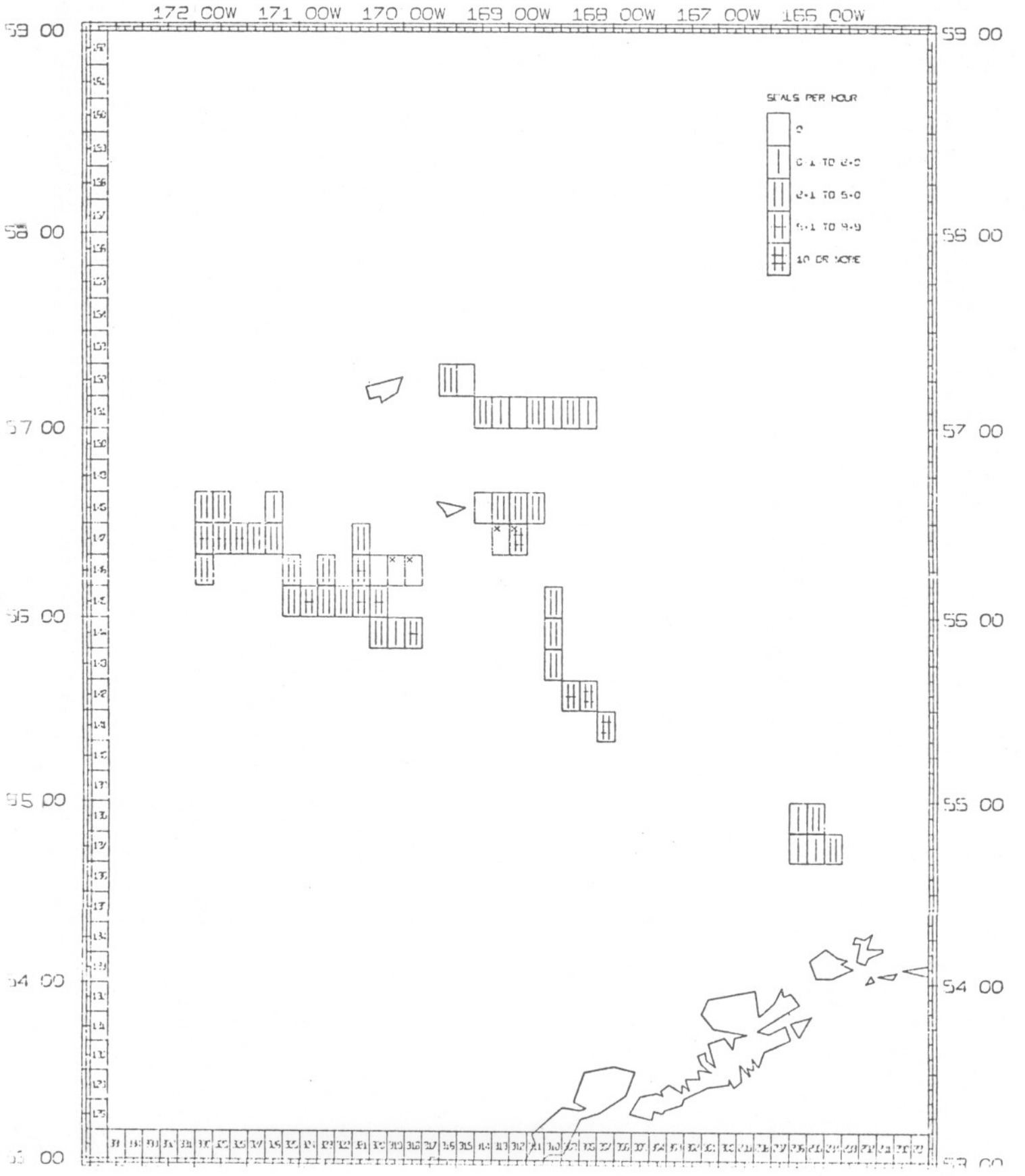
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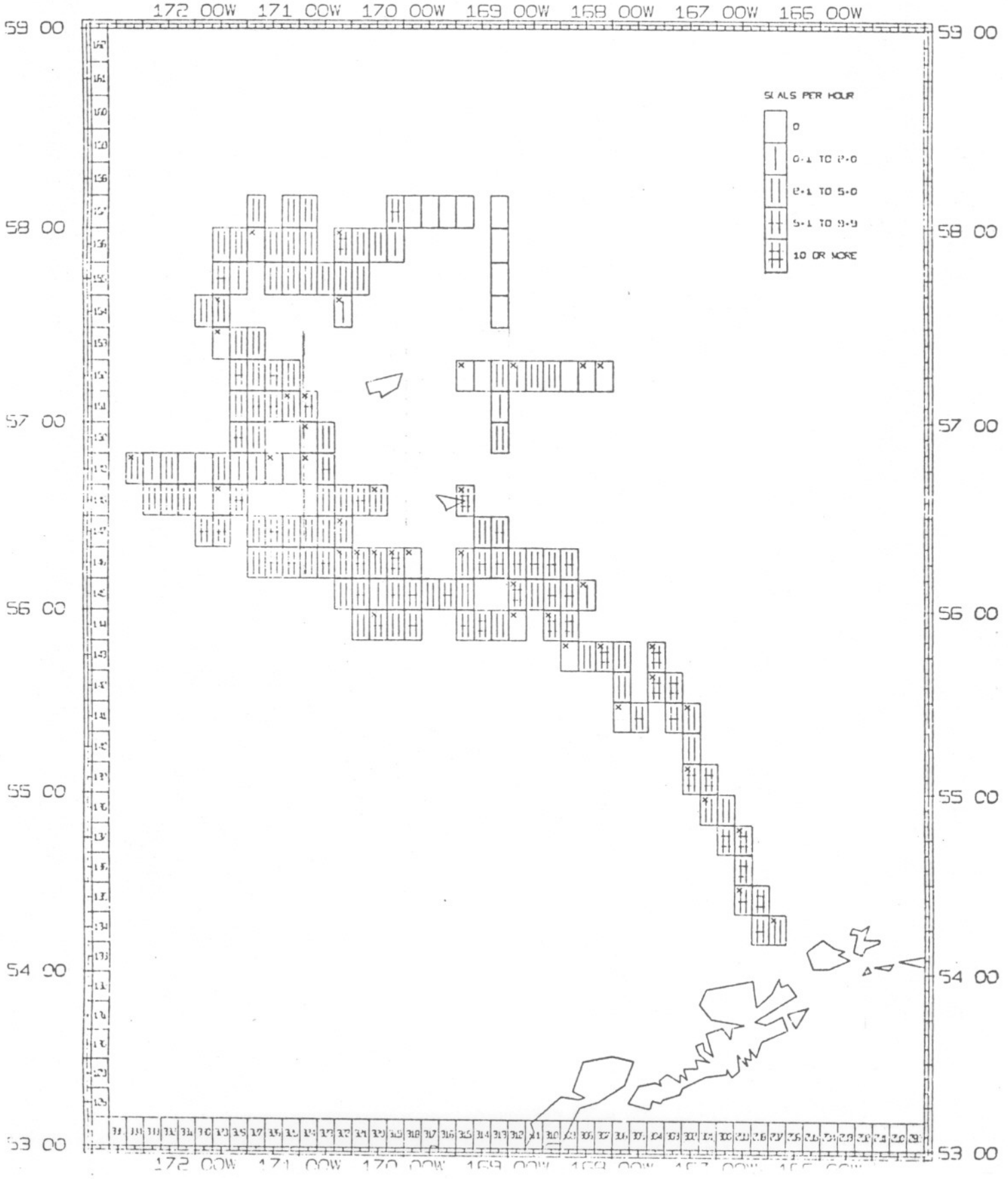
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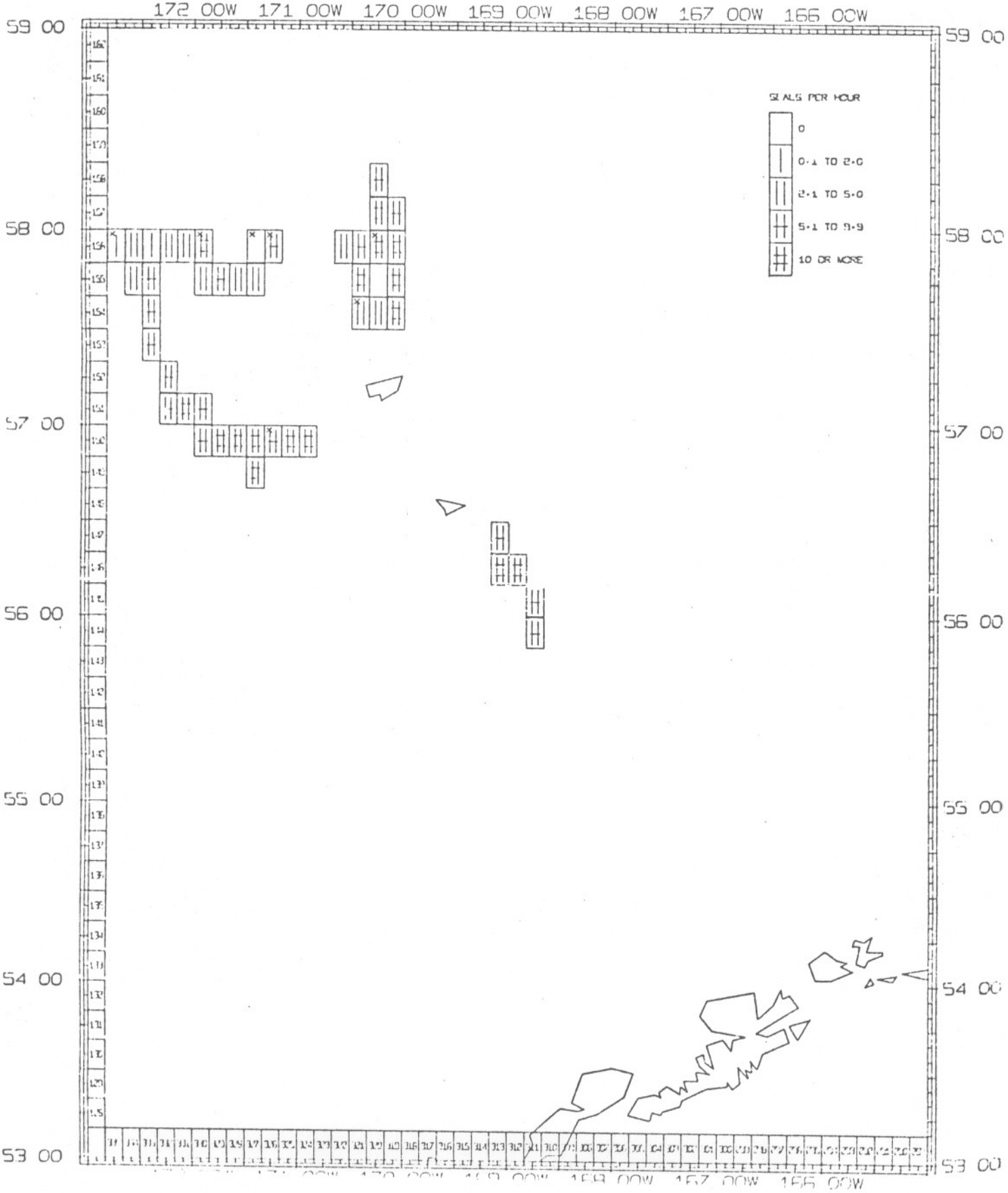
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10 OR MORE

Age and Sex

The age and sex distribution of seals collected in 1973 is shown in table 11. Two-, three-, and four-year-old males (25, 43, and 24%, respectively) comprised 92% of the total males collected. The youngest male was age 2 years and the oldest age 8 years. Female seals of ages 3 to 12, which were more evenly distributed in the catch, comprised 81% of the total females collected. Females 6 and 7 years of age were the largest groups contributing 11% each, whereas females of other ages accounted for from 6 to 9% of the collection. The oldest female taken was 20 years old.

Recoveries of Marked Seals

Fur seals have been marked each year by the United States on the Pribilof Islands and by the USSR on the Commander, Robben, and Kuril Islands. Major marking and tagging programs were begun in 1958 for studies of populations on the breeding grounds and at sea (see Section 1, p. 8 of this report).

A total of 20 animals that had been marked as pups were recovered (table 12). The youngest of these seals were three 4-year-olds (including one male), and the oldest were two 14-year-olds.

Length and Weight

Mean lengths and weights for nonpregnant and post partum females collected in 1973 are given in tables B-9 to B-12 and for males in tables B-13 and 14. The lengths and weights of two pregnant females and their fetuses are given in tables B-15 and B-16 .

Reproduction

Only two seals collected in July were pregnant. Post partum females (453) comprised 75% of the total females (601) taken. The youngest post partum females collected were six primiparous 4-year-old animals and the oldest were two post partum multiparous 19-year-old seals. Table 13 gives the reproductive rates of all females age 3 and older collected pelagically in the eastern North Pacific Ocean by the United States since 1958.

A significant increase in the pregnancy rate was noted for most age groups of seals taken in the Bering Sea in 1973 than for seals collected off Washington during the last few years. Preliminary analysis by X^2 for samples taken in the Bering Sea in 1962, 1963, and 1973 indicates

Table 11.--Age and sex, by month, of fur seals collected pelagically by the United States in the Bering Sea, 18 July to 11 September 1973[1/]

Age	July				August				September				Total			
	Male		Female		Male		Female		Male		Female		Male		Female	
Years	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
2	3	18.8	-	-	12	30.8	4	1.8	4	20.0	6	3.0	19	25.3	10	1.7
3	7	43.8	1	0.6	15	38.5	14	6.3	10	50.0	21	10.3	32	42.7	36	6.0
4	5	31.3	4	2.3	9	23.1	18	8.1	4	20.0	17	8.4	18	24.0	39	6.5
5	-	-	8	4.6	-	-	19	8.5	-	-	17	8.4	-	-	44	7.3
6	-	-	23	13.2	1	2.6	26	11.7	-	-	18	8.9	1	1.3	67	11.2
7	1	6.3	20	11.5	-	-	25	11.2	-	-	21	10.3	1	1.3	66	11.0
8	-	-	20	11.5	2	5.1	17	7.6	1	5.0	14	6.9	3	4.0	51	8.5
9	-	-	23	13.2	-	-	18	8.1	-	-	16	7.9	-	-	57	9.5
10	-	-	16	9.2	-	-	14	6.3	-	-	18	8.9	-	-	48	8.0
11	-	-	12	6.9	-	-	12	5.4	-	-	16	7.9	-	-	40	6.7
12	-	-	13	7.5	-	-	16	7.2	-	-	10	4.9	-	-	39	6.5
13	-	-	10	5.7	-	-	13	5.8	-	-	8	3.9	-	-	31	5.2
14	-	-	8	4.6	-	-	5	2.2	-	-	7	3.0	-	-	20	3.3
15	-	-	6	3.4	-	-	8	3.6	-	-	5	2.5	-	-	19	3.2
16	-	-	5	2.9	-	-	6	2.7	-	-	7	3.4	-	-	18	3.0
17	-	-	4	2.3	-	-	-	-	-	-	-	-	-	-	4	0.7
18	-	-	1	0.6	-	-	5	2.2	-	-	-	-	-	-	6	1.0
19	-	-	-	-	-	-	2	0.9	-	-	-	-	-	-	2	0.3
20	-	-	-	-	-	-	-	-	-	-	2	1.0	-	-	2	0.3
Unknown	-	-	-	-	-	-	1	0.4	-	-	1	0.5	-	-	2	0.3
Total	16		174		39		223		19		204		74		601	

1/ Includes one 8-year-old seal collected 1 July 1973.

Table 12. --Tag recoveries from fur seals collected pelagically by the United States in the eastern Bering Sea, 18 July to 11 September 1973

[Figures in parentheses indicate number of animals that had lost tags; they are included in the totals]

Age	Year of tagging	Tag series	Seals tagged or marked	Tag recovery ♂	Tag recovery ♀	Seals collected in each age group[1/] ♂	Seals collected in each age group[1/] ♀
Years			Number	Number		---Number---	
4	1969	Marked[2/]	25,000	1	2	18	39
5	1968	U	9,475	-	1	-	44
6	1967	T	12,472	-	1	1	67
7	1966	S	24,580	-	1(1)	1	66
8	1965	Marked[2/]	30,087	-	2	3	51
9	1964	Q	24,991	-	2(2)	-	57
10	1963	P	24,971	-	1	-	48
11	1962	O	49,908	-	2	-	40
12	1961	N	49,921	-	3(1)	-	39
13	1960	M	59,981	-	2(2)	-	31
14	1959	L	49,881	-	2	-	20

1/ Table does not include seals born in years when none were tagged or marked, nor year classes from which no tagged or marked seals were taken.

2/ See table A-13, Seal pups tagged and marked, Pribilof Islands, Alaska, 1963-73.

Table 13.--Number of female seals collected pelagically by the United States in the eastern Pacific Ocean and (in parentheses) percentage pregnant, 1958-73

Age Years	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1958-73 combined
	Number																
3	39 (2.6)	43 (0.0)	18 (0.0)	84 (0.0)	93 (1.1)	53 (0.0)	74 (0.0)	51 (0.0)	30 (0.0)	10 (0.0)	35 (0.0)	19 (0.0)	62 (0.0)	39 (0.0)	15 (0.0)	36 (0.0)	701 (0.3)
4	42 (2.4)	93 (6.4)	36 (2.8)	96 (1.0)	140 (2.9)	113 (7.1)	62 (1.6)	73 (0.0)	68 (1.5)	9 (0.0)	95 (5.3)	32 (3.1)	66 (0.0)	56 (0.0)	17 (0.0)	40 (15.0)	1,038 (3.4)
5	70 (35.7)	114 (56.1)	55 (49.1)	68 (20.6)	123 (26.0)	102 (43.8)	84 (35.7)	23 (26.1)	66 (27.3)	9 (44.4)	37 (37.8)	23 (34.8)	37 (35.1)	24 (25.0)	36 (13.9)	44 (59.1)	975 (38.0)
6	99 (80.8)	118 (77.1)	45 (80.0)	62 (75.8)	72 (54.2)	90 (74.4)	81 (75.3)	37 (56.8)	35 (71.4)	20 (60.0)	47 (76.6)	23 (56.5)	41 (63.4)	26 (69.2)	26 (50.0)	67 (80.6)	839 (71.9)
7	103 (83.3)	143 (76.2)	66 (78.8)	95 (75.8)	93 (84.9)	77 (88.3)	44 (77.3)	24 (79.2)	46 (78.3)	7 (71.4)	69 (72.5)	27 (63.0)	19 (84.2)	23 (87.0)	20 (55.0)	60 (87.0)	922 (89.0)
8	102 (89.2)	164 (86.6)	105 (85.7)	107 (79.4)	98 (89.8)	87 (97.7)	46 (84.8)	33 (84.8)	43 (79.1)	7 (85.7)	38 (78.9)	22 (72.7)	23 (82.6)	15 (80.0)	20 (80.0)	51 (96.1)	961 (86.3)
9	81 (96.3)	108 (88.9)	144 (92.4)	114 (93.9)	73 (83.6)	60 (95.0)	30 (83.3)	17 (70.6)	20 (100.0)	12 (100.0)	40 (82.5)	5 (100.0)	22 (77.3)	11 (54.5)	13 (61.5)	57 (89.5)	867 (88.7)
10	97 (87.6)	96 (85.4)	129 (91.5)	112 (93.8)	100 (89.0)	72 (93.1)	49 (87.8)	10 (90.0)	13 (84.6)	11 (90.9)	40 (77.5)	21 (81.0)	13 (61.5)	18 (77.8)	17 (82.4)	48 (89.6)	846 (88.2)
11	113 (92.0)	98 (89.8)	136 (91.2)	82 (89.0)	91 (89.0)	88 (94.3)	42 (85.7)	18 (83.3)	23 (78.3)	4 (100.0)	39 (76.9)	26 (73.1)	14 (78.6)	10 (80.0)	15 (93.3)	40 (97.5)	825 (89.0)
12	134 (82.9)	76 (88.2)	106 (90.6)	71 (93.0)	97 (89.7)	92 (92.4)	51 (84.3)	15 (73.3)	16 (100.0)	3 (66.7)	40 (90.0)	24 (83.3)	13 (69.2)	16 (81.2)	8 (87.5)	39 (92.3)	801 (87.9)
13	110 (82.7)	56 (89.3)	120 (87.5)	76 (82.9)	58 (94.8)	76 (99.8)	33 (84.8)	8 (100.0)	12 (100.0)	3 (100.0)	24 (83.3)	11 (36.4)	14 (64.3)	8 (100.0)	8 (100.0)	51 (93.6)	648 (88.7)
14	92 (81.5)	70 (84.2)	107 (80.4)	67 (92.5)	65 (87.7)	57 (80.7)	38 (76.3)	10 (80.0)	14 (85.7)	1 (100.0)	26 (80.8)	7 (71.4)	1 (100.0)	3 (66.7)	5 (80.0)	20 (100.0)	583 (83.7)
15	71 (78.9)	87 (88.5)	67 (83.6)	68 (79.4)	53 (81.1)	75 (85.3)	41 (65.9)	14 (78.6)	15 (93.3)	3 (66.7)	30 (86.7)	4 (100.0)	5 (100.0)	4 (50.0)	6 (66.7)	19 (100.0)	562 (82.6)
16	56 (78.6)	69 (75.4)	53 (73.7)	55 (83.6)	50 (82.0)	45 (82.2)	22 (72.7)	12 (83.3)	5 (80.0)	6 (100.0)	26 (96.2)	5 (60.0)	3 (100.0)	3 (66.7)	3 (66.7)	18 (94.4)	431 (80.5)
17	36 (58.6)	36 (80.6)	46 (67.4)	24 (62.5)	44 (72.7)	28 (71.4)	21 (61.9)	10 (80.0)	5 (40.0)	2 (0.0)	21 (81.0)	7 (57.1)	- -	2 (0.0)	2 (50.0)	4 (100.0)	288 (68.1)
18	22 (59.1)	27 (85.2)	23 (82.6)	25 (64.0)	25 (72.0)	12 (58.3)	20 (60.0)	8 (37.5)	- -	- -	11 (72.7)	4 (75.0)	6 (16.7)	3 (100.0)	1 (100.0)	6 (16.7)	193 (66.3)
19	14 (28.6)	16 (81.3)	19 (57.9)	10 (50.0)	15 (60.0)	5 (60.0)	7 (57.1)	2 (0.0)	3 (33.3)	- -	10 (60.0)	2 (50.0)	2 (0.0)	- -	1 (0.0)	2 (100.0)	108 (54.6)
20	3 (33.3)	5 (40.0)	6 (16.7)	7 (100.0)	11 (72.7)	11 (45.5)	10 (20.0)	2 (0.0)	1 (0.0)	1 (0.0)	7 (71.4)	- -	- -	1 (100.0)	- -	2 (100.0)	67 (47.8)
21	1 (100.0)	7 (85.7)	6 (50.0)	2 (50.0)	3 (100.0)	4 (50.0)	- -	1 (0.0)	1 (0.0)	- -	3 (33.3)	- -	1 (0.0)	- -	- -	- -	29 (58.6)
22	1 (0.0)	5 (40.0)	- -	- -	3 (66.7)	- -	- -	- -	- -	1 (0.0)	3 (0.0)	- -	- -	1 (100.0)	- -	- -	14 (35.7)
23	- -	1 (0.0)	1 (0.0)	1 (0.0)	- -	2 (0.0)	1 (100.0)	1 (0.0)	- -	- -	1 (0.0)	- -	- -	- -	- -	- -	8 (12.5)
24	- -	1 (0.0)	1 (0.0)	1 (0.0)	1 (0.0)	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	4 (0.0)
26	- -	1 (0.0)	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	1 (0.0)
Total	1,286 (76.1)	1,434 (73.8)	1,289 (79.7)	1,227 (68.5)	1,306 (63.4)	1,209 (69.3)	756 (58.7)	369 (45.8)	416 (52.3)	109 (61.5)	642 (61.4)	262 (53.4)	342 (40.4)	263 (44.1)	213 (50.7)	590 (77.0)	11,715 (64.7)
6-26 years	1,135 (83.3)	1,184 (83.4)	1,180 (84.4)	979 (81.3)	952 (83.2)	881 (86.0)	536 (77.0)	222 (73.4)	252 (84.5)	81 (77.8)	475 (78.9)	188 (69.7)	177 (70.6)	144 (76.4)	145 (71.0)	470 (89.8)	9,001 (82.4)

that the pregnancy rates calculated for these years differed significantly for females of ages 4, 5, and 6 years but not for females age 7 and older. The evidence also indicates that no significant change in the pregnancy rate has occurred. Lower pregnancy rates among females taken off Washington during the last few years are not actual declines but rather an indication of segregation of females at sea by reproductive condition.

Feeding Habits

Of 675 seals collected in 1973, 519 stomachs (77%) contained food and 156 (23%) were empty. Eighty-two percent of the total stomach volume was represented by gadids, principally walleye pollock, Theragra chalcogramma (67%) and Gadidae (15%) which was probably walleye pollock (Table 14). These foods were followed in order by squids (11%) representing three genera of the Family Gonatidae (Gonatus, Berryteuthis, and Gonatopsis); a deep sea smelt, Bathylagidae (4%); and Greenland halibut, Reinhardtius hippoglossoides (2%). These prey species represented 99% of the total food volume for seals collected in 1973. The locations where principal food species were found in stomachs of fur seals taken in the Bering Sea are shown in figures 10 to 16.

Relation of Food of Fur Seals to Commercial Fisheries

Salmon (3 occurrences) and walleye pollock (194 occurrences) were the most valuable commercial fish eaten by fur seals taken in the Bering Sea in 1973. Salmon, Oncorhynchus spp., were identified from scales taken from two stomachs. Walleye pollock were small (4 to 20 cm).

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Table 14. --Stomach contents of fur seals collected pelagically by the United States in the Bering Sea, 18 July to 11 September 1973 1/

Food	Summer July-August			Fall September			Summer-Fall July-September		
	Volume		Frequency	Volume		Frequency	Volume		Frequency
	Cc.	Percent	Number	Cc.	Percent	Number	Cc.	Percent	Number
Fish									
Entosphenus tridentatus	T	0.0	1	-	-	-	T	0.0	1
Salmonidae	460	0.3	3	-	-	-	460	0.2	3
Osmeridae	T	0.0	2	48	0.1	7	48	0.0	9
Mallotus villosus	25	0.0	2	1,087	1.6	11	1,112	0.5	13
Batnylagidae	4,646	2.7	17	5,345	8.0	13	9,991	4.2	30
Myctophidae	T	0.0	1	-	-	-	T	0.0	1
Gadidae	15,459	8.9	66	20,008	29.8	81	35,467	14.8	147
Gadus macrocephalus	930	0.5	1	-	-	-	930	0.4	1
Theragra chalcogramma	128,989	74.6	143	32,511	48.5	50	161,500	67.2	194
Anoplopoma fimbria	T	0.0	1	T	0.0	1	T	0.0	2
Pleurogrammus monopterygius	188	0.1	4	-	-	-	188	0.1	4
Bathymasteridae	25	0.0	1	-	-	-	25	0.0	1
Reinhardtius hippoglossoides	2,134	1.2	29	1,796	2.7	35	3,930	1.6	65
Unidentified	371	0.2	43	45	0.1	11	416	0.2	54
Squid									
Gonatidae	425	0.3	169	T	0.0	75	425	0.2	244
Gonatus sp.	474	0.3	65	238	0.3	31	712	0.3	96
Berryteuthis magister	11,982	6.9	65	4,646	6.9	33	16,628	6.9	98
Gonatopsis borealis	6,826	4.0	44	1,367	2.0	14	8,193	3.4	58
Unidentified	T	0.0	8	T	0.0	3	T	0.0	11
Bird	T	0.0	2	-	-	-	T	0.0	2
Pebbles	T	0.0	8	T	0.0	5	T	0.0	13
Inorganic material	T	0.0	1	-	-	-	T	0.0	1
Isopoda	T	0.0	1	-	-	-	T	0.0	1
Amphipoda	83	0.0	8	-	-	-	83	0.0	8
Mollusca	T	0.0	1	-	-	-	T	0.0	1
Crustacea	T	0.0	1	-	-	-	T	0.0	1
Gastropoda	T	0.0	3	T	0.0	1	T	0.0	4
Total	173,017			67,091			240,108		
Stomachs with food	341			178			519		
Stomachs empty	111			45			156		

1/ Includes one seal collected 1 July 1973.

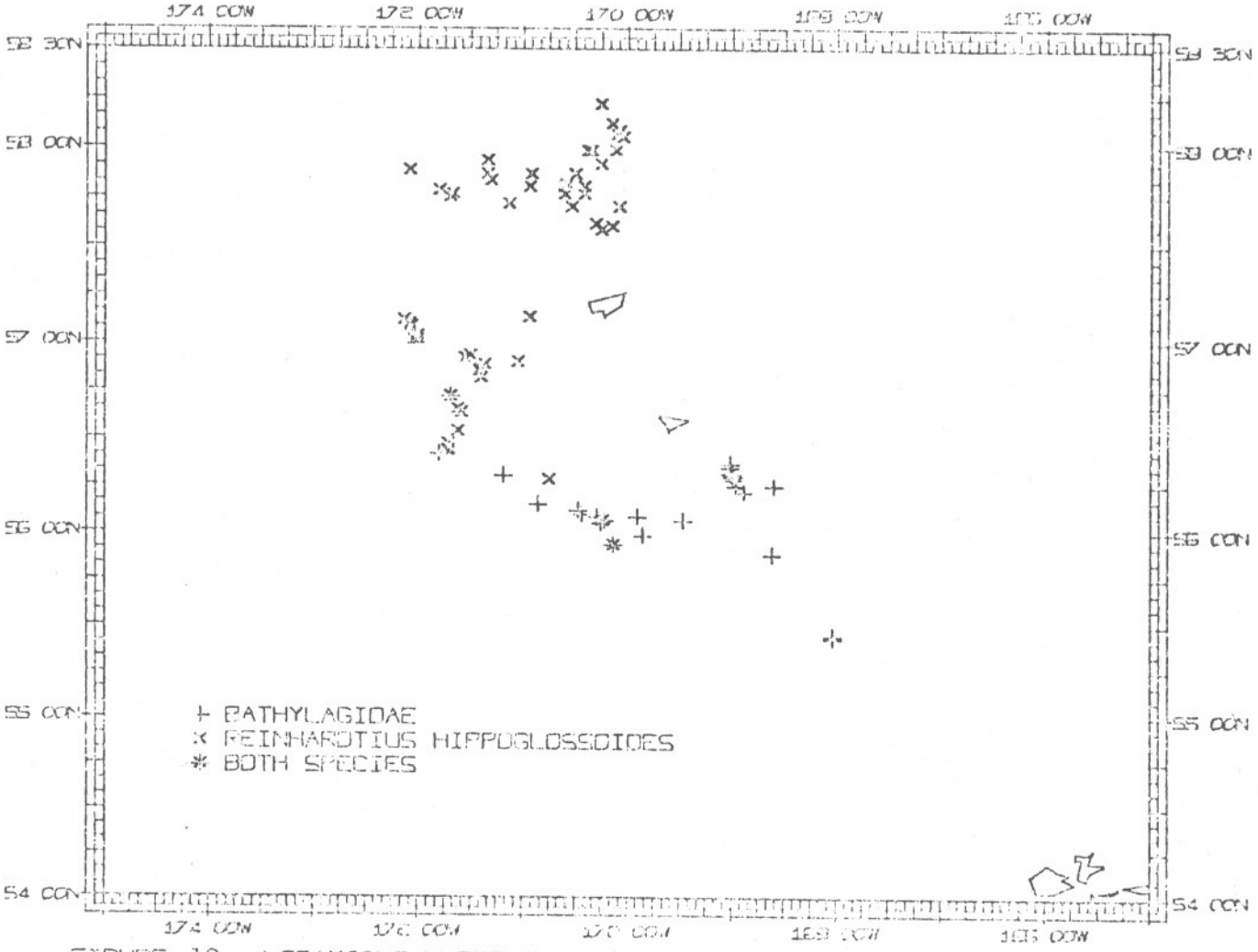

FIGURE 10 --LOCATIONS WHERE FUR SEAL STOMACHS COLLECTED IN THE BERING SEA IN 1973 CONTAINED BATHYLAGIDAE (30 OCCURRENCES) AND REINHARDTIUS HIPPOGLOSSOIDES (63 OCCURRENCES

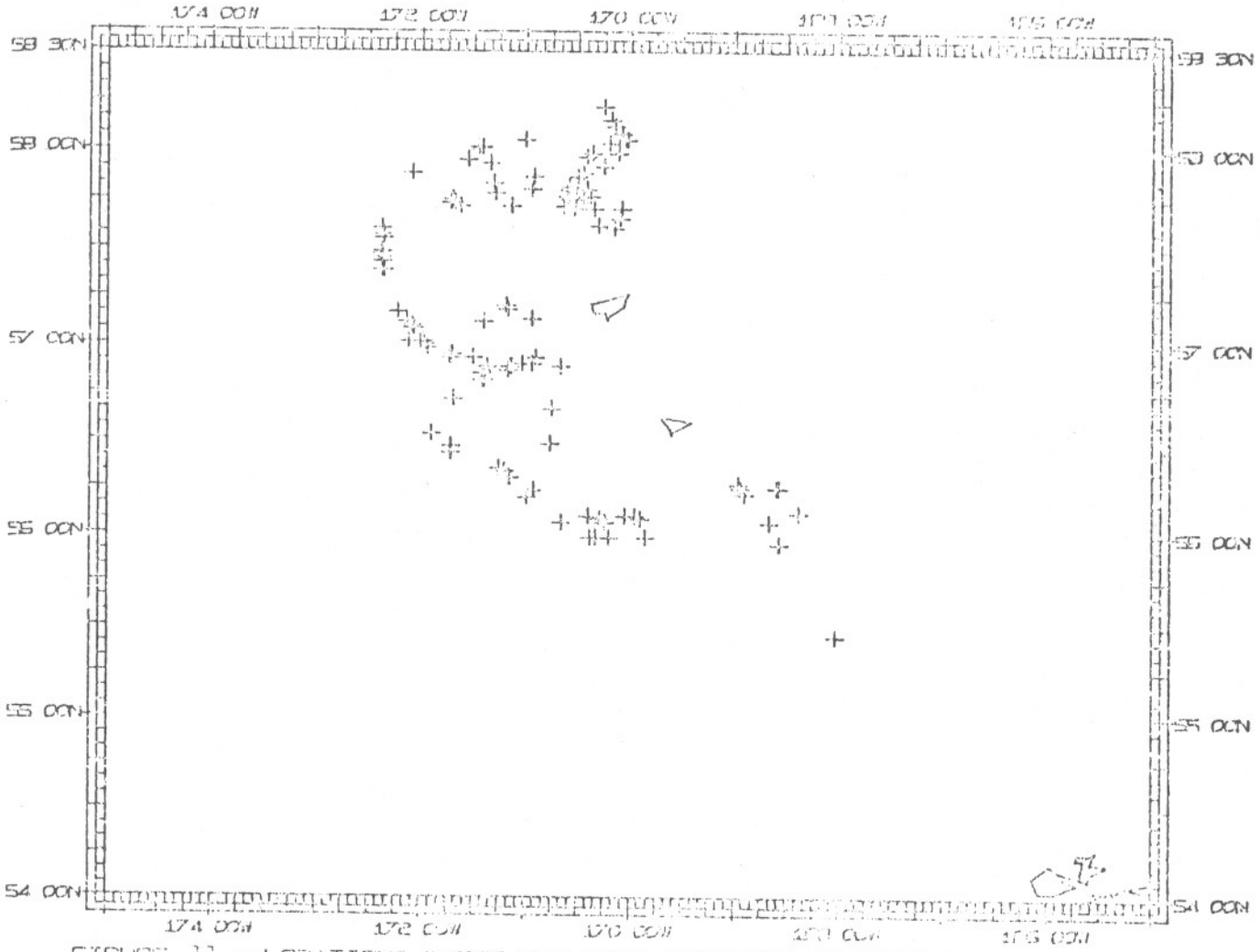

FIGURE 11 --LOCATIONS WHERE FUR SEAL STOMACHS COLLECTED IN THE BERING SEA IN 1979 CONTAINED RADIOAE (147 OCCURRENCES)

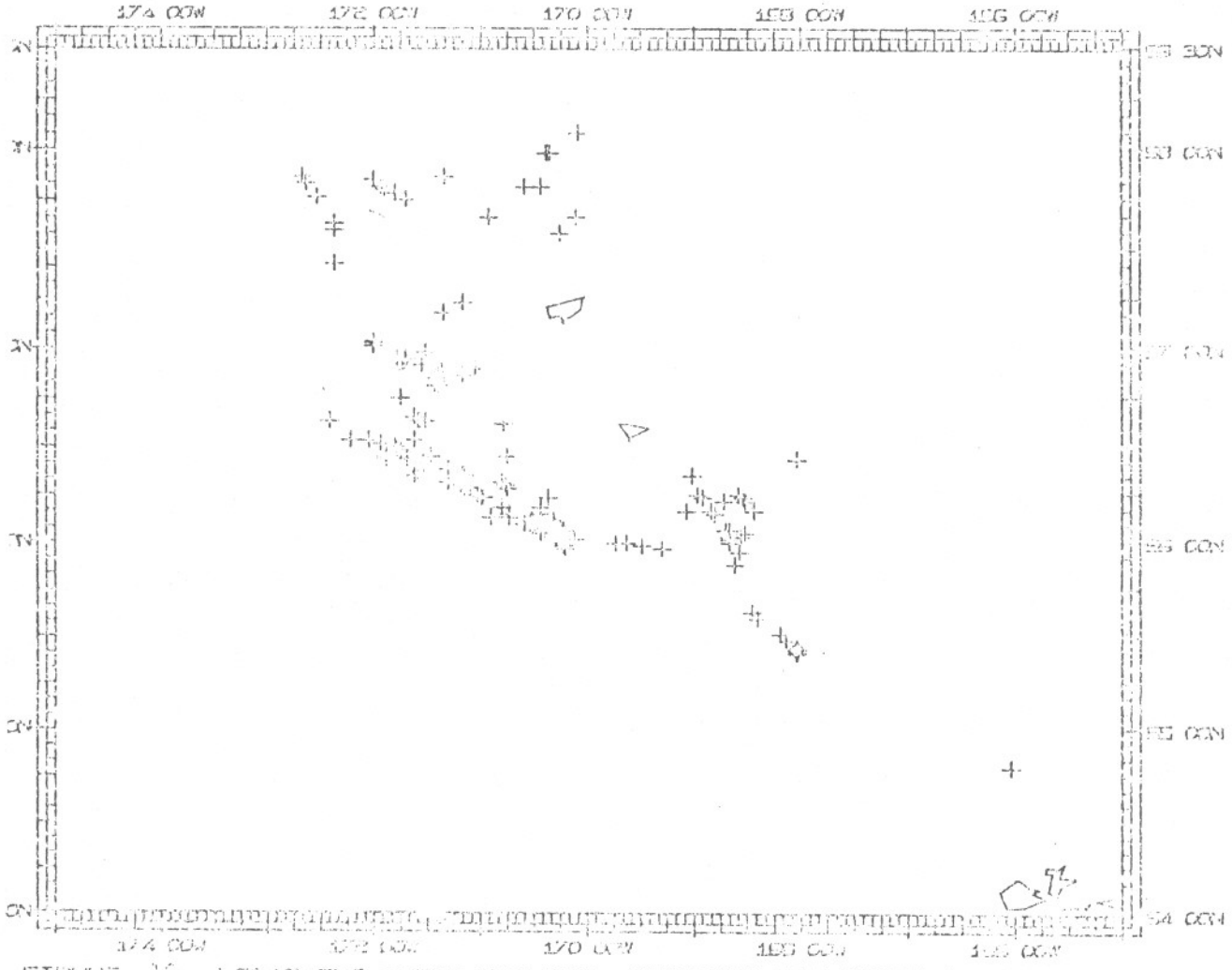

FIGURE 16--LOCATIONS WHERE FUR SEAL STOMACHS COLLECTED IN THE BERING SEA IN 1975 CONTAINED THERAGRA CHALCOGRAMMA (134 OCCURRENCES)

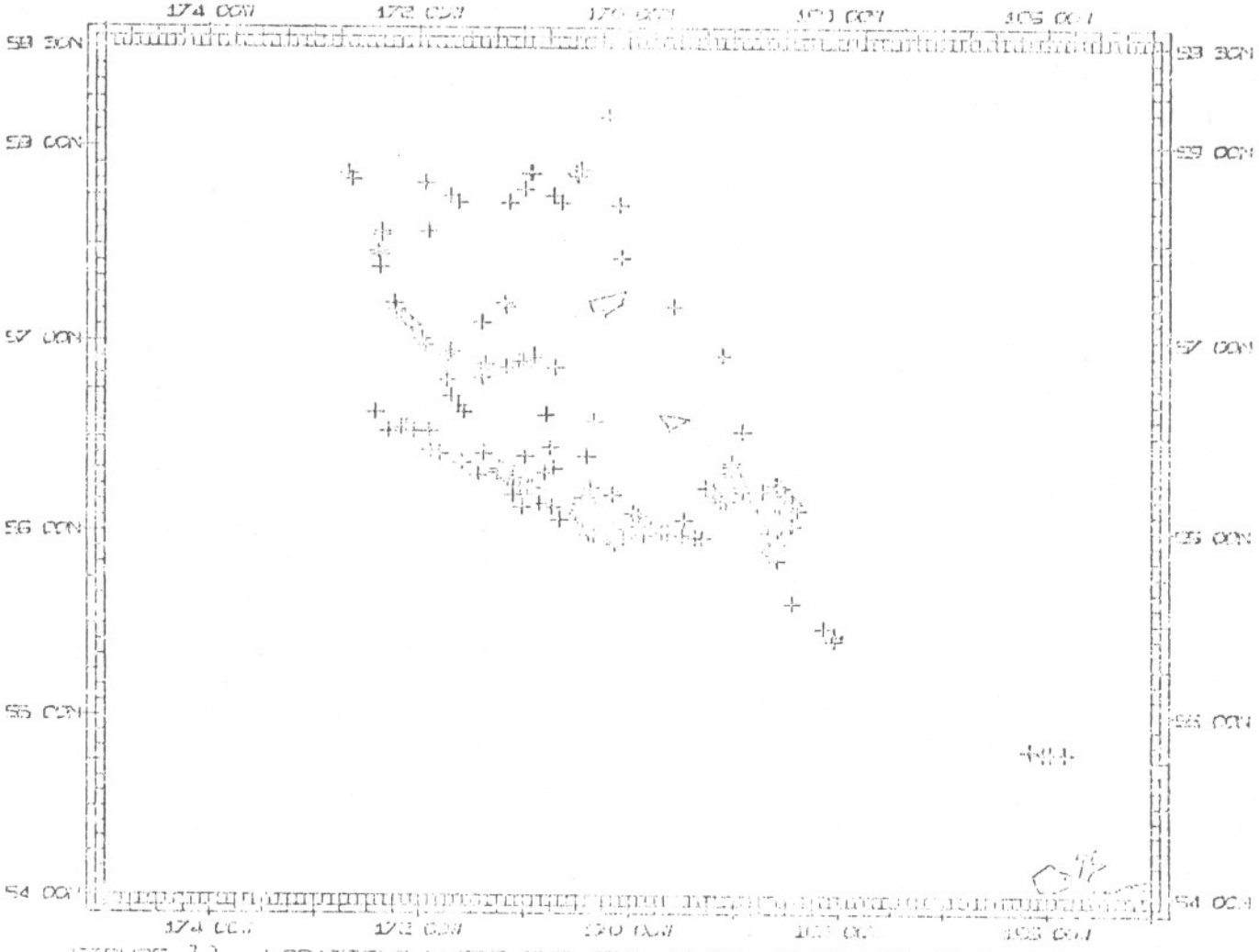

FIGURE 13 --LOCATIONS WHERE FUR SEAL STOMACHS COLLECTED IN THE BERING SEA IN 1973 CONTAINED SQUIDS (644 OCCURRENCES)

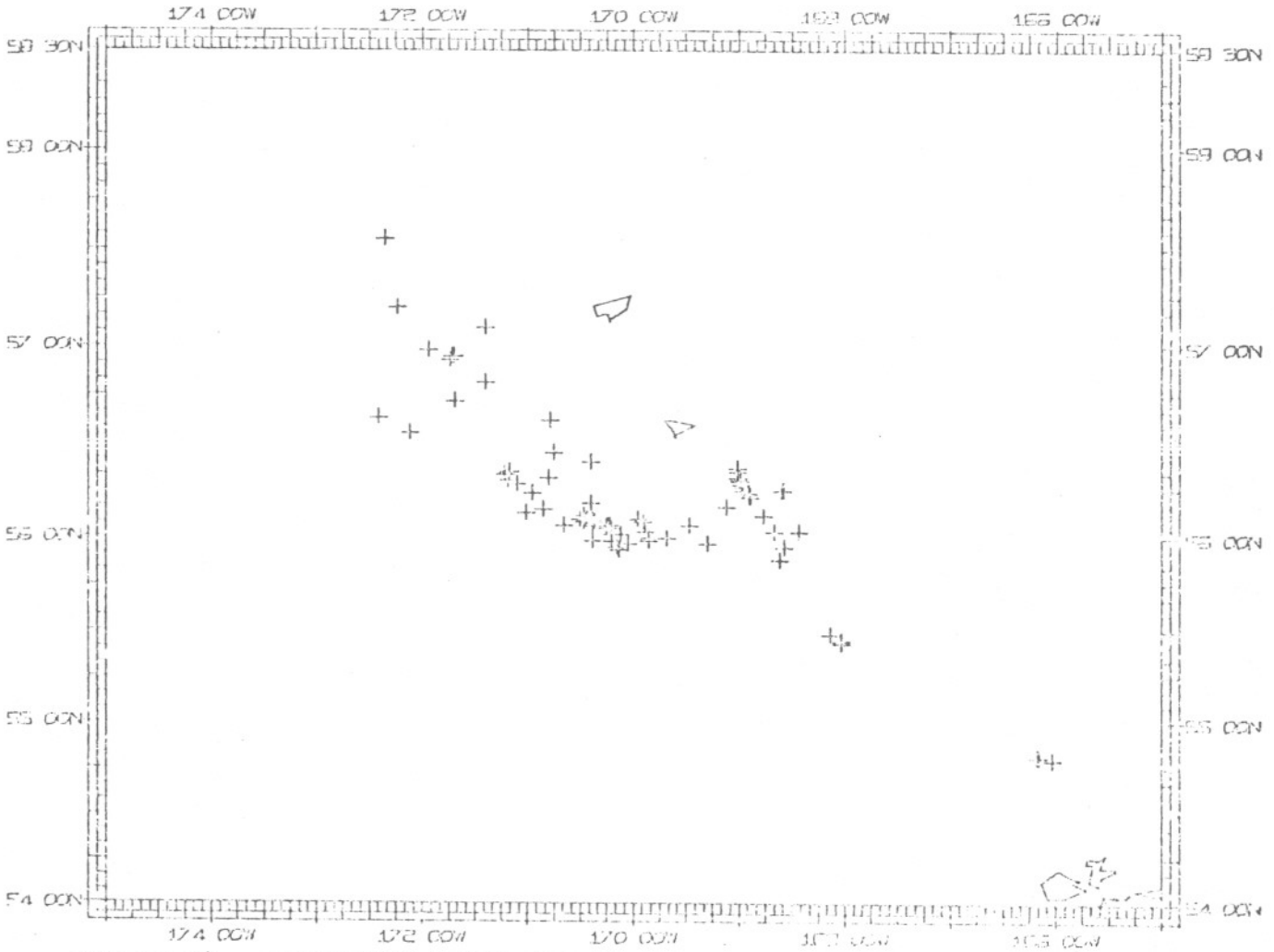

FIGURE 14.--LOCATIONS WHERE FUR SEAL STOMACHS COLLECTED IN THE BERING SEA IN 1973 CONTAINED *GONATUS* SP. (55 OCCURRENCES)

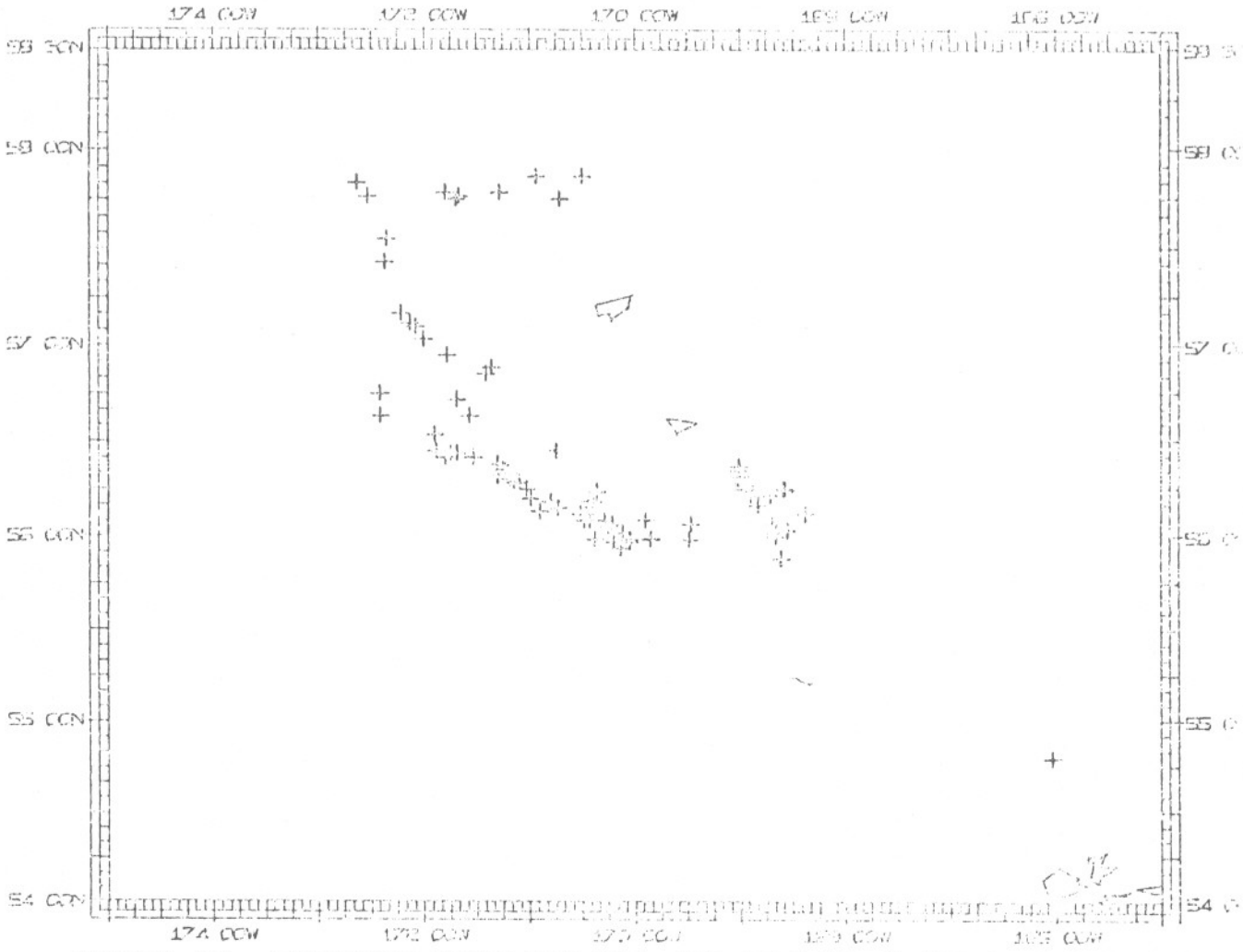

FIGURE 15 --LOCATIONS WHERE FUR SEAL STOMACHS COLLECTED IN THE BERING SEA IN 1975 CONTAINED PERCIFORMES MAGISTER (86 OCCURRENCES)

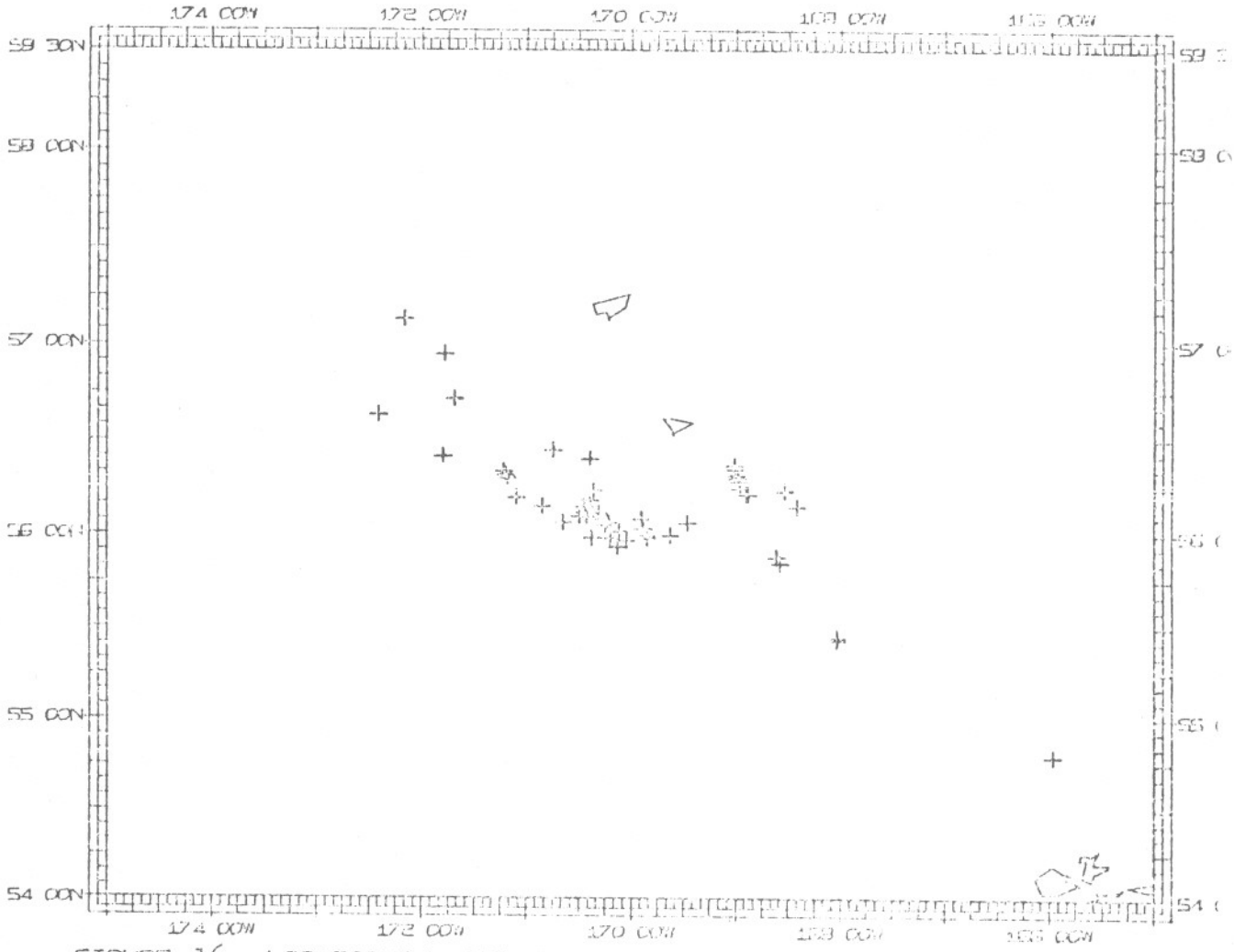

FIGURE 16 --LOCATIONS WHERE FUR SEAL STOMACHS COLLECTED IN THE BERING SEA IN 1973 CONTAINED GONATOPSIS BOREALIS (56 OCCURRENCES)

Table A-1.--Age classification of male seals killed on St. Paul Island, 25 June to 28 July 1973

Date	Rookery 1/	Males killed	Tooth sample	Seals in each age group of sample					Estimated seals killed from each age group				
				2	3	4	5	6	2	3	4	5	6
		Number	Number	Percent					Number				
June													
25	NEP(west)	318	58	-	22.4	63.8	12.1	1.7	-	71	203	39	5
25	NEP(east)	458	108	0.9	25.9	61.1	12.1	-	4	119	280	55	-
26	POL	232	45	-	35.5	57.8	6.7	-	-	82	134	16	-
27	TZR	480	104	2.9	32.7	59.6	4.8	-	14	157	286	23	-
28	ZAP	303	55	-	38.2	54.5	7.3	-	-	116	165	22	-
29	REEF	1,435	288	1.0	38.5	57.0	3.5	-	14	553	818	50	-
30	L-K	168	39	-	25.7	61.5	12.8	-	-	43	103	22	-
July													
2	NEP(west)	222	46	2.2	28.2	67.4	2.2	-	5	62	150	5	-
2	NEP(east)	525	100	-	33.0	60.0	6.0	1.0	-	173	315	32	5
3	POL	281	55	-	36.4	61.8	1.8	-	-	102	174	5	-
3	TZR	794	148	-	43.9	51.4	4.7	-	-	349	408	37	-
5	ZAP	690	129	4.7	46.5	45.7	3.1	-	33	321	315	21	-
6	REEF	1,147	226	0.9	50.9	45.5	2.7	-	10	584	522	31	-
7	L-K	275	45	2.2	28.9	64.5	4.4	-	6	80	177	12	-
9	NEP(west)	190	36	2.8	52.8	41.6	2.8	-	5	101	79	5	-
9	NEP(east)	669	130	0.8	47.7	47.7	3.8	-	5	319	319	26	-
10	POL	618	123	2.5	50.4	46.3	0.8	-	15	312	286	5	-
11	TZR	1,151	232	0.9	60.8	36.6	1.7	-	10	700	421	20	-
12	ZAP	1,512	305	1.3	65.3	31.8	1.6	-	20	987	481	24	-
13	REEF	1,180	225	2.2	63.6	32.4	1.8	-	26	751	382	21	-
14	L-K	414	77	2.6	49.4	48.0	-	-	11	204	199	-	-
16	NEP(west)	542	100	1.0	66.0	32.0	1.0	-	5	358	174	5	-
16	NEP(east)	1,241	243	0.8	57.2	39.9	2.1	-	10	710	495	26	-
17	POL	799	145	1.4	49.0	46.9	2.7	-	11	391	375	22	-
18	TZR	649	121	2.5	46.3	47.9	3.3	-	16	301	311	21	-
19	ZAP	2,044	394	3.8	70.8	23.6	1.5	0.3	78	1,447	482	31	6
20	REEF	1,283	231	3.9	62.8	32.9	0.4	-	50	806	422	5	-
21	L-K	338	53	3.8	67.9	24.5	1.9	1.9	13	230	83	6	6
23	NEP(west)	633	121	2.5	64.4	31.4	1.7	-	16	407	199	11	-
23	NEP(east)	1,289	244	2.1	67.6	29.1	1.2	-	27	871	375	16	-
24	POL	768	145	2.8	59.3	33.8	4.1	-	22	455	260	31	-
25	TZR	1,239	236	1.7	72.0	25.4	0.9	-	21	892	315	11	-
26	ZAP	2,089	362	3.9	70.4	23.8	1.9	-	81	1,471	497	40	-
27	REEF	1,834	370	2.4	77.6	19.2	0.8	-	44	1,423	352	15	-
28	L-K	647	133	0.8	60.1	37.6	1.5	-	5	389	243	10	-
Season total		28,457	5,472						577	16,337	10,800	721	22

1/ NEP(east) = east or Morjovi side of Northeast Point; NEP(west) = west or Vostochni side of Northeast Point; TZR = Tolstoi, Zapadni Reef, and Little Zapadni; POL = Polovina and Little Polovina; ZAP = Zapadni; REEF = Reef, Gorbatch, and Ardiguen; L-K = Lukanin and Kitovi.

Table A-2. --Cumulative age classification of male seals killed on St. Paul Island, 25 June to 28 July 1973

Date	Rookery[1/]	Estimated seals killed from each age group					Total kill	Seals killed from each age group				
		2	3	4	5	6		2	3	4	5	6
		Number						Percent				
June												
25	NEP(west)	-	71	203	39	5	318	-	22	64	12	2
25	NEP(east)	4	190	483	94	5	776	1	24	62	12	1
26	POL	4	272	617	110	5	1,008	-	27	61	11	1
27	TZR	18	429	903	133	5	1,488	1	29	61	9	-
28	ZAP	18	545	1,068	155	5	1,791	1	30	60	9	-
29	REEF	32	1,098	1,886	205	5	3,226	1	34	59	6	-
30	L-K	32	1,141	1,989	227	5	3,394	1	34	58	7	-
July												
2	NEP(west)	37	1,203	2,139	232	5	3,616	1	33	59	7	-
2	NEP(east)	37	1,376	2,454	264	10	4,141	1	33	59	7	-
3	POL	37	1,478	2,628	269	10	4,422	1	33	60	6	-
3	TZR	37	1,827	3,036	306	10	5,216	1	35	58	6	-
5	ZAP	70	2,148	3,351	327	10	5,906	1	36	57	6	-
6	REEF	80	2,732	3,873	358	10	7,053	1	39	55	5	-
7	L-K	86	2,812	4,050	370	10	7,328	1	39	55	5	-
9	NEP(west)	91	2,913	4,129	375	10	7,518	1	39	55	5	-
9	NEP(east)	96	3,232	4,448	401	10	8,187	1	40	54	5	-
10	POL	111	3,544	4,734	406	10	8,805	1	40	54	5	-
11	TZR	121	4,244	5,155	426	10	9,956	1	43	52	4	-
12	ZAP	111	5,231	5,636	450	10	11,468	1	46	49	4	-
13	REEF	167	5,982	6,018	471	10	12,648	1	47	48	4	-
14	L-K	178	6,186	6,217	471	10	13,062	1	47	48	4	-
16	NEP(west)	183	6,544	6,391	476	10	13,604	1	48	47	4	-
16	NEP(east)	193	7,254	6,886	502	10	14,845	1	49	47	3	-
17	POL	204	7,645	7,261	524	10	15,644	1	49	47	3	-
18	TZR	220	7,946	7,572	545	10	16,293	1	49	47	3	-
19	ZAP	298	9,393	8,054	576	16	18,337	2	51	44	3	-
20	REEF	348	10,199	8,476	581	16	19,620	2	52	43	3	-
21	L-K	361	10,429	8,559	587	22	19,958	2	52	43	3	-
23	NEP(west)	377	10,836	8,758	598	22	20,591	2	53	42	3	-
23	NEP(east)	404	11,707	9,133	614	22	21,880	2	53	42	3	-
24	POL	426	12,162	9,393	645	22	22,648	2	54	41	3	-
25	TZR	447	13,054	9,708	656	22	23,887	2	55	40	3	-
26	ZAP	528	14,525	10,205	696	22	25,976	2	56	39	3	-
27	REEF	572	15,948	10,557	711	22	27,810	2	57	38	3	-
28	L-K	577	16,337	10,800	721	22	28,457	2	57	38	3	-

1/ NEP(east) = east or Morjovi side of Northeast Point; NEP(west) = west or Vostochni side of Northeast Point; TZR = Tolstoi, Zapadni Reef, and Little Zapadni; POL = Polovina and Little Polovina; ZAP = Zapadni; REEF = Reef, Gorbatch, and Ardiguen; L-K = Lukanin and Kitovi.

Table A - 3 -- Adult male seals counted, by class [1/] and rookery section, St. Paul Island, 19-21 June 1973

Rookery and class of male	Section														Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	Number														
Lukanin															
1	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0
2	19	17	-	-	-	-	-	-	-	-	-	-	-	-	36
3	18	8	-	-	-	-	-	-	-	-	-	-	-	-	26
4	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0
5	21	0	-	-	-	-	-	-	-	-	-	-	-	-	21
Kitovi [2/]															
1	0(0)	0	5	1	0	-	-	-	-	-	-	-	-	-	6
2	13(4)	5	19	28	17	-	-	-	-	-	-	-	-	-	86
3	7(9)	5	14	10	18	-	-	-	-	-	-	-	-	-	63
4	0(0)	0	0	1	0	-	-	-	-	-	-	-	-	-	1
5	0(0)	4	0	0	65	-	-	-	-	-	-	-	-	-	69
Reef															
1	4	5	3	3	0	2	0	4	1	0	0	-	-	-	22
2	32	51	36	30	41	35	24	41	42	25	18	-	-	-	375
3	13	8	7	2	16	14	0	18	9	9	7	-	-	-	103
4	0	0	0	0	1	0	0	0	0	0	2	-	-	-	3
5	0	0	0	0	214	7	0	0	0	0	15	-	-	-	236
Gorbatch															
1	3	1	1	0	2	4	-	-	-	-	-	-	-	-	11
2	52	36	28	13	22	32	-	-	-	-	-	-	-	-	183
3	18	15	12	3	13	15	-	-	-	-	-	-	-	-	76
4	0	0	0	0	1	1	-	-	-	-	-	-	-	-	2
5	3	0	0	117	0	0	-	-	-	-	-	-	-	-	120

Table A - 3. -- Adult male seals counted, by class 1/ and rookery section, St. Paul Island, 19-21 June 1973--Continued

Rookery and class of male	Section														Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	Number														
Ardiguen 3/															
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23
Morjovi 4/															
1	0(0)	0	0	0	0	0	-	-	-	-	-	-	-	-	0
2	23(24)	27	18	23	29	35	-	-	-	-	-	-	-	-	179
3	17(4)	13	9	15	19	15	-	-	-	-	-	-	-	-	92
4	0(0)	1	0	1	0	0	-	-	-	-	-	-	-	-	2
5	87(0)	0	37	0	0	56	-	-	-	-	-	-	-	-	180
Vostochni															
1	0	0	0	0	0	2	0	0	4	0	0	0	0	1	7
2	30	21	18	18	22	75	29	59	32	19	29	33	51	27	463
3	13	9	11	10	7	20	10	26	14	5	8	10	17	11	171
4	0	0	0	0	0	0	0	0	1	0	0	0	2	0	3
5	77	0	0	51	21	71	0	0	0	0	9	77	63	6	375
Little Polovina															
1	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0
2	41	21	-	-	-	-	-	-	-	-	-	-	-	-	62
3	7	7	-	-	-	-	-	-	-	-	-	-	-	-	14
4	3	2	-	-	-	-	-	-	-	-	-	-	-	-	5
5	53	0	-	-	-	-	-	-	-	-	-	-	-	-	53

Table A-3. --Adult male seals counted, by class[1/] and rookery section, St. Paul Island, 19-21 June 1973--Continued

Rookery and class of male	Section														Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	Number														
Polovina															
1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	3
2	24	16	-	-	-	-	-	-	-	-	-	-	-	-	40
3	6	2	-	-	-	-	-	-	-	-	-	-	-	-	8
4	3	4	-	-	-	-	-	-	-	-	-	-	-	-	7
5	80	0	-	-	-	-	-	-	-	-	-	-	-	-	80
Polovina Cliffs															
1	0	0	0	0	0	2	0	-	-	-	-	-	-	-	2
2	12	16	23	34	34	25	56	-	-	-	-	-	-	-	200
3	7	10	11	10	15	14	18	-	-	-	-	-	-	-	85
4	0	0	0	1	2	0	0	-	-	-	-	-	-	-	3
5	0	0	0	0	0	107	0	-	-	-	-	-	-	-	107
Tolstoi [5/]															
1	-	2	2	5	13	6	4	1	-	-	-	-	-	-	33
2	-	52	30	22	37	53	57	40	-	-	-	-	-	-	291
3	-	23	21	16	26	17	26	7	-	-	-	-	-	-	136
4	-	0	0	0	0	2	0	0	-	-	-	-	-	-	2
5	-	0	0	0	0	0	0	115	-	-	-	-	-	-	115
Zapadni Reef															
1	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0
2	15	42	-	-	-	-	-	-	-	-	-	-	-	-	57
3	13	14	-	-	-	-	-	-	-	-	-	-	-	-	27
4	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0
5	47	9	-	-	-	-	-	-	-	-	-	-	-	-	56

Table A-3.--Adult male seals counted, by class [1/] and rookery section, St. Paul Island, 19-21 June 1973--Continued

Rookery and class of male	Section														Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	Number														
Little Zapadni															
1	0	0	0	1	1	4	-	-	-	-	-	-	-	-	6
2	19	27	31	35	34	23	-	-	-	-	-	-	-	-	169
3	4	19	17	11	13	9	-	-	-	-	-	-	-	-	73
4	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0
5	0	0	0	0	0	83	-	-	-	-	-	-	-	-	83
Zapadni															
1	0	0	2	5	3	3	0	0	-	-	-	-	-	-	13
2	32	51	53	49	54	28	41	16	-	-	-	-	-	-	324
3	17	30	27	27	15	26	15	7	-	-	-	-	-	-	164
4	0	2	0	0	0	0	0	0	-	-	-	-	-	-	2
5	0	0	0	4	0	0	0	216	-	-	-	-	-	-	220

1/ Class 1 Shoreline - Full-grown males about age 10 and older without females but apparently with established territories at the high tide mark.

Class 2 Territorial without females - Full-grown males about age 10 and older without females but with established territories on the rookery.

Class 3 Territorial with females - Full-grown males about age 10 and older with females and established territories on the rookery.

Class 4 Back fringe - Full-grown and partly grown males about age 7 and older, without females and without territories, that are found along the inland fringe of the rookery.

Class 5 Hauling ground - Full-grown and partly grown males about age 7 and older, without females, that are found on traditional hauling grounds.

Class 3 males were formerly called harem bulls, and Classes 1, 2, 4, and 5 were collectively called idle bulls.

2/ Numbers in parentheses are the adult males counted in Kitovi Amphitheater.

3/ No numbered sections.

4/ Numbers in parentheses are the adult males counted on the second point south of Sea Lion Neck.

5/ Count of adult males in Section 1 is included in Section 2.

Table A- 4.--Adult male seals counted, by rookery, St. Paul Island, June 1973

Island and rookery	Date	Class of adult male[1/]					Total
		1	2	3	4	5	
		Number					
St. Paul Island	June						
Lukanin	20	0	36	26	0	21	83
Kitovi	20	6	86	63	1	69	225
Reef	19	22	375	103	3	236	739
Gorbatch	19	11	183	76	2	120	392
Ardiguen	19	3	46	24	0	23	96
Morjovi	21	0	179	92	2	180	453
Vostochni	21	7	463	171	3	375	1,019
Little Polovina	20	0	62	14	5	53	134
Polovina	20	3	40	8	7	80	138
Polovina Cliffs	20	2	200	85	3	107	397
Tolstoi	20	33	291	136	2	115	577
Zapadni Reef	21	0	57	27	0	56	140
Little Zapadni	21	6	169	73	0	83	331
Zapadni	21	13	324	164	2	210	713
Total		106	2,511	1,062	30	1,728	5,437
Sea Lion Rock							
Sivutch	18	-	[2/]302	56	0	[3/] -	358
Grand total		106	2,813	1,118	30	1,728	5,795

1/ See Table A-3 or glossary for a description of the classes of adult male seals.

2/ Includes class 1 adult male seals.

3/ Class 5 males were not counted.

Table A-5 .--Adult male seals counted, by class[1/] and rookery section, St. Paul Island, 14-15 July 1973

Rookery[2/] and class of male	Section 1	2	3	4	5	6	7	8	Total
	Number								
Tolstoi									
1	2	5	6	4	0	4	3	3	27
2	2	1	2	1	1	9	14	7	37
3	49	65	63	42	97	110	98	64	588
4	0	0	0	0	8	4	1	0	13
5	0	0	0	0	0	0	0	156	156
Zapadni Reef									
1	9	1	-	-	-	-	-	-	10
2	7	1	-	-	-	-	-	-	8
3	92	40	-	-	-	-	-	-	132
4	3	0	-	-	-	-	-	-	3
5	15	17	-	-	-	-	-	-	32
Little Zapadni									
1	2	5	1	3	5	1	-	-	17
2	3	5	5	2	2	6	-	-	23
3	28	43	60	71	60	49	-	-	311
4	0	0	1	5	2	1	-	-	9
5	2	0	0	0	0	26	-	-	28
Zapadni[3/]									
1	5(0)	3	5	9	7	10	5	1	45
2	0(0)	4	9	3	10	1	7	1	35
3	50(7)	92	93	100	66	67	64	19	558
4	2(0)	3	1	6	4	0	3	1	20
5	0(175)	0	0	0	0	0	0	188	363

1/ See Table A-3 or glossary for a description of the classes of adult male seals.

2/ Adult males were counted on selected rookeries only.

3/ Numbers in parentheses are the adult males counted on Zapadni Point Reef.

Table A-6 . --Adult male seals counted, by class[1/] and rookery section, St. George Island, 12 July 1973

Rookery and class of male	Section 1	2	3	4	5	6	Total
	Number						
Zapadni							
1	3	2	6	-	-	-	11
2	6	0	8	-	-	-	14
3	42	66	25	-	-	-	133
4	0	0	0	-	-	-	0
5	45	0	6	-	-	-	51
South							
1	3	7	7	-	-	-	17
2	4	10	7	-	-	-	21
3	66	81	65	-	-	-	212
4	0	0	0	-	-	-	0
5	19	0	0	-	-	-	19
North							
1	0	0	0	1	4	1	6
2	2	2	5	7	1	6	23
3	45	45	53	50	33	46	272
4	0	0	0	0	2	1	3
5	25	10	0	0	2	18	55
East Reef[2/]							
1	-	-	-	-	-	-	0
2	-	-	-	-	-	-	8
3	-	-	-	-	-	-	44
4	-	-	-	-	-	-	1
5	-	-	-	-	-	-	13
East Cliffs							
1	1	7	-	-	-	-	8
2	0	3	-	-	-	-	3
3	47	69	-	-	-	-	116
4	0	0	-	-	-	-	0
5	49	40	-	-	-	-	89

See footnotes at end of table.

Table A-6.--Adult male seals counted, by class[1/] and rookery section, St. George Island, 12 July 1973--Continued

Rookery and class of male	Section 1	2	3	4	5	6	Total
	Number						
Staraya Artil							
1	0	0	-	-	-	-	0
2	6	10	-	-	-	-	16
3	58	40	-	-	-	-	98
4	0	0	-	-	-	-	0
5	17	0	-	-	-	-	17

1/ See Table A-3 or glossary for a description of the classes of adult male seals.

2/ No numbered sections.

Table A-7.--Adult male seals counted, by rookery, Pribilof Islands, Alaska, July 1973

Island and rookery	Date	Class of adult male[1/] 1	2	3	4	5	Total
		Number					
St. Paul Island[2/]	July						
Tolstoi	14	27	37	588	13	156	821
Zapadni Reef	14	10	8	132	3	32	185
Little Zapadni	14	17	23	311	9	28	388
Zapadni	15	45	35	558	20	363	1,021
Total		99	103	1,589	45	579	2,415
St. George Island							
Zapadni	12	11	14	133	0	51	209
South	12	17	21	212	0	19	269
North	12	6	23	272	3	55	359
East Reef	12	0	8	44	1	13	66
East Cliffs	12	8	3	116	0	89	216
Staraya Artil	12	0	16	98	0	17	131
Total		42	85	875	4	244	1,250
Grand total		141	188	2,464	49	823	3,665

1/ See Table A-3 or glossary for a description of the classes of adult male seals.

2/ The adult male seals were counted on selected rookeries only.

Table A-8 .--Harem and idle male seals counted in mid-July, Pribilof Islands, Alaska, 1964-73

Year	St. Paul Island		St. George Island		Both islands	
	Harem	Idle	Harem	Idle	Harem	Idle
	-----Number----		----Number-----		-----Number----	
1964	9,085	7,095	1,989	1,489	11,074	8,584
1965	8,553	5,616	1,917	1,113	10,470	6,729
1966	7,974	5,839	1,974	1,017	9,948	6,856
1967	1/ 7,230	1/ 4,439	1,646	1,268	8,876	5,707
1968	1/ 6,176	1/ 3,100	1,748	1,283	7,924	4,383
1969	2/ 5,928	2/ 2,535	1,457	677	7,385	3,212
1970	4,945	1,666	1,466	803	6,411	2,469
1971	3/ 4,200	3/ 1,900	1,235	534	5,435	2,434
1972 4/	3,738	2,384	1,153	328	4,891	2,712
1973	5/ 4,906	5/ 2,550	875	375	5,781	2,925

1/ Harem and idle males on St. Paul Island were counted on Reef, Lukanin, Kitovi, Tolstoi, and Zapadni Reef Rookeries in 1967, and on Reef, Zapadni Reef, Vostochni, and Morjovi Rookeries in 1968, then extrapolated to produce counts representing all the rookeries.

2/ Includes harem and idle males counted on Sivutch Rookery (Sea Lion Rock).

3/ Harem and idle males on St. Paul Island were counted on Reef, Vostochni, Polovina Cliffs, and Zapadni Reef Rookeries in 1971. Estimates of total number were made based on these counts, the counts on all rookeries in June, and counts made on all rookeries in 1970.

4/ Values for St. Paul Island are extrapolated from July counts on Northeast Point Rookeries in 1972 and counts on Northeast Point Rookeries and total counts on St. Paul Island in 1970. Values for St. George Island are extrapolated from July counts on Zapadni and South Rookeries and counts on Zapadni and South Rookeries and the total count on St. George Island in 1971.

5/ In 1973 estimates of the total number of harem and idle males on St. Paul Island were extrapolated from counts on Zapadni, Little Zapadni, Zapadni Reef, and Tolstoi Rookeries in June and July of 1973 and on all rookeries of St. Paul Island in June 1973.

Table A-9 .--Adult male seals counted, by class,[1/] rookery, and year, St. Paul Island, Alaska, June 1966-73

Rookery and class of male	Year							
	1966	1967	1968	1969	1970	1971	1972	1973
	Number							
Lukanin								
1	13	12	8	4	10	6	2	0
2	83	93	62	51	24	22	36	36
3	67	53	45	34	59	58	39	26
4	0	4	1	2	0	0	1	0
5	84	51	15	28	45	54	44	21
Total	247	213	131	119	138	140	122	83
Kitovi								
1	22	17	31	10	5	8	7	6
2	229	211	179	156	69	96	95	86
3	193	144	122	76	137	136	96	63
4	4	4	0	2	0	0	0	1
5	102	91	49	52	45	51	66	69
Total	550	467	381	296	256	291	264	225
Reef								
1	119	72	57	77	26	33	16	22
2	852	752	616	508	401	522	431	375
3	333	272	255	222	206	110	142	103
4	0	18	42	11	29	4	4	3
5	425	241	400	175	313	229	239	236
Total	1,729	1,355	1,370	993	975	898	832	739
Gorbatch								
1	78	43	32	31	16	8	14	11
2	441	407	341	250	205	193	205	183
3	180	159	128	146	128	136	88	76
4	62	25	25	23	13	5	1	2
5	362	236	242	202	155	213	109	120
Total	1,123	870	768	652	517	555	417	392
Ardiguen								
1	8	6	2	3	1	0	6	3
2	40	49	62	59	107	46	44	46
3	53	39	42	27	43	24	38	24
4	9	0	0	0	0	0	0	0
5	50	58	50	64	62	40	47	23
Total	160	152	156	153	213	110	135	96

Table A-9 . --Adult male seals counted, by class, [1/] rookery, and year, St. Paul Island, Alaska, June 1966-73--Continued

Rookery and class of male	Year							
	1966	1967	1968	1969	1970	1971	1972	1973
	Number							
Morjovi								
1	108	41	35	30	22	13	11	0
2	452	394	309	236	167	133	129	179
3	230	189	228	160	139	124	97	92
4	3	73	21	3	5	2	0	2
5	464	249	146	191	190	160	91	180
Total	1,257	946	739	620	523	432	328	453
Vostochni								
1	92	109	67	39	23	17	15	7
2	1,019	940	804	605	420	330	373	463
3	522	333	462	360	289	254	187	171
4	18	147	11	11	1	4	5	3
5	542	557	389	306	164	194	187	375
Total	2,193	2,086	1,733	1,321	897	799	767	1,019
Little Polovina								
1	12	7	12	5	0	2	4	0
2	162	143	107	83	59	88	46	62
3	73	51	71	28	43	14	24	14
4	29	27	14	11	0	4	1	5
5	254	150	75	38	50	17	6	53
Total	530	378	279	165	152	125	81	134
Polovina								
1	75	27	8	15	3	4	3	3
2	168	150	89	89	44	51	35	40
3	65	43	68	25	31	4	13	8
4	0	25	1	1	2	0	0	7
5	253	185	177	43	61	80	41	80
Total	561	430	343	173	141	139	92	138
Polovina Cliffs								
1	48	38	52	33	15	7	19	2
2	494	408	315	295	192	245	186	200
3	202	192	256	105	150	49	70	85
4	5	68	16	3	7	4	3	3
5	81	47	74	65	58	101	67	107
Total	830	753	713	501	422	406	345	397

Table A-9 . --Adult male seals counted, by class, [1/] rookery, and year, St. Paul Island, Alaska, June 1966-73--Continued

Rookery and class of male	Year							
	1966	1967	1968	1969	1970	1971	1972	1973
	Number							
Tolstoi								
1	65	80	49	40	25	12	15	33
2	622	455	350	411	269	270	273	291
3	233	251	309	130	240	198	187	136
4	0	24	25	0	0	10	3	2
5	131	472	150	133	125	140	96	115
Total	1,051	1,282	883	714	659	630	574	577
Zapadni Reef								
1	13	13	3	3	1	7	0	0
2	142	125	72	67	43	63	59	57
3	65	52	75	46	43	41	33	27
4	0	13	3	1	0	0	3	0
5	146	64	59	4	28	38	24	56
Total	366	267	212	121	115	149	119	140
Little Zapadni								
1	70	42	27	37	15	17	10	6
2	339	328	218	219	148	166	154	169
3	150	184	234	127	175	119	108	73
4	0	28	9	18	2	12	2	0
5	133	120	84	61	44	36	45	83
Total	692	702	572	462	384	350	319	331
Zapadni								
1	149	74	55	51	42	19	18	13
2	716	611	508	465	315	296	315	324
3	275	277	357	219	251	225	167	164
4	0	82	34	10	5	12	7	2
5	521	353	300	504	202	414	338	210
Total	1,661	1,397	1,254	1,249	815	966	845	713
Grand total	12,950	11,298	9,534	7,539	6,207	5,990	5,240	5,437

1/ See Table A-3 or glossary for a description of the classes of adult male seals.

Table A-10.--Dead seal pups counted, by rookery sections, Pribilof Islands, Alaska, 20-26 August 1973

Island and rookery	Section 1	2	3	4	5	6	7	8	Total
	Number								
St. Paul Island[1/]									
Tolstoi	178	232	289	147	488	676	697	906	3,613
Little Zapadni	92	192	391	513	272	323	-	-	1,783
Zapadni Reef	209	452	-	-	-	-	-	-	661
Zapadni	176	499	744	977	433	317	506	199	3,851
Total									9,908
St. George Island									
North	217	198	177	231	99	231	-	-	1,153
Zapadni	123	150	65	-	-	-	-	-	338
South	48	41	23	-	-	-	-	-	112
East Reef[2/]	-	-	-	-	-	-	-	-	75
East Cliffs	255	176	-	-	-	-	-	-	431
Staraya Artil	411	141	-	-	-	-	-	-	552
Total									2,661

1/ Dead pups counted on selected rookeries only.

2/ No numbered sections.

Table A-11. Dead seal pups counted, [1] by rookery, Pribilof Islands, Alaska, 1964-73

Island and rookery	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
	Number									
St. Paul Island										
Morjovi	1,830	2,649	1,686	1,072	2,285	734	1,618	4,773	2,187	-
Vostochni	3,404	4,214	2,785	1,969	4,195	1,711	3,330	8,280	4,701	-
Little Polovina	631	1,132	449	233	509	200	337	1,207	372	-
Polovina Cliffs	1,097	2,856	809	825	1,616	836	1,636	5,445	1,566	-
Polovina	783	1,176	312	319	487	327	475	980	345	-
Ardiguen	102	459	160	90	118	112	75	373	161	-
Gorbatch	1,549	3,123	1,593	874	1,446	823	974	2,405	1,332	-
Reef	3,000	7,664	3,562	2,008	3,064	1,365	2,221	4,103	1,686	-
Kitovi	462	2,202	406	522	755	652	679	1,854	559	-
Lukanin	402	1,126	432	240	597	460	401	1,224	494	-
Tolstoi	2,614	3,955	3,425	2,251	3,315	2,778	3,580	5,147	3,540	3,613
Little Zapadni	1,101	2,461	1,634	1,098	1,781	798	1,386	3,223	1,686	1,783
Zapadni Reef	425	723	451	380	685	177	308	673	505	661
Zapadni	4,172	5,384	3,710	2,195	4,445	2,306	3,561	6,752	3,515	3,851
Counted total	21,572	39,124	21,414	14,076	25,298	13,279	20,581	46,439	22,649	9,908
Estimated oversight 5%	1,079	1,956	1,071	704	1,265	664	1,029	2,322	1,132	495
Total	22,651	41,080	22,485	14,780	26,563	13,943	21,610	48,761	23,781	10,403
St. George Island										
North	792	1,854	1,561	971	1,567	444	866	1,862	1,032	1,153
Zapadni	446	1,263	1,196	578	1,197	260	636	1,058	464	450
East	272	676	764	201	824	187	522	638	372	505
Staraya Artil	767	1,186	1,152	770	1,055	640	1,243	1,662	616	552
Counted total	2,277	4,979	4,673	2,520	4,643	1,531	3,267	5,220	2,484	2,661
Estimated oversight 5%	114	249	234	126	232	76	163	261	124	133
Total	2,391	5,228	4,907	2,646	4,875	1,607	3,430	5,481	2,608	2,794
Pribilof Islands counted total [3]	23,849	44,103	26,087	16,596	29,941	14,810	23,848	51,659	25,133	12,569
Estimated oversight 5%	1,193	2,205	1,305	830	1,497	740	1,192	2,583	1,256	628
Total	25,042	46,308	27,392	17,426	31,438	15,550	25,040	54,242	26,389	13,197

1/ The dead pups are counted after 15 August each year; most mortality has occurred by that date.

2/ The dead pups were counted only on selected rookeries of St. Paul Island in 1973.

3/ Not included in the total are 2,228 dead pups counted on Sea Lion Rock (Sivutch) in 1966.

Table A-12 --Seal pups marked by freeze branding, St. Paul Island, 1966-70

Year	Rookery	Marks or symbols used	Seals effectively marked	Location of marks
			---Number----	
1966	Zapadni Reef	S or $_{0}$ [1/]	40 (♂♂ and ♀♀)	Dorsal surface of front flipper (manus)
1966	Zapadni Reef	---do.---	40 (♂♂ and ♀♀)	Dorsal surface of forearm (antebrachium)
1967	Zapadni Reef	T, ⊣ , ⊥ , or ⊢ [2/]	115 (♂♂ and ♀♀)[3/]	Do.
1969	Reef	Bar (-) and angle (<) numbering system[4/]	192♂♂ and 183 ♀♀	Dorsal surface of left forearm (antebrachium) and head
1969	Gorbatch	------do.------	200♂♂ and 200 ♀♀	Do.
1970	Reef	------do.------	245♂♂ and 189 ♀♀	Dorsal surface of right forearm (antebrachium) and head
1970	Gorbatch	------do.------	246♂♂ and 218 ♀♀	Do.

1/ For photographs of branded animals, see Fur Seal Investigations, 1966, Marine Mammal Biological Laboratory, Seattle, Wash.

2/ For photograph of a branded animal, see Fur Seal Investigations, 1967, Marine Mammal Biological Laboratory, Seattle, Wash.

3/ In addition, 16 adult females were freeze branded on Kitovi Rookery with letter "U" and "S" instruments on the forearm, shoulder, chest, and rump.

4/ For system of identification symbols used, see Fur Seal Investigations, 1969, Marine Mammal Biological Laboratory, Seattle, Wash.

Table A-13.--Seal pups tagged and marked, Pribilof Islands, Alaska, 1964-73

Year	Series	St. Paul Island	St. George Island	Location of tag	Checkmarks or marks
		------Number-------			
1964	Q 1-5000		4,993	Right front flipper	Tip of right front flipper sliced off
	Q 5001-25000	19,998		-------do.------	Do.
1965	R 1-10000	10,000		Left front flipper	"V" notch near tip left front flipper
	Marked	10,007		Not tagged	"V" notch near tip right front flipper
	Marked	10,080		---do.---	Tip of 1st digit (big toe) on right hind flipper sliced off
1966	S 1-2500		2,499	Left front flipper	Tip of left front flipper sliced off
	S 2501-12500	10,000		Right front flipper	Tip of 2d digit on right hind flipper sliced off
	Marked	9,578		Not tagged	Tip of 3d digit on right hind flipper sliced off
	Marked		2,503	---do.---	Tip of 2d digit on left hind flipper sliced off
1967	T 9-2500		2,492	Right front flipper	Tip of right front flipper sliced off
	T 5001-15000	9,980		-----do.--------	Do.
1968	U 1-2500		2,475	Left front flipper	"V" notch near tip left front flipper
	U 2501-12500	9,200		------do.------	Do.
1969	Marked	20,000		Not tagged	Tip of 1st digit (big toe) on left hind flipper sliced off
	Marked		5,000	----do.--	Tip of 1st digit (big toe) on right hind flipper sliced off
1970	Marked	20,030		Not tagged	Tip of 2d digit on left hind flipper sliced off
	Marked		5,000	----do.--	Tip of 2d digit on right hind flipper sliced off
1971	Marked	19,995		Not tagged	Tip of 3d digit on left hind flipper sliced off
	Marked		5,000	----do.--	Tip of 3d digit on right hind flipper sliced off
1972	Marked	20,019		Not tagged	Tip of 1st digit (big toe) on right hind flipper sliced off
	Marked		5,000	---do.---	Tip of 1st digit (big toe) on left hind flipper sliced off
1973	Marked	20,000		Not tagged	Tip of 2d digit on right hind flipper sliced off
	Marked		5,000	---do.---	Tip of 2d digit on left hind flipper sliced off

Table A-11.--Record of tags applied[1/] to male seals selected as yearlings and as 2-year-olds on the basis of body length or size, St. Paul Island, 1961-63 and 1965-71

Age category and year	Tag series	Tag number	Effective tags[2/]
			Number
Yearlings[3/]			
1961	M	1-2000	754
1962	N	50001-51000	929
1963	O	50001-51000	799
1965	1R	1-1000	991
1966	1S	20001-21500	1,495
1967	1T	1-1500	835
1968	1U	20001-21500	714
Age 2			
1966	2S	30001-31500	1,483
1967	2T	1-1500	1,220
1968	2U	30001-31500	1,495
Ages 1-2			
1969	1V	1-3431	3,419
1970	1W	1-4000	3,779
1971	1Y	1-4000	3,992

1/ Each seal was double tagged; one tag was attached at the hairline of each front flipper. Before 1971, seals with tags that had been attached at ages 3-4 months or at ages 1-2 years were given an additional tag.

2/ Total number of seals tagged within the series.

3/ Male and female seals were intentionally tagged in 1961, 1962, 1963, and 1965. From 1966 to 1971, only male seals were selected for tagging.

Table A-15. --Marked, tagged, and lost-tag male seals recovered, by age, St. Paul Island, 25 June to 28 July 1973

Mark or tag series	Age	Marks or tags	Lost tags[1/]	Grand total
	Years	Number		
Hind flipper (LH3)[2/]	2	40	-	40
Hind flipper (RH3)[2/]	2	9	-	9
Hind flipper (LH2)[2/]	3	813	-	813
Hind flipper (RH2)[2/]	3	40	-	40
Hind flipper (LH1)[2/]	4	655	-	655
Hind flipper (RH1)[2/]	4	60	-	60
U	5	3	7	10
T	6	-	1	1

1/ Seals that had lost their tags but were recognized by a marked flipper.

2/ Seals not tagged but marked by removing part of a flipper--tip of first digit left and right hind flipper (LH1, RH1), tip of second digit left and right hind flipper (LH2, RH2), and tip of third digit left and right hind flipper (LH3, RH3).

Table A-16. --Tag recoveries[1/] from males that had been selected and tagged as yearlings in previous years, St. Paul Island, 1973

Year tagged and tag series	Age when: Tagged (Years)	Age when: Recovered (Years)	Total (Number)
1969			
1V		[2/] Unknown	1
1970			
1W	1	4	49
1W	2	5	33
1W	3	6	2
1W		[2/] Unknown	2
1971			
1Y	1	3	49
1Y	2	4	377
1Y	3	5	15
1Y		[2/] Unknown	22

1/ In addition to the seals listed, 136 males that had lost both tags were taken.

2/ The tags were recovered but age could not be determined because the flippers or the heads were separated from the carcasses during the skin-stripping process.

Table A-17.--Soviet tags recovered in the United States kill of fur seals, St. Paul Island, 25 June to 28 July 1973

Date	Tag number	Age	Sex	Island of tagging	Rookery of recovery
		Years			
12 July	EM-1925, EM1926	2	M	Medny	Zapadni
27 July	EM-6203	2	M	Medny	Reef
23 July	CB-220	3	M	Bering	Northeast Point
25 July	CB-4373	3	M	Bering	Tolstoi-Zapadni Reef
26 July	CB-4505	3	M	Bering	Zapadni
25 July	CB-7214, CB-7228	3	M	Bering	Tolstoi-Zapadni Reef
23 July	CB-7313, CB-7337	3	M	Bering	Northeast Point
29 June	CB-8337, CB-8385	3	M	Bering	Reef
5 July	CM-327, CM-328	3	M	Medny	Zapadni
26 July	CM-6439	3	M	Medny	Zapadni
19 July	CM-7897	3	M	Medny	Zapadni
23 July	CM-8061	3	M	Medny	Northeast Point
26 June	CM-8991	3	M	Medny	Polovina
12 July	BB-2988	4	M	Bering	Zapadni
9 July	BB-3472	4	M	Bering	Northeast Point
25 June	BM-323, BM-324	4	M	Medny	Northeast Point
6 July	BM-9516	4	M	Medny	Reef
12 July	BM-9595	4	M	Medny	Zapadni
16 July	BT-4266	4	M	Robben	Northeast Point

Table B-1.--List of chart units occupied by a research vessel in eastern Bering Sea, 18-31 July 1973, showing hours in unit, seals seen per hour, and number of seals seen and collected[1/]

Square	Hours in unit	Seals seen per hour	Seals	
			Seen	Collected
	Number	Number	Number	Number
H137-V294	1.8	2.2	4	3
H137-V295	3.0	1.6	5	1
H137-V296	4.0	1.0	4	3
H138-V295	1.9	3.1	6	0
H138-V296	1.3	0.7	1	0
H141-V307	5.9	17.9	106	45
H142-V308	1.6	26.2	42	1
H142-V309	1.8	7.2	13	3
H143-V310	1.8	3.3	6	0
H144-V310	7.5	4.6	35	17
H144-V318	0.9	6.6	6	3
H144-V319	1.5	2.0	3	2
H144-V320	1.6	4.3	7	5
H145-V310	1.8	3.8	7	6
H145-V320	6.6	7.2	48	25
H145-V321	8.8	7.6	67	29
H145-V322	3.1	3.8	12	6
H145-V323	0.9	2.2	2	2
H145-V324	1.6	6.8	11	3
H145-V325	1.6	3.7	6	2
H146-V318	0.2	0.0	0	0
H146-V319	0.4	0.0	0	0
H146-V320	0.8	0.0	0	0
H146-V321	3.2	5.6	18	3
H146-V323	0.7	2.8	2	1
H146-V325	1.7	3.5	6	3
H146-V330	1.6	2.5	4	0
H147-V312	0.3	10.0	3	0
H147-V313	0.2	0.0	0	0
H147-V321	2.5	3.2	8	4
H147-V326	1.8	2.2	4	0
H147-V327	1.0	5.0	5	1

1/ See footnote at end of table.

Table B-1. --List of chart units occupied by a research vessel in eastern Bering Sea, 18-31 July 1973, showing hours in unit, seals seen per hour, and number of seals seen and collected[1/]--Continued

Square	Hours in unit	Seals seen per hour	Seals	
			Seen	Collected
	Number	Number	Number	Number
H147-V328	2.0	6.5	13	5
H147-V329	3.0	5.6	17	3
H147-V330	2.0	5.5	11	1
H148-V311	2.4	2.5	6	0
H148-V312	2.5	4.8	12	1
H148-V313	0.7	2.8	2	0
H148-V314	1.0	0.0	0	0
H148-V326	0.9	1.1	1	0
H148-V329	0.8	5.0	4	2
H148-V330	1.7	2.9	5	2
H151-V308	0.9	1.1	1	0
H151-V309	0.9	2.2	2	0
H151-V310	1.0	1.0	1	0
H151-V311	0.6	3.3	2	1
H151-V312	0.8	0.0	0	0
H151-V313	0.7	1.4	1	0
H151-V314	0.7	2.8	2	0
H152-V315	0.8	0.0	0	0
H152-V316	3.0	4.0	12	6

1/ The base chart is USCGS No. 8802. The sides of each unit are 10 minutes of latitude by 10 minutes of longitude. The units are located by a system of vertical column and horizontal row numbers. Vertical column numbering begins at the lower right corner of chart (fig. 7) and horizontal row numbering begins at the lower left corner.

Table B-2.--List of chart units occupied by a research vessel in eastern Bering Sea, 1-31 August 1973, showing hours in unit, seals seen per hour, and number of seals seen and collected[1/]

Square	Hours in unit	Seals seen per hour	Seals	
			Seen	Collected
	Number	Number	Number	Number
H134-V297	0.2	5.0	1	0
H134-V298	1.0	9.0	9	0
H135-V298	1.2	10.8	13	0
H135-V299	0.3	6.6	2	0
H136-V299	1.2	15.0	18	0
H137-V299	0.3	16.6	5	0
H137-V300	0.8	18.7	15	0
H138-V300	0.7	4.2	3	0
H138-V301	0.4	5.0	2	0
H139-V301	1.1	20.0	22	0
H139-V302	0.2	15.0	3	0
H140-V302	1.2	3.3	4	0
H141-V302	0.3	3.3	1	0
H141-V303	0.8	6.2	5	0
H141-V305	1.1	5.4	6	0
H141-V306	0.1	0.0	0	0
H142-V303	0.7	11.4	8	0
H142-V304	0.5	14.0	7	0
H142-V306	0.7	4.2	3	0
H143-V304	0.2	15.0	3	0
H143-V306	0.7	2.8	2	0
H143-V307	0.2	25.0	5	0
H143-V308	0.8	2.5	2	0
H143-V309	0.2	0.0	0	0
H144-V309	0.8	12.5	10	0
H144-V310	0.5	28.0	14	0
H144-V312	0.2	0.0	0	0
H144-V313	1.0	5.0	5	0
H144-V314	0.8	10.0	8	2
H144-V315	2.9	5.1	15	3
H144-V318	2.0	6.0	12	4
H144-V319	2.2	4.0	9	5

1/ See footnote at end of table.

Table B-2.--List of chart units occupied by a research vessel in eastern Bering Sea, 1-31 August 1973, showing hours in unit, seals seen per hour, and number of seals seen and collected[1/]--Continued

Square	Hours in unit	Seals seen per hour	Seals	
			Seen	Collected
	Number	Number	Number	Number
H144-V320	0.5	8.0	4	1
H144-V321	0.8	3.7	3	1
H145-V308	0.5	2.0	1	0
H145-V309	1.1	8.1	9	5
H145-V310	2.6	6.1	16	5
H145-V311	0.8	3.7	3	0
H145-V312	0.5	32.0	16	0
H145-V315	1.3	3.0	4	1
H145-V316	1.8	8.8	16	4
H145-V317	2.4	4.1	10	4
H145-V318	3.1	5.1	16	7
H145-V319	2.0	6.0	12	5
H145-V320	0.6	1.6	1	0
H145-V321	2.4	5.8	14	5
H145-V322	2.2	4.5	10	4
H146-V309	1.1	6.3	7	3
H146-V310	2.1	5.7	12	8
H146-V311	1.2	6.6	8	1
H146-V312	4.4	6.3	28	3
H146-V313	3.0	9.3	28	4
H146-V314	2.3	6.0	14	3
H146-V315	0.3	3.3	1	0
H146-V318	0.2	0.0	0	0
H146-V319	0.1	10.0	1	1
H146-V320	0.2	5.0	1	0
H146-V321	0.4	7.5	3	1
H146-V322	0.5	4.0	2	0
H146-V323	2.7	5.9	16	5
H146-V324	5.6	4.6	26	12
H146-V325	4.7	5.7	27	9
H146-V326	2.8	7.1	20	10
H146-V327	0.9	4.4	4	2

1/ See footnote at end of table.

Table B-2.--List of chart units occupied by a research vessel in eastern Bering Sea, 1-31 August 1973, showing hours in unit, seals seen per hour, and number of seals seen and collected[1/]--Continued

Square	Hours in unit	Seals seen per hour	Seals	
			Seen	Collected
	Number	Number	Number	Number
H147-V313	0.6	6.6	4	0
H147-V314	0.8	3.7	3	0
H147-V322	0.2	5.0	1	0
H147-V323	3.0	3.6	11	8
H147-V324	1.0	5.0	5	4
H147-V325	1.0	3.0	3	2
H147-V326	3.0	6.0	18	8
H147-V327	2.5	3.6	9	2
H147-V329	4.0	5.2	21	8
H147-V330	1.3	5.3	7	3
H148-V315	0.5	42.0	21	0
H148-V320	0.2	5.0	1	0
H148-V321	0.8	8.7	7	3
H148-V322	1.1	2.7	3	0
H148-V323	2.2	2.7	6	3
H148-V328	3.9	6.1	24	6
H148-V329	0.2	0.0	0	0
H148-V331	3.4	3.8	13	3
H148-V332	1.5	3.3	5	4
H148-V333	1.8	3.3	6	1
H149-V323	2.8	8.9	25	7
H149-V324	0.4	0.0	0	0
H149-V325	0.7	0.0	0	0
H149-V326	0.5	0.0	0	0
H149-V327	0.7	1.4	1	0
H149-V328	1.1	1.8	2	1
H149-V329	2.4	3.3	8	3
H149-V330	0.8	0.0	0	0
H149-V331	0.7	0.0	0	0
H149-V332	0.8	2.5	2	0
H149-V333	1.2	1.6	2	1
H149-V334	0.5	4.0	2	1

1/ See footnote at end of table.

Table B-2.--List of chart units occupied by a research vessel in eastern Bering Sea, 1-31 August 1973, showing hours in unit, seals seen per hour, and number of seals seen and collected[1/]--Continued

Square	Hours in unit	Seals seen per hour	Seals	
			Seen	Collected
	Number	Number	Number	Number
H150-V313	1.5	3.3	5	2
H150-V323	1.8	3.3	6	5
H150-V324	0.4	0.0	0	0
H150-V327	1.3	3.8	5	1
H150-V328	2.4	5.4	13	2
H151-V313	1.2	0.8	1	1
H151-V324	0.5	8.0	4	1
H151-V325	0.5	4.0	2	0
H151-V326	0.7	5.7	4	0
H151-V327	1.7	7.0	12	5
H151-V328	0.8	5.0	4	0
H152-V307	0.2	0.0	0	0
H152-V308	0.4	0.0	0	0
H152-V309	0.7	0.0	0	0
H152-V310	0.8	3.7	3	0
H152-V311	0.6	3.3	2	0
H152-V312	0.5	2.0	1	0
H152-V313	1.5	2.6	4	0
H152-V314	0.6	0.0	0	0
H152-V315	0.2	0.0	0	0
H152-V325	0.8	3.7	3	1
H152-V326	1.1	6.3	7	3
H152-V327	1.6	5.0	8	2
H152-V328	1.8	7.2	13	1
H153-V327	0.7	4.2	3	1
H153-V328	1.0	3.0	3	0
H153-V329	0.3	0.0	0	0
H154-V313	1.8	0.0	0	0
H154-V322	0.5	2.0	1	0
H154-V329	0.4	2.5	1	0
H154-V330	1.8	2.7	5	1
H155-V313	1.0	0.0	0	0

1/ See footnote at end of table.

Table B-2.--List of chart units occupied by a research vessel in eastern Bering Sea, 1-31 August 1973, showing hours in unit, seals seen per hour, and number of seals seen and collected[1/]--Continued

Square	Hours in unit	Seals seen per hour	Seals	
			Seen	Collected
	Number	Number	Number	Number
H155-V321	3.2	4.0	13	3
H155-V322	4.4	4.5	20	14
H155-V323	1.0	5.0	5	1
H155-V324	0.8	5.0	4	2
H155-V325	0.8	3.7	3	1
H155-V326	1.8	2.2	4	2
H155-V328	1.0	1.0	1	0
H155-V329	1.2	5.8	7	4
H156-V313	1.0	0.0	0	0
H156-V319	1.2	0.8	1	1
H156-V320	1.1	2.7	3	2
H156-V321	0.9	2.2	2	1
H156-V322	0.2	50.0	10	3
H156-V324	2.8	3.9	11	5
H156-V325	1.1	4.5	5	0
H156-V326	1.6	3.7	6	2
H156-V327	0.5	0.0	0	0
H156-V328	1.3	2.3	3	2
H156-V329	1.0	3.0	3	2
H157-V313	1.5	0.0	0	0
H157-V315	0.7	0.0	0	0
H157-V316	0.6	0.0	0	0
H157-V317	0.6	0.0	0	0
H157-V318	0.8	0.0	0	0
H157-V319	1.2	5.8	7	1
H157-V324	1.4	5.0	7	0
H157-V325	0.8	3.7	3	2
H157-V327	1.4	5.0	7	2

1/ The base chart is USCGS No. 8802. The sides of each unit are 10 minutes of latitude by 10 minutes of longitude. The units are located by a system of vertical column and horizontal row numbers. Vertical column numbering begins at the lower right corner of chart (fig. 8) and horizontal row numbering begins at the lower left corner.

Table B-3.--List of chart units occupied by a research vessel in eastern Bering Sea, 1-11 September 1973, showing hours in unit, seals seen per hour, and number of seals seen and collected[1/]

Square	Hours in unit	Seals seen per hour	Seals	
			Seen	Collected
	Number	Number	Number	Number
H144-V311	0.8	6.2	5	1
H145-V311	1.8	9.4	17	12
H146-V312	4.4	10.9	48	22
H146-V313	0.8	10.0	8	5
H147-V313	0.8	6.2	5	3
H149-V327	1.2	14.1	17	12
H150-V324	1.2	10.8	13	7
H150-V325	1.5	10.0	15	7
H150-V326	0.3	6.6	2	0
H150-V327	2.2	17.2	38	23
H150-V328	0.7	48.5	34	0
H150-V329	2.7	22.5	61	22
H150-V330	1.3	7.6	10	7
H151-V330	1.2	5.8	7	4
H151-V331	2.6	10.3	27	11
H151-V332	0.7	5.7	4	3
H152-V332	2.6	5.3	14	3
H153-V333	2.6	8.4	22	13
H154-V319	3.0	21.6	65	4
H154-V320	1.0	5.0	5	2
H154-V321	0.2	5.0	1	0
H154-V333	2.8	6.4	18	13
H155-V319	2.0	40.0	80	2
H155-V321	2.2	11.8	26	8
H155-V327	0.6	3.3	2	0
H155-V328	1.0	4.0	4	2
H155-V329	0.9	5.5	5	3
H155-V330	0.8	2.5	2	2
H155-V333	0.7	5.7	4	0
H155-V334	1.2	3.3	4	1

1/ See footnote at end of table.

Table B-3.--List of chart units occupied by a research vessel in eastern Bering Sea, 1-11 September 1973, showing hours in unit, seals seen per hour, and number of seals seen and collected[1/]--Continued

Square	Hours in unit	Seals seen per hour	Seals	
			Seen	Collected
	Number	Number	Number	Number
H156-V319	1.2	22.5	27	0
H156-V320	0.3	16.6	5	0
H156-V321	2.7	5.9	16	10
H156-V322	0.6	5.0	3	0
H156-V326	0.5	6.0	3	1
H156-V327	0.2	0.0	0	0
H156-V330	0.2	10.0	2	1
H156-V331	1.0	4.0	4	2
H156-V332	0.8	2.5	2	0
H156-V333	1.2	1.6	2	0
H156-V334	0.9	4.4	4	3
H156-V335	0.5	2.0	1	0
H157-V319	3.0	9.3	28	9
H157-V320	1.0	10.0	10	4
H158-V320	1.2	5.8	7	1

1/ The base chart is USCGS No. 8802. The sides of each unit are 10 minutes of latitude by 10 minutes of longitude. The units are located by a system of vertical column and horizontal row numbers. Vertical column numbering begins at the lower right corner of chart (fig. 9) and horizontal row numbering begins at the lower left corner.

Table B-4. --Total seals shot, percentage collected, wounded and lost, and killed and lost between California and the Bering Sea, 1958-73

Year	Total seals shot	Seals shot					
		Collected		Wounded and lost		Killed and lost	
	Number	Number	Percent	Number	Percent	Number	Percent
1958	2,060	1,503	73.0	302	14.6	255	12.4
1959	2,150	1,548	72.0	316	14.7	286	13.3
1960	2,007	1,495	74.5	271	13.5	241	12.0
1961	1,652	1,352	81.8	176	10.7	124	7.5
1962	1,794	1,483	82.7	178	9.9	133	7.4
1963	1,700	1,355	79.7	202	11.9	143	8.4
1964	1,048	883	84.3	97	9.3	68	6.4
1965	514	419	81.5	50	9.7	45	8.8
1966	589	444	75.4	78	13.2	67	11.4
1967[1/]	181	132	72.9	27	14.9	22	12.2
1968[2/]	1,000	830	83.0	66	6.6	104	10.4
1969	417	334	80.1	41	9.8	42	10.1
1970	552	405	73.4	78	14.1	69	12.5
1971	460	353	76.7	44	9.6	63	13.7
1972	320	257	80.3	19	5.9	44	13.8
1973	850	675	79.4	56	6.6	119	14.0
Total	17,294	13,468	77.9	2,001	11.6	1,825	10.6

1/ Includes 16 days during November and December 1966.

2/ Includes 25 days during November and December 1967.

Table B-5.--Total seals sighted, collected, wounded and lost, and killed and lost between California and the Bering Sea, 1958-73

Year	Total seals sighted[1/]	Sighted seals					
		Collected		Wounded and lost		Killed and lost	
	Number	Number	Percent	Number	Percent	Number	Percent
1958	7,024	1,503	21.4	302	4.3	255	3.6
1959	5,919	1,548	26.2	316	5.3	286	4.8
1960	6,287	1,495	23.8	271	4.3	241	3.8
1961	3,415	1,352	40.0	176	5.2	124	3.6
1962	6,111	1,483	24.3	178	2.9	133	2.2
1963	5,790	1,355	23.4	202	3.5	143	2.5
1964	2,864	883	30.8	97	3.4	68	2.4
1965	1,627	419	27.8	50	3.1	45	2.8
1966	2,704	444	16.4	78	2.9	67	2.5
1967[2/]	897	132	14.7	27	3.0	22	2.5
1968[3/]	2,587	830	32.1	66	2.6	104	4.0
1969	1,136	334	29.4	41	3.6	42	3.7
1970	1,983	405	20.4	78	3.9	69	3.5
1971	1,323	353	26.7	44	3.3	63	4.8
1972	849	257	30.3	19	2.2	44	5.2
1973	2,386	675	28.3	56	2.3	119	5.4
Total	52,902	13,468	25.4	2,001	3.8	1,825	3.4

1/ Not all seals sighted are hunted.
2/ Includes 16 days during November and December 1966.
3/ Includes 25 days during November and December 1967.

Table B-6 .--Number of seals per group among 2,430 seals sighted in the eastern Bering Sea, 26 June to 16 September 1973

Number of seals in group	Group	Seals	
	Number	Number	Percent
1	1,423	1,423	58.6
2	307	614	25.3
3	82	246	10.1
4	19	76	3.1
5	2	10	0.4
6	3	18	0.7
7	2	14	0.6
9	1	9	0.4
10	2	20	0.8
Total	1,841	2,430	100.0

Note: These numbers do not include a sighting of 393 seals (actual count) around the vessel at 0650 on 21 July, nor an estimated 100-150 at 0700 on 4 September.

Table B-7.--Number of seals collected, and number collected per boat-hunting day, by 10-day periods, [1] eastern Bering Sea, 18 July to 11 September 1973

Period	Boat hunting days[2]	Seals collected			Seals collected per boat-hunting day	
		Males	Females	Total	Number	Percent
	----------	----------	Number	---------		
18-20 July	1.00	2	5	7	0.7	1.0
21-31 July	8.50	14	168	182	21.4	27.0
1-10 Aug.	7.50	15	69	84	11.2	12.5
11-20 Aug.	3.25	5	33	38	11.7	5.6
21-31 Aug.	6.75	18	122	140	20.7	20.8
1-10 Sept.	5.50	19	198	217	39.4	32.2
11 Sept.	0.25	0	6	6	24.0	0.9
Total	32.75	73	601	[3]675	20.6	100.0

1/ The first and last periods were less than 10 days.

2/ A boat-hunting day is a day in which a vessel is used for 8 hours or more; units of boat-hunting days are 0.25, 0.50, 0.75, and 1.00.

3/ Total includes one female collected 1 July.

Table B-8 .--Number of seals seen, and number seen per boat-hunting day, by 10-day periods, 1/ eastern Bering Sea, 18 July to 11 September 1973

Period	Boat-hunting days 2/	Total seals seen	Seals seen per boat-hunting day	Seals seen per 10-day interval
	----------Number----------			Percent
18-20 July	1.00	20	20.0	1.1
21-31 July	8.50	513	60.4	29.1
1-10 Aug.	7.50	298	39.7	16.9
11-20 Aug.	3.25	124	38.2	7.0
21-31 Aug.	6.75	362	53.6	20.5
1-10 Sept.	5.50	430	78.2	24.4
11 Sept.	0.25	18	72.0	1.0
Total	32.75	1,765	53.9	100.0

1/ The first and last periods were less than 10 days.

2/ A boat-hunting day is one in which a vessel is used for 8 hours or more; units of boat-hunting days are 0.25, 0.50, 0.75, and 1.00.

Table B-9.--Monthly mean lengths of nonpregnant female seals collected pelagically by the United States in the Bering Sea, 18 July to 11 September 1973[1/]

Age	July		August		September		Combined length		
	Seals	Mean length	Seals	Mean length	Seals	Mean length	Seals	Mean	Standard deviation
Years	Number	Cm.	Number	Cm.	Number	Cm.	Number	Cm.	Cm.
2	-	-	4	97.5	6	101.0	10	99.6	4.35
3	1	112.0	14	107.4	21	106.6	36	107.1	5.04
4	3	112.3	14	113.6	16	113.1	33	113.2	4.89
5	1	106.0	5	112.6	11	114.5	17	113.5	6.15
6	5	122.6	5	120.6	3	120.7	13	121.4	3.75
7	4	125.0	3	122.3	1	116.0	8	122.9	5.59
8	1	128.0	1	123.0	-	-	2	125.5	-
9	4	120.3	1	116.0	1	130.0	6	121.2	5.49
10	1	124.0	2	120.5	1	128.0	4	123.3	-
11	-	-	1	120.0	-	-	1	120.0	-
12	2	126.5	-	-	1	131.0	3	128.0	-
13	1	123.0	1	125.0	-	-	2	124.0	-
16	-	-	-	-	1	127.0	1	127.0	-
18	-	-	5	129.6	-	-	5	129.6	5.46
20	-	-	-	-	2	130.5	2	130.5	-
Unknown	-	-	1	112.0	-	-	1	112.0	-
Total	23		57		64		144		

1/ Includes one 8-year-old seal collected 1 July 1973.

Table B-10.--Monthly mean weights of nonpregnant female seals collected pelagically by the United States in the Bering Sea, 18 July to 11 September 1973[1/]

Age	July		August		September		Combined weight		
	Seals	Mean weight	Seals	Mean weight	Seals	Mean weight	Seals	Mean	Standard deviation
Years	Number	Kg.	Number	Kg.	Number	Kg.	Number	Kg.	Kg.
2	-	-	4	17.3	6	19.3	10	18.5	2.27
3	1	26.0	14	22.6	21	21.4	36	22.0	3.54
4	3	26.3	14	26.4	16	25.8	33	26.1	3.96
5	1	26.0	5	24.2	11	27.5	17	26.5	3.32
6	5	32.4	5	30.4	3	34.0	13	32.0	2.45
7	4	33.8	3	32.7	1	24.0	8	32.1	4.45
8	1	35.0	1	34.0	-	-	2	34.5	-
9	4	34.0	1	31.0	1	32.0	6	33.2	3.49
10	1	33.0	2	30.5	1	46.0	4	35.0	-
11	-	-	1	32.0	-	-	1	32.0	-
12	2	39.5	-	-	1	41.0	3	40.0	-
13	1	34.0	1	30.0	-	-	2	32.0	-
16	-	-	-	-	1	43.0	1	43.0	-
18	-	-	5	45.8	-	-	5	45.8	7.09
20	-	-	-	-	2	44.5	2	44.5	-
Unknown	-	-	1	25.0	-	-	1	25.0	-
Total	23		57		64		144		

1/ Includes one 8-year-old seal collected 1 July 1973.

Table B-11. --Monthly mean lengths of post partum female seals collected pelagically by the United States in the Bering Sea, 18 July to 11 September 1973

	July		August		September		Combined length		
Age	Seals	Mean length	Seals	Mean length	Seals	Mean length	Seals	Mean	Standard deviation
Years	Number	Cm.	Number	Cm.	Number	Cm.	Number	Cm.	Cm.
4	1	123.0	4	114.8	1	121.0	6	117.2	6.74
5	6	119.7	14	114.5	6	118.8	26	116.7	5.64
6	18	119.1	21	120.1	15	121.9	54	120.3	6.96
7	16	121.3	22	120.6	20	123.9	58	121.9	5.13
8	19	121.3	16	124.8	14	122.0	49	122.7	4.40
9	19	122.8	17	124.4	15	123.7	51	123.6	5.33
10	14	125.0	12	123.8	17	125.6	43	124.9	4.87
11	12	124.8	11	126.2	16	126.6	39	125.9	4.04
12	11	125.2	16	125.8	9	124.2	36	125.2	5.11
13	9	125.0	12	125.0	8	125.5	29	125.1	6.72
14	8	122.0	5	126.4	7	125.7	20	124.4	5.80
15	6	129.5	8	125.9	5	126.2	19	127.1	8.21
16	5	125.4	6	127.0	6	126.3	17	126.3	8.59
17	4	126.8	-	-	-	-	4	126.8	-
18	1	127.0	-	-	-	-	1	127.0	-
19	-	-	2	132.5	-	-	2	132.5	-
Unknown	-	-	-	-	1	117.0	1	117.0	-
Total	149		166		140		455		

Table B-12. --Monthly mean weights of post partum female seals collected pelagically by the United States in the Bering Sea, 18 July to 11 September 1973

Age	July		August		September		Combined weight		
	Seals	Mean weight	Seals	Mean weight	Seals	Mean weight	Seals	Mean	Standard deviation
Years	Number	Kg.	Number	Kg.	Number	Kg.	Number	Kg.	Kg.
4	1	28.0	4	26.3	1	35.0	6	28.0	7.18
5	6	31.8	14	27.8	6	31.5	26	29.6	6.20
6	18	29.3	21	32.3	15	33.5	54	31.7	4.99
7	16	30.4	22	31.9	20	35.8	58	32.8	5.41
8	19	32.6	16	35.3	14	37.3	49	34.8	4.27
9	19	33.8	17	37.4	15	36.2	51	35.7	4.68
10	14	34.0	12	37.7	17	37.4	43	36.3	4.82
11	12	36.9	11	38.5	16	40.0	39	38.6	4.37
12	11	35.8	16	39.9	9	39.6	36	38.6	5.76
13	8	34.9	12	39.9	8	40.8	28	38.7	6.63
14	8	34.4	5	37.2	7	39.4	20	36.9	5.81
15	6	42.3	8	40.9	5	41.4	19	41.5	3.84
16	5	39.2	6	43.0	5	45.0	16	42.4	6.26
17	4	39.8	-	-	-	-	4	39.8	-
18	1	37.0	-	-	-	-	1	37.0	-
19	-	-	2	48.0	-	-	2	48.0	-
Unknown	-	-	-	-	1	29.0	1	29.0	-
Total	148		166		139		453		

Table B-13.--Monthly mean lengths of male seals collected pelagically by the United States in the Bering Sea, 18 July to 11 September 1973

Age	July		August		September		Combined length		
	Seals	Mean length	Seals	Mean length	Seals	Mean length	Seals	Mean	Standard deviation
Years	Number	Cm.	Number	Cm.	Number	Cm.	Number	Cm.	Cm.
2	3	104.3	12	106.7	4	105.5	19	106.1	3.87
3	7	113.6	15	111.9	10	116.3	32	113.7	6.51
4	5	123.4	9	123.7	4	121.3	18	123.1	6.92
6	-	-	1	141.0	-	-	1	141.0	-
7	1	146.0	-	-	-	-	1	146.0	-
8	-	-	2	166.0	1	181.0	3	171.0	-
Total	16		39		19		74		

Table B-14.--Monthly mean weights of male seals collected pelagically by the United States in the Bering Sea, 18 July to 11 September 1973

	July		August		September		Combined weight		
Age	Seals	Mean weight	Seals	Mean weight	Seals	Mean weight	Seals	Mean	Standard deviation
Years	Number	Kg.	Number	Kg.	Number	Kg.	Number	Kg.	Kg.
2	3	21.0	12	22.3	4	21.5	19	21.9	2.60
3	7	26.7	14	25.4	10	31.9	31	27.8	7.22
4	5	34.4	9	31.9	4	36.5	18	33.6	9.01
6	-	-	1	65.0	-	-	1	65.0	-
7	1	65.0	-	-	-	-	1	65.0	-
8	-	-	2	105.0	1	135.0	3	115.0	26.46
Total	16		38		19		73		

Table B-15.--Monthly mean lengths and weights of pregnant female seals collected pelagically by the United States in the Bering Sea, 18 July to 11 September 1973

	July		
Age	Seals	Mean length	Mean weight
Years	Number	Cm.	Kg.
5	1	119.0	40.0
10	1	129.0	46.0
Total	2		

Table B-16. --Monthly mean lengths and weights of fur seal fetuses collected pelagically by the United States in the Bering Sea, 18 July to 11 September 1973

Period	Male			Female		
	Fetuses	Mean length	Mean weight	Fetuses	Mean length	Mean weight
	Number	Cm.	Kg.	Number	Cm.	Kg.
11-20 July	-	-	-	2	59.8	5.2

Table B-17.--Pregnancy rates of female seals collected pelagically by the United States in the eastern Bering Sea, 18 July to 11 September 1973

Age	July			August			September			Combined data	
	Seals	Pregnant		Seals	Pregnant		Seals	Pregnant		July-Sept. Pregnant	1958-73 pelagic collections Pregnant
Years	Number	Number	Percent	Number	Number	Percent	Number	Number	Percent	Percent	Percent
3	1	-	0.0	14	-	0.0	21	-	0.0	0.0	0.3
4	4	1	25.0	19	4	21.0	17	1	5.9	15.0	3.4
5	8	7	87.5	19	14	73.7	17	6	35.3	59.1	38.0
6	23	18	78.3	26	21	80.7	18	15	83.3	80.6	71.9
7	20	16	80.0	25	22	88.0	21	20	95.2	87.8	80.0
8	20[1/]	19	95.0	17	16	94.1	14	14	100.0	96.1	86.3
9	23	19	82.6	18	17	94.4	16	15	93.8	89.5	86.7
10	16	15	93.8	14	12	85.7	18	17	94.4	89.6	88.2
11	12	12	100.0	12	11	91.7	16	16	100.0	97.5	89.0
12	13	11	84.6	16	16	100.0	10	9	90.0	92.3	87.9
13	10	9	90.0	13	12	92.3	8	8	100.0	93.6	86.7
14	8	8	100.0	5	5	100.0	7	7	100.0	100.0	83.7
15	6	6	100.0	8	8	100.0	5	5	100.0	100.0	82.6
16	5	5	100.0	6	6	100.0	7	6	85.7	94.4	80.5
17	4	4	100.0	-	-	-	-	-	-	100.0	68.1
18	1	1	100.0	5	-	0.0	-	-	-	16.7	66.3
19	-	-	-	2	2	100.0	-	-	-	100.0	54.6
20	-	-	-	-	-	-	2	-	0.0	0.0	47.8
Unknown	-	-	-	1	-	0.0	1	1	100.0	50.0	58.6

Table B-18. --Reproductive condition of female seals collected pelagically by the United States in the eastern Bering Sea, 18 July to 11 September 1973

Age	Sample size	Immature	Mature		
			Ovulated		Not ovulated
			Pregnant	Nonpregnant 1/	
			July		
3	1	1	-	-	-
4	4	3	1	-	-
5	8	1	7	-	-
6	23	5	18	-	-
7	20	4	16	-	-
8	20	-	19	1 [1-A]	-
9	23	-	19	-	4
10	16	-	15	-	1
11	12	-	12	-	-
12	13	-	11	-	2
13	10	-	9	-	1
14	8	-	8	-	-
15	6	-	6	-	-
16	5	-	5	-	-
17	4	-	4	-	-
18	1	-	1	-	-
Total	174	14	151	1	8
			August		
2	4	4	-	-	-
3	14	14	-	-	-
4	18	14	4	-	-
5	19	5	14	-	-
6	26	5	21	-	-
7	25	1	22	-	2
8	17	1	16	-	-
9	18	1	17	-	-
10	14	-	12	-	2
11	12	-	11	-	1
12	16	-	16	-	-
13	13	-	12	-	1
14	5	-	5	-	-
15	8	-	8	-	-
16	6	-	6	-	-
18	5	-	-	-	5
19	2	-	2	-	-
Unknown	1	1	-	-	-
Total	223	46	166	-	11

See footnote at end of table.

Table B-18. --Reproductive condition of female seals collected pelagically by the United States in the eastern Bering Sea, 18 July to 11 September 1973--Continued

Age	Sample size	Immature	Mature		
			Ovulated		Not ovulated
			Pregnant	Nonpregnant 1/	
			September		
2	6	6	-	-	-
3	21	21	-	-	-
4	17	16	1	-	-
5	17	11	6	-	-
6	18	3	15	-	-
7	21	1	20	-	-
8	14	-	14	-	-
9	16	-	15	-	1
10	18	-	17	-	1
11	16	-	16	-	-
12	10	-	9	-	1
13	8	-	8	-	-
14	7	-	7	-	-
15	5	-	5	-	-
16	7	-	6	-	1
20	2	-	-	-	2
Unknown	1	-	1	-	-
Total	204	58	140	-	6
			July-September		
2	10	10	-	-	-
3	36	36	-	-	-
4	39	33	6	--	-
5	44	17	27	-	-
6	67	13	54	-	-
7	66	6	58	-	2
8	51	1	49	1 [1-A]	-
9	57	1	51	-	5
10	48	-	44	-	4
11	40	-	39	-	1
12	39	-	36	-	3
13	31	-	29	-	2
14	20	-	20	-	-
15	19	-	19	-	-
16	18	-	17	-	1
17	4	-	4	-	-
18	6	-	1	-	5
19	2	-	2	-	-
20	2	-	-	-	2
Unknown	2	1	1	-	-
Total	601	118	457	1	25

1/ The nonpregnant ovulated columns include seals that aborted a conceptus (indicated [number-A] thus).

Appendix C

PERSONS ENGAGED IN FUR SEAL RESEARCH IN 1973

Name	Affiliation	Work
Permanent employees		
George Y. Harry, Jr.	MMD	Division Director
Alton Y. Roppel	--do.--	Seal research, Mgmt. & Monitoring
Patrick Kozloff	--do--	Do.
James H. Johnson	--do--	Seal research, behavior
Clifford H. Fiscus	--do--	Do.
William M. Marquette	--do--	Do.
Robert H. Lander	--do--	Seal research, population dynamics
Hiroshi Kajimura	--do--	Seal research, pelagic
Gerald A. Sanger	--do--	Do.
Richard L. Foust	--do--	Do.
Mark C. Keyes	--do--	Seal research, physiology and medicine
Lavrenty Stepetin	St. Paul Is. resident	Seal research, Mgmt. & Monitoring
Temporary employees		
Robert E. Atkinson	MMD	Seal research, pelagic
Terrell C. Newby	--do--	Do.
Robert L. DeLong	--do--	Seal research, behavior
Richard O. Larson	--do--	Do.
Thomas R. Wilson	--do--	Seal research, physiology and medicine
Ronald G. Pletnikoff	Graduate, Southwestern Col. Winfield	Seal research, Mgmt. & Monitoring
Perfenia Pletnikoff, Jr.	Student, Alaska Methodist U.	Do.
Anthony Philemonoff	St. Paul Is. resident	Do.
Catherine P. Stepetin	--do--	Do.
Anna D. Melovidov	--do--	Do.
Cooperators		
Alvin W. Smith	NBRL	Seal research, physiology and medicine
Richard J. Brown	--do--	Do.
Robert Crawford	--do--	Do.
Henry Bray	--do--	Do.